NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
JAN S. GOUVEIA
RANDY GRUNE
JADINE URASAKI

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

IN REPLY REFER TO:
HWY-DD 2.7737

Mr. Gary Hooser, Interim Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment for
Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Hooser:

The State of Hawaii Department of Transportation (DOT) has reviewed the Draft Environmental Assessment (DEA) for the subject project and anticipates a Finding of No Significant Impact. The DEA has been prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Hawaii Administrative Rules. Please publish notice of this DEA in the February 23, 2011 issue of OEQC's *The Environmental Notice*.

We have enclosed one (1) each the following items:

- Hardcopy of the OEQC publication form and DEA; and
- CD including the DEA and OEQC publication form in pdf format.

Please contact Ms. Li Nah Okita of our department at 692 7581, Highways, Design Section, Design Branch, and reference HWY-DD 2.7737 as noted above, or email me at li.nah.okita@hawaii.gov if you have any questions.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Attachments

c: Mr. Earl Matsukawa, Wilson Okamoto Corporation

DRAFT ENVIRONMENTAL ASSESSMENT

WAIEHU BEACH ROAD, REHABILITATION OF IAO STREAM BRIDGE

Prepared By:

WILSON OKAMOTO
CORPORATION

Prepared For:

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FEBRUARY 2011

Draft Environmental Assessment

Waiehu Beach Road, Rehabilitation of Iao Stream Bridge

District of Wailuku, Maui, Hawaii

Agency Job No. BR-STP-3400(5)

Prepared For:

State of Hawaii
Department of Transportation
Highway Divisions

Prepared By:

Wilson Okamoto Corporation
Engineers and Planners
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOA Job No. 7213-01

February 2011

TABLE OF CONTENTS

Page

PREFACE ..... **V**

SUMMARY ..... **VII**

1. INTRODUCTION **1-1**

1.1 Project Background 1-1
1.2 Project Need 1-7
1.3 Project Description 1-7
1.4 Project Schedule and Cost 1-31

2. DESCRIPTION OF THE EXISTING ENVIRONMENT, PROJECT IMPACTS AND MITIGATION MEASURES **2-1**

2.1 Climate 2-1
2.2 Geology and Topography 2-1
2.3 Soils 2-2
2.4 Hydrology 2-5
2.5 Flood Hazard 2-6
2.6 Flora and Fauna Resources 2-7
2.7 Air Quality 2-10
2.8 Noise 2-11
2.9 Archaeological Resources 2-11
2.10 Population 2-14
2.11 Socio-Economic Characteristics 2-14
2.12 Police, Fire, and Ambulance Services 2-15
2.13 Medical Facilities 2-15
2.14 Schools 2-16
2.15 Recreational Resources 2-16
2.16 Solid Waste 2-17
2.17 Infrastructure and Utilities 2-18
2.17.1 Roadway System 2-18
2.17.2 Water System 2-18
2.17.3 Wastewater System 2-19
2.17.4 Drainage System 2-20
2.17.5 Electrical and Communication Systems 2-20
2.17.6 Gas Systems 2-21

3. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS **3-1**

3.1 State Land Use District 3-1
3.2 Chapter 344, State Environmental Policy 3-3
3.3 Hawaii Coastal Management Program 3-4
3.4 Special Management Area Designation 3-10

3.5 County General Plan 3-10
3.6 Wailuku-Kahului Community Plan 3-13
3.7 County of Maui Zoning 3-16
3.8 Maui Long-Range Land Transportation Plan 3-16

4. ALTERNATIVES TO THE PROPOSED ACTION 4-1

4.1 No Action Alternative 4-1
4.2 Alternative 1: Widen on Mauka Side of Existing Bridge 4-1
4.3 Alternative 2: Widen on Makai Side of Existing Bridge 4-1
4.4 Alternative 3: Alternative Alignment – Widened Bridge Approach and Transition to Exiting Roadway 4-1

5. REQUIRED PERMITS AND APPROVALS 5-1

6. ANTICIPATED DETERMINATION OF FONSI 6-1

7. CONSULTATION 7-1

7.1 Pre-Assessment Consultation 7-1
7.2 Draft EA Consultation 7-2

8. REFERENCES 8-1

LIST OF FIGURES

Page

Figure 1-1 Location Map 1-2
Figure 1-2 Surrounding Land Uses 1-6
Figure 1-3 General Roadway Plan 1-9
Figure 1-4 Roadway Plan Station 7+00 to 11+00 1-11
Figure 1-5 Roadway Plan Station 11+00 to 16+00 1-13
Figure 1-6 Roadway Plan Station 16+00 to 20+00 1-15
Figure 1-7 Typical Roadway Sections "A", "B", and "C" 1-17
Figure 1-8 Approximate Limits of Excavation, Along Waihee Approach 1-19
Figure 1-9 Bridge Layout Plan 1-21
Figure 1-10 Bridge Longitudinal Section 1-23
Figure 1-11 Proposed Extent of Improvements on Mauka Side of Abutment 1 1-25
Figure 1-12 Proposed Extent of Improvements on Makai Side of Abutment 1 1-26
Figure 1-13 Proposed Extent of Improvements on Mauka Side of Abutment 2 1-27
Figure 1-14 Proposed Extent of Improvements on Makai Side of Abutment 2 1-28

LIST OF FIGURES (CONTINUED)

Page

Figure 1-15 Proposed Extent of Improvements on Mauka Side of Piers 1 and 2 1-29
Figure 1-16 Proposed Extent of Improvements on Makai Side of Piers 1 and 2 1-30
Figure 2-1 Soils Map 2-3
Figure 2-2 Agricultural land of importance in Hawaii (ALISH) 2-4
Figure 2-3 Flood Insurance Rate Map 2-8
Figure 2-4 Tsunami Evacuation Zone 2-9
Figure 3-1 State Land Use District Map 3-2
Figure 3-2 Special Management Area 3-11
Figure 3-3 Maui County Zoning Map 3-17

LIST OF PHOTOS

Page

Photo 1 Waihee Approach to Existing Bridge 1-3
Photo 2 Wailuku Approach to Existing Bridge 1-3
Photo 3 Mauka Elevation of Existing Bridge 1-4
Photo 4 Makai Elevation of Existing Bridge 1-4
Photo 5 Existing Pedestrian Walkway on Mauka Side of Bridge 1-5
Photo 6 Wailuku Approach of Existing Pedestrian Walkway 1-5

LIST OF TABLES

Page

Table 2-1 Demographic Characteristics Comparison of Wailuku CDP with the County of Maui 2-13

LIST OF APPENDICES

Appendix A Stream Biological and Water Quality Survey for the Iao Stream Bridge Rehabilitation at Waiehu Beach Road, Maui. AECOS, Inc. February 2011.

Appendix B Archaeological Literature Review and Field Inspection for the Iao Bridge Widening and Sidewalk Improvements Project, Wailuku Ahupuaa, Wailuku District, Maui Island. Cultural Surveys Hawaii. March 2010.

Appendix C Pre-Consultation Comment and Response Letters

(This page intentionally left blank)

PREFACE

This Draft Environmental Assessment (EA) / Anticipated Finding of No Significant Impact (FONSI) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and Title 11, Chapter 200, Hawaii Administrative Rules (HAR), Department of Health, State of Hawaii. The State Department of Transportation, Highways Division is proposing the Waiehu Beach Road, Rehabilitation of Iao Stream Bridge project in the Wailuku District of the Island of Maui. The project requires the use of State lands and State funds. Therefore, the project is subject to the State environmental review process.

The proposed action assessed herein is for the widening of Waiehu Beach Road and the rehabilitation and widening of Iao Stream Bridge. The widening will provide multi-use road shoulders and a sidewalk with guardrails in the Wailuku District, Island of Maui, Hawaii. Improvements also include bringing the entire bridge into compliance with current seismic standards. It is anticipated that a Finding of No Significant Impact (FONSI) will be issued and filed with the State Office of Environmental Quality Control (OEQC) by the approving agency following public review of the Draft EA.

(This page intentionally left blank)

SUMMARY

Proposing Agency:	State of Hawaii Department of Transportation, Highway Division
Approving Agency:	State of Hawaii Department of Transportation, Highway Division
Location:	Wailuku, Maui, Hawaii
Tax Map Keys (TMKs):	None, State of Hawaii Roadway
Recorded Fee Owner:	State of Hawaii
Existing Use:	Public roadway with shoulders, and a bridge over Iao Stream carrying the roadway and a walkway on the mauka side.
State Land Use Classification:	Urban District
Community Plan Designation:	None
County Zoning Designation:	None
Proposed Action:	The proposed action involves widening the existing Iao Stream Bridge and a portion of Waiehu Beach Road to provide wider, multi-use road shoulders, and a sidewalk on the mauka side of the road. Improvements will also include bringing the entire bridge into compliance with current seismic standards
Impacts:	No significant impacts are anticipated from the construction and operation of the proposed project. Construction activities are anticipated to have short-term noise, traffic, and air quality impacts in the surrounding area. Construction noise and air quality impacts will be minimized by compliance with applicable State Department of Health Rules. No signification long-term environmental or community impacts in the vicinity of the project site are anticipated.
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Parties Consulted During Pre-Assessment:	<u>Federal Agencies</u> U.S. Army Corps of Engineers U.S. Fish and Wildlife Service U.S. Geological Survey

State Agencies
Department of Accounting and General Services
Department of Business, Economic Development and Tourism (DBEDT)
Department of Hawaiian Home Lands
Department of Health (DOH)
DOH, Clean Water Branch
DOH, Environmental Management Division
DOH, Office of Environmental Quality Control
Department of Land and Natural Resources (DLNR)
DLNR, Division of Boating & Ocean Recreation
DLNR, Commission on Water resources Management
DLNR, Division of Forestry and Wildlife
DLNR, Division of State Parks
DLNR, Engineering Division
DLNR, Land Division
DLNR, State Historic Preservation Division
DLNR, Maui/Lanai Island Burial Council
Office of Hawaiian Affairs
University of Hawaii Environmental Center

County of Maui Agencies
Civil Defense Agency
Cultural Resources Commission
Department of Fire and Public Safety
Department of Parks and Recreation
Department of Planning
Department of Public Works
Department of Transportation
Department of Water Supply
Police Department

Elected Officials
County Mayor
Council Members

1. INTRODUCTION

1.1 Project Background

The State of Hawaii (State), Department of Transportation (DOT), Highways Division is proposing to implement the Waiehu Beach Road, Rehabilitation of Iao Stream Bridge project, referred to herein as the "project" or "proposed project."

The project site is located approximately between milepost 1.50 to 1.65 on Waiehu Beach Road (Route 3400), connecting Central and West Maui. This section of Waiehu Beach Road lies upstream of Paukukalo Beach in the district of Wailuku, Island of Maui. The project extends 0.25-miles from its intersection with Kaae Road/Kuhio Place, over the existing Iao Stream Bridge, to its intersection with Nukuwai Place/Eha Street (see Figure 1-1). The project site is not identified by a specific tax map key (TMK) parcel.

Existing Uses: The existing Waiehu Beach Road is a two-lane, undivided highway and is classified as a Primary Rural Arterial. The existing roadway consists of two 11-foot lanes with 3-foot to 5-foot wide shoulders.

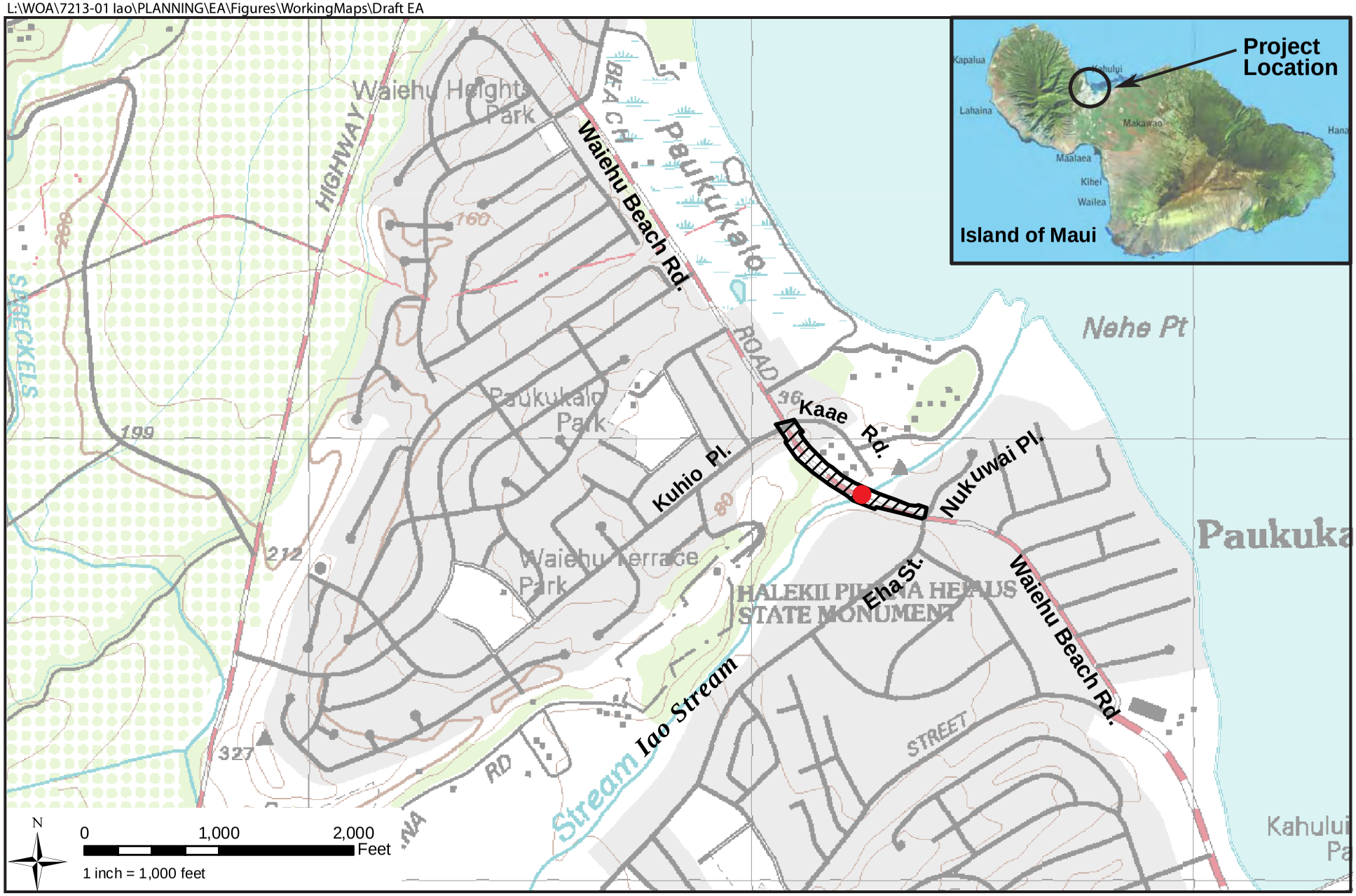
The existing Iao Stream Bridge is approximately 176-feet long and 39-feet wide. The bridge deck is approximately 20-feet above Iao Stream. The bridge is supported by five continuous longitudinal concrete beams lying over two solid wall type piers within the stream and abutment walls at either bank. Record drawings indicate that the bridge was constructed with two 12-foot wide travel lanes, 2-foot wide gutters at the edge of each travel lane, and two 4-foot wide sidewalks on each side of the roadway. The surfaces of the sidewalks are raised 9-inches above the bridge deck and a railing on the mauka side of the bridge was subsequently constructed to separate the sidewalk from the travel way. There is no railing or barrier on the makai side of the bridge (see Photographs 1 through 6). According to record drawings, the construction of the Iao Stream Bridge was completed in 1954.

The approaches to Iao Stream Bridge along Waiehu Beach Road vary in width and configuration. Currently, pedestrians and bicyclists share use of the roadway shoulders. The makai and mauka-Wailuku approach shoulders are approximately 5-feet wide and a metal beam guardrail separates the shoulders from the traffic lanes near the bridge.

The configuration of the Waiehu approach is similar to the Wailuku approach at locations near the bridge. At the mauka-Waiehu approach, a metal beam guardrail continues the function of the concrete railing on the bridge, separating the raised sidewalk from the travel way. A metal beam guardrail is also present on the makai-Waiehu approach shoulder.

Surrounding Uses: The project site is located southwest of the central Kahului area. Nearby land uses include a variety of residential, commercial/business, civic, and recreational land uses (see Figure 1-2).

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

Project Site

Iao Stream Bridge

FIGURE 1-1
LOCATION MAP

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

Photo 1: Waihee Approach to Existing Bridge

Photo 2: Wailuku Approach to Existing Bridge

PHOTO 1 AND 2
EXISTING IAO STREAM BRIDGE PHOTOGRAPHS

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

Photo 3: Mauka Elevation of Existing Bridge

Photo 4: Makai Elevation of Existing Bridge

PHOTO 3 AND 4
EXISTING IAO STREAM BRIDGE PHOTOGRAPHS

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

Photo 5: Existing Pedestrian Walkway on Mauka Side of Bridge

Photo 6: Wailuku Approach of Existing Pedestrian Walkway

PHOTO 5 AND 6
EXISTING IAO STREAM BRIDGE PHOTOGRAPHS

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA

LEGEND

Project Site

FIGURE 1-2
SURROUNDING LAND USES

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

The residential communities located within the project vicinity are comprised single-family homes that includes Waiehu Heights located to the northeast of the project site, the Paukukalo Residential Lots to the east, Waiehu Terrace to the southeast, and the Wailuku Beach Lots to the west.

Commercial and businesses located in the vicinity of the project site include a McDonalds restaurant located directly to the west of the project site as well as the Wailuku Industrial Park located to the south.

Recreational uses situated around the proposed project site include Paukukalo Park located to the northeast, Waiehu Terrace Park to the east, and Papohaku Park to the south. Halekii-Pihana Heiau State Monument is a 10.2 acre park located approximately 0.2 miles to the south of the project site. The park includes two historical heiaus that were rededicated as war temples by Kahekili, Maui's last ruling chief.

1.2 Project Need

The State of Hawaii Department of Transportation has identified various deficiencies for the Iao Stream Bridge. These deficiencies extend to the bridge approaches and adjacent roadways. The deficiencies in the existing conditions include:

- Inadequate width of shoulders on the bridge and approaches for combined use by motorists, bicyclists, and pedestrians;
- Inadequate separation between pedestrians from the traffic lanes;
- Inadequate width of sidewalks for combined pedestrian and bicycle use;
- Inadequate width of sidewalk and non-conformance to accessibility standards; and
- Nonconforming end treatment for bridge railing and metal beam guardrails.

Rehabilitation is also needed due to deterioration in sections of the roadway as well as the roadway pavement.

1.3 Project Description

The proposed project involves widening a 0.25 mile section of Waiehu Beach Road and the existing Iao Stream Bridge. The proposed improvements include the following (see figures 1-3 to 1-7):

- The existing Iao Stream Bridge, which is 38.50-feet wide, will be widened on both sides. The makai side will be widened by 3.75-feet and the mauka side will be widened by 8.25-feet. Thus, the finished width of the bridge will be 50.50-feet.
- The approach roadway shoulders will be widened on both sides. The makai side of the road will have a consistent 10-foot wide shoulder while the mauka side of the road will typically have an 8-foot wide shoulder that terminates as the shoulder gives way to a right turn lane onto Eha Street. The shoulders are multi-use and will accommodate bicycles and emergency pullout for vehicles. The makai shoulder will also accommodate pedestrians.
- A separate 5-foot wide sidewalk for pedestrians will be provided on the mauka side of the road.

- The existing guardrails will be replaced with new guardrails with end connections, redesigned to comply with current standards. The guardrail on the mauka side of the road will separate the roadway shoulder from the proposed sidewalk.
- The bridge railings will be 42-inch high concrete railings. In addition, a separate 42-inch high combined vehicle/pedestrian/bike concrete railing will be installed between the sidewalk and the road shoulder on the mauka side of the bridge.
- The improvements to Iao Bridge will bring the entire bridge into compliance with current seismic standards

Construction for the widening of Waiehu Beach Road to accommodate wider roadway shoulders on both sides and a separate sidewalk on the mauka side will involve relatively minor amounts of cutting and filling. This will primarily involve removing talus material and soils that have accumulated at the base of large cuts through the dune system when the Waiehu Beach Road was constructed. Excavation work on the mauka side of the roadway will involve removal of talus material and soil from a 2-foot wide swath along the existing roadway shoulder (see Figure 1-8). On the makai side of the roadway, only the toe of the adjacent dune system will be excavated. Excavation on both sides will be less than a foot below existing conditions.

Construction for the widening of Iao Bridge will involve the following (see Figures 1-9 and 1-10):

- Demolishing the existing bridge overhangs and railings on both sides of the bridge to allow for the deck extensions.
- Extending the bridge abutments (the walls on either side of the Iao Stream channel that support the bridge) on both the mauka and makai sides of the existing bridge. This will require demolishing sections of the reinforced concrete channel walls and bottom, at the four corners of the bridge (see Figures 11- to 1-14) Once the concrete at the bottom of the channels is removed, the ground beneath the new abutment extensions will need to be excavated to construct the concrete footings that will support the extended abutments. The concrete walls of the channel will also need to be removed and the retained earth excavated to accommodate the extended abutments. After the abutment extensions have been constructed with reinforced concrete, the remaining openings in the channel walls and bottom will be reconstructed to tie-in with the extended abutments.
- Extending the existing two piers on both the mauka and makai sides of the bridge. This will require demolishing sections of the channel bottom, and excavating the ground beneath the pier extensions for the footings supporting the extensions (see Figure 1-15 and 1-16). After the footings and pier extensions above them are constructed, the remaining openings in the channel bottom will be reconstructed to tie in with the extensions.
- Constructing the bridge super structure extension (over which the widened bridge deck carrying the road will be constructed. The super structure will consist of new girders secured atop the abutments and center pier on either side of the bridge.
- Constructing the bridge deck extensions over the new girders. The new deck extensions will tie in with the existing bridge deck. The roadway improvements described previously will be constructed over the widened bridge deck.

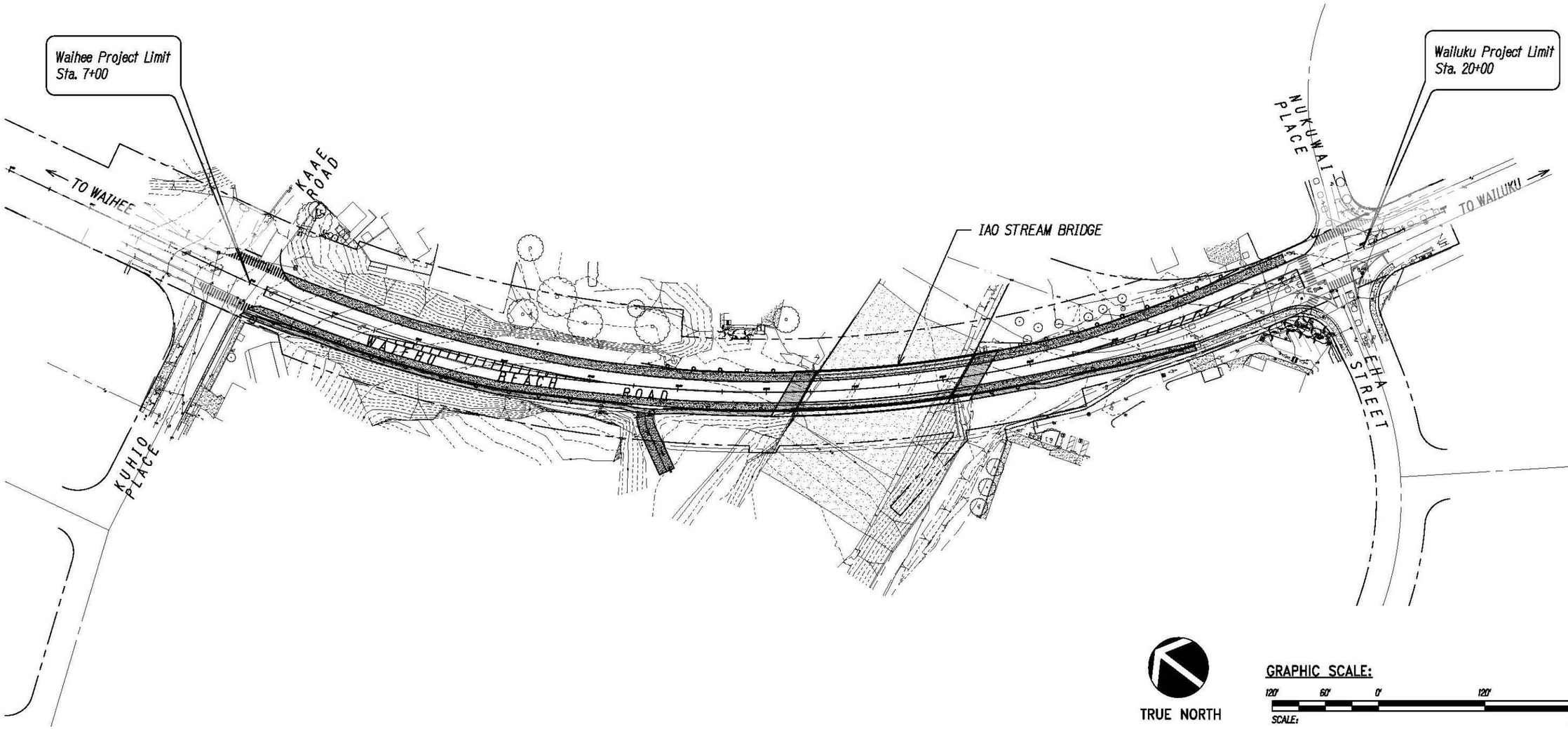


FIGURE 1-3
GENERAL ROADWAY PLAN

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

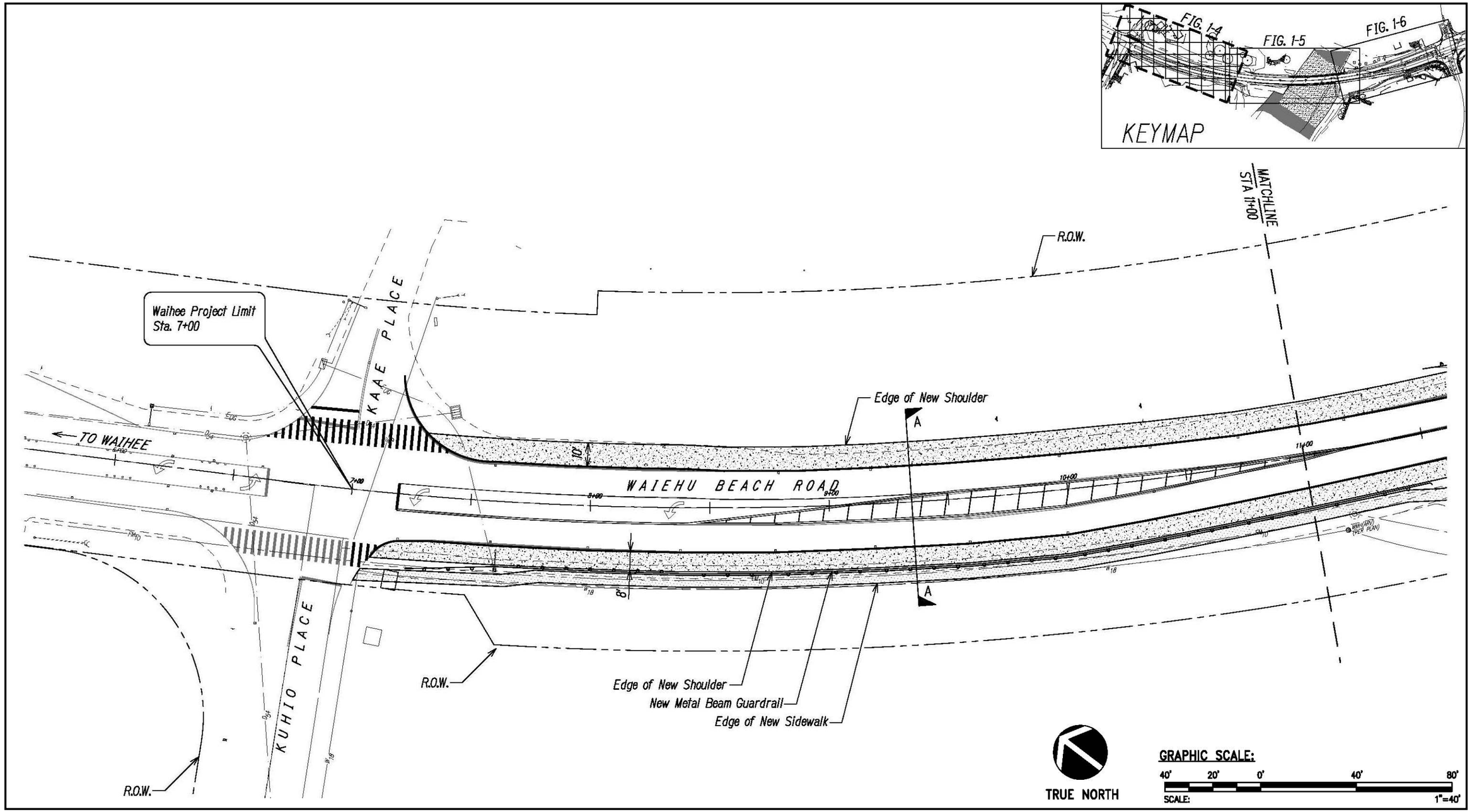


FIGURE 1-4
ROADWAY PLAN STATION 7+00 TO 11+00

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

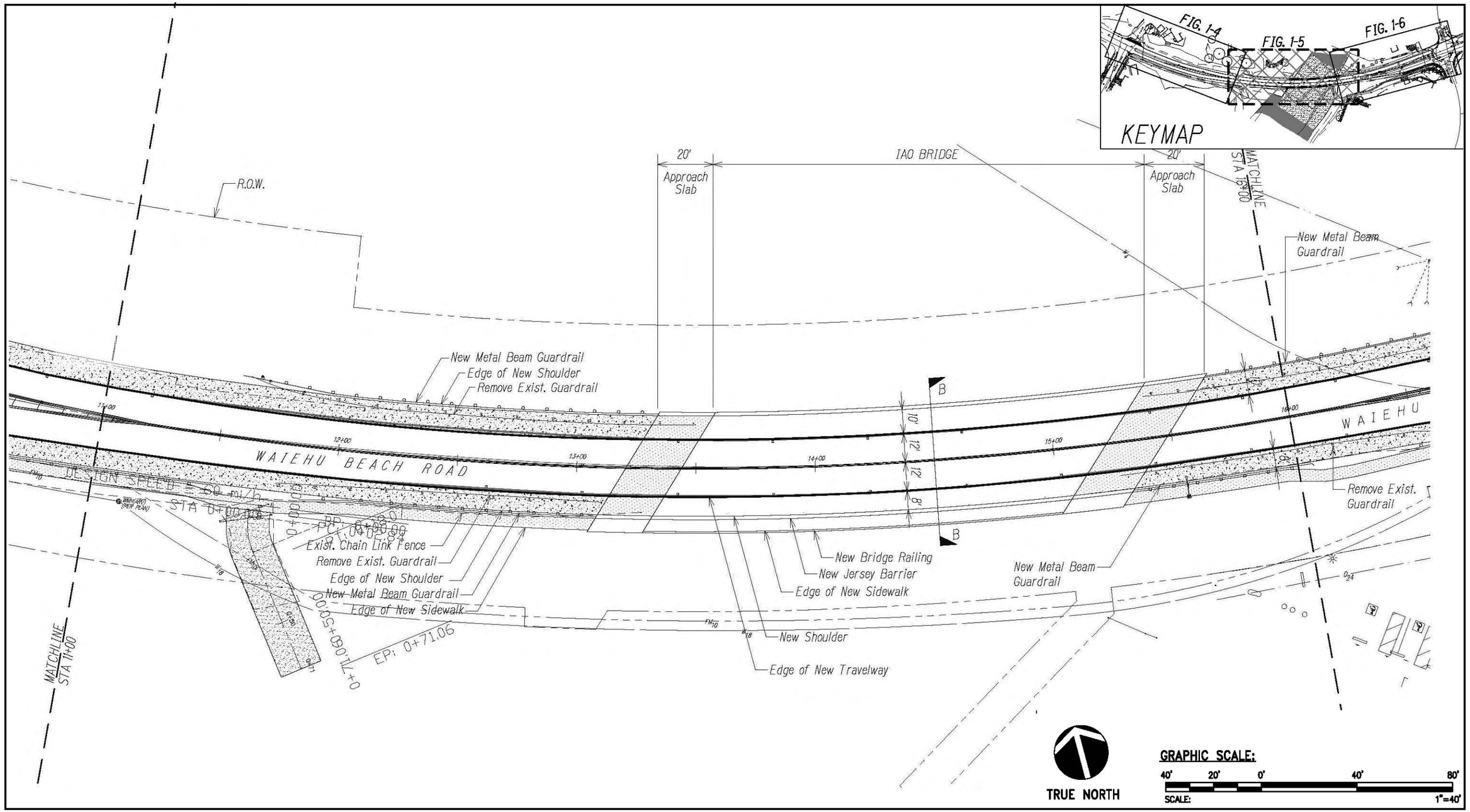


FIGURE 1-5
ROADWAY PLAN STATION 11+00 TO 16+00

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

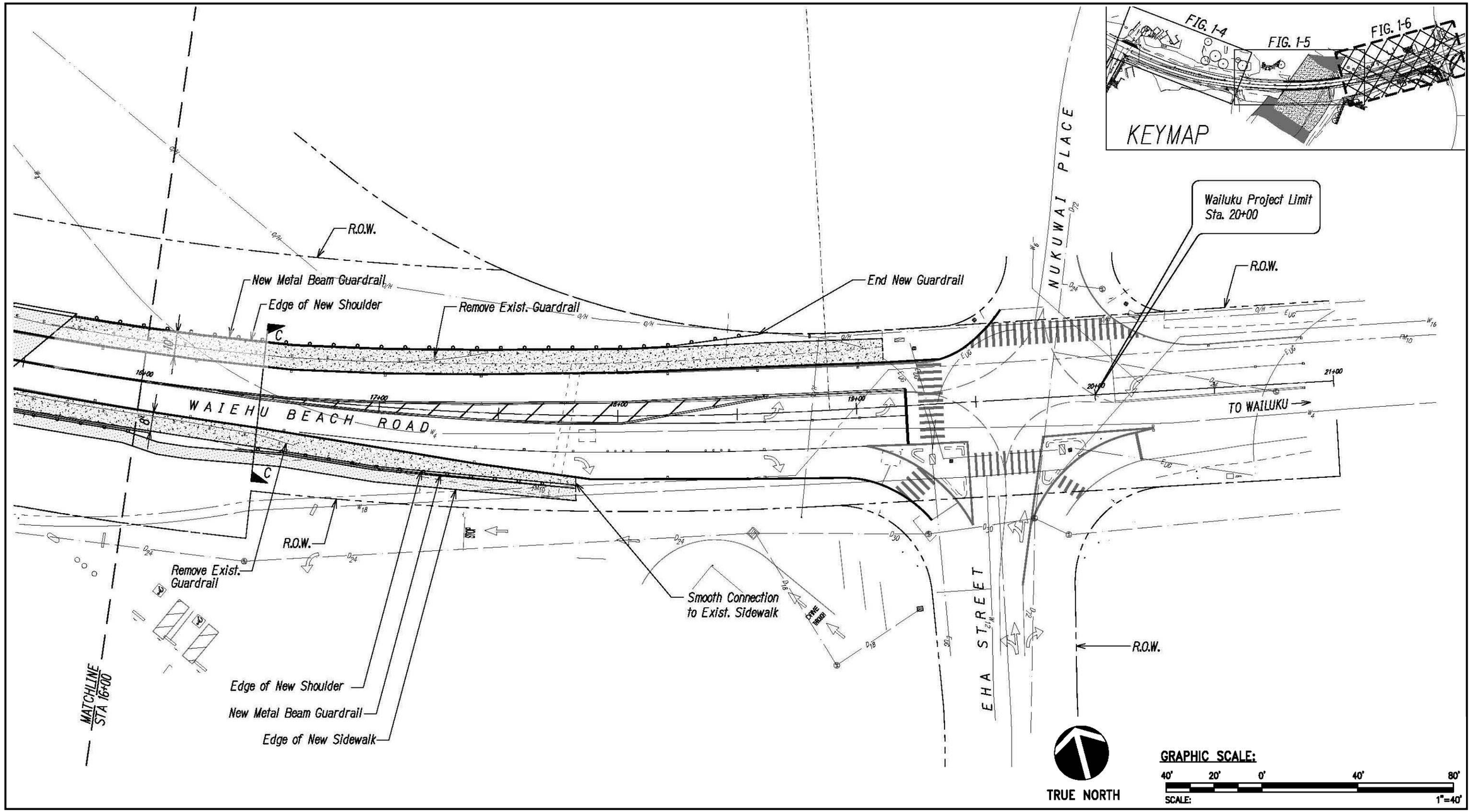


FIGURE 1-6
ROADWAY PLAN STATION 16+00 TO 20+00

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

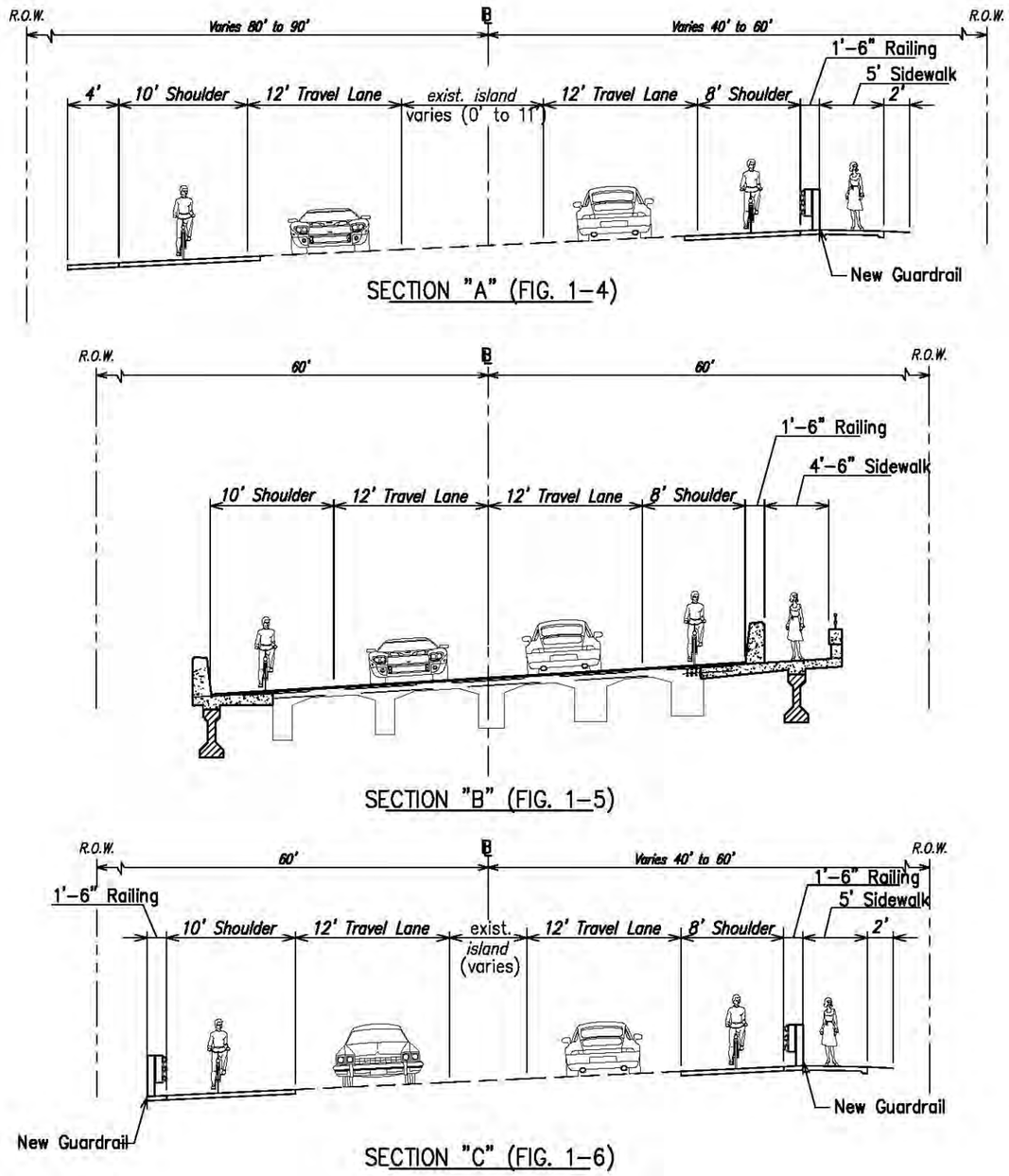
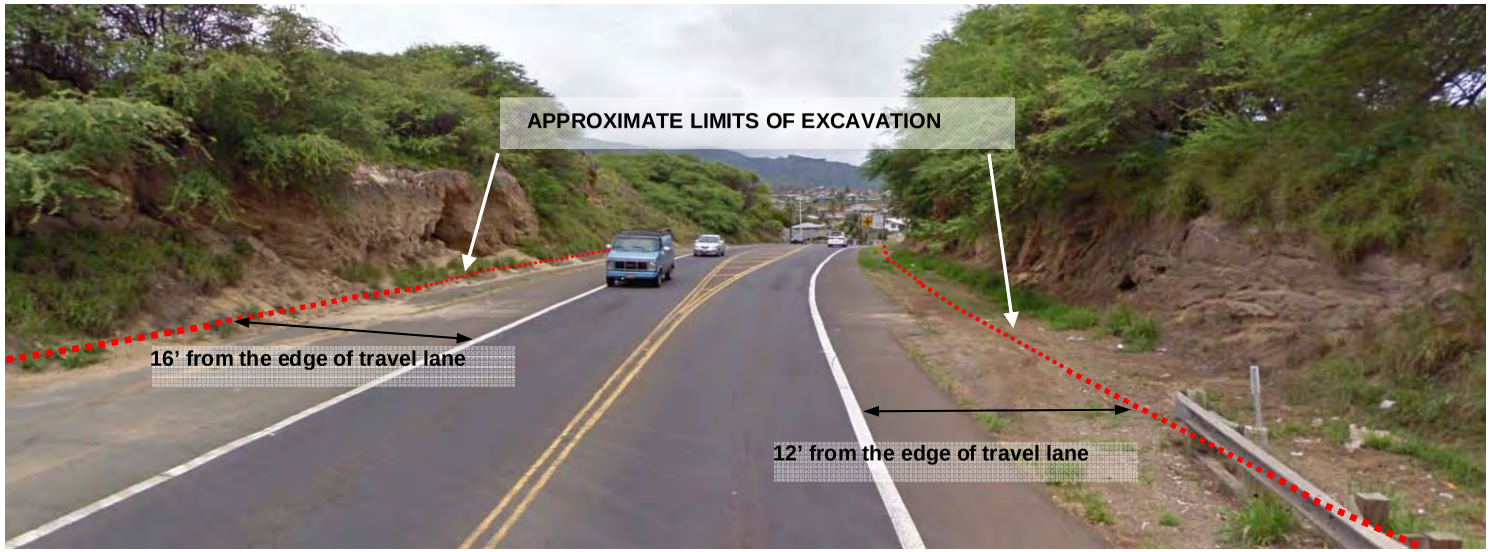


FIGURE 1-7
TYPICAL ROADWAY SECTIONS "A", "B" AND "C"

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

VIEW TOWARDS WAIHEE



VIEW TOWARDS WAILUKU

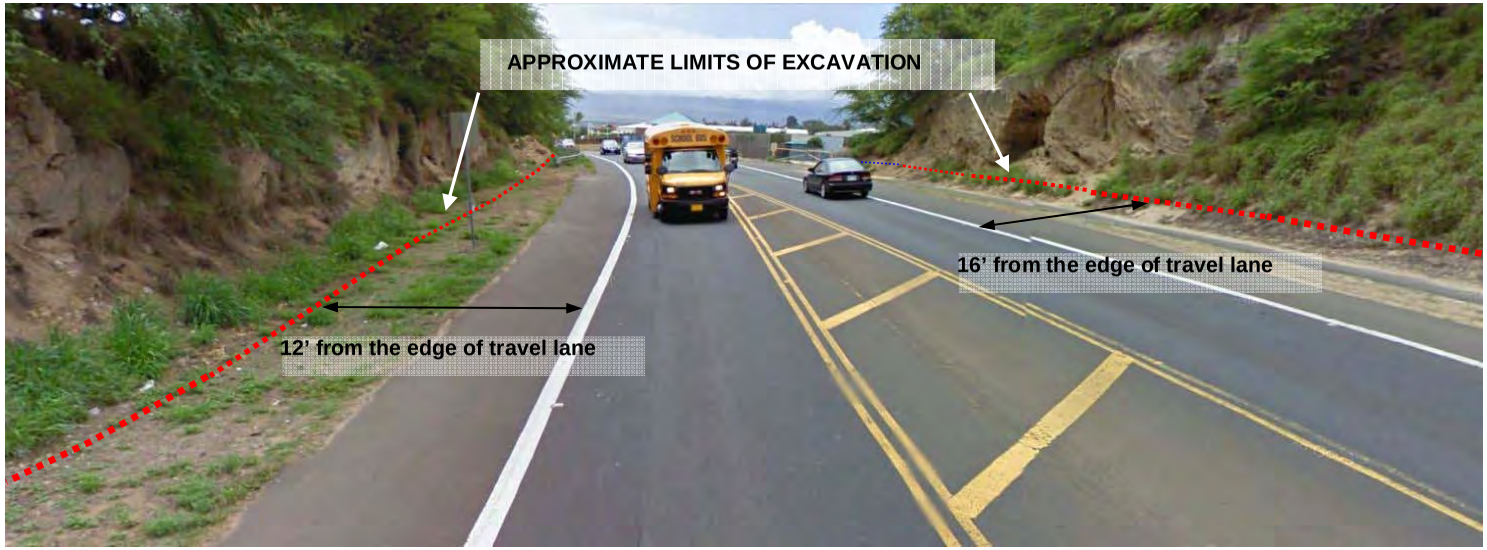


FIGURE 1-8
APPROXIMATE LIMITS OF EXCAVATION, ALONG WAIHEE APPROACH

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

(This page intentionally left blank)

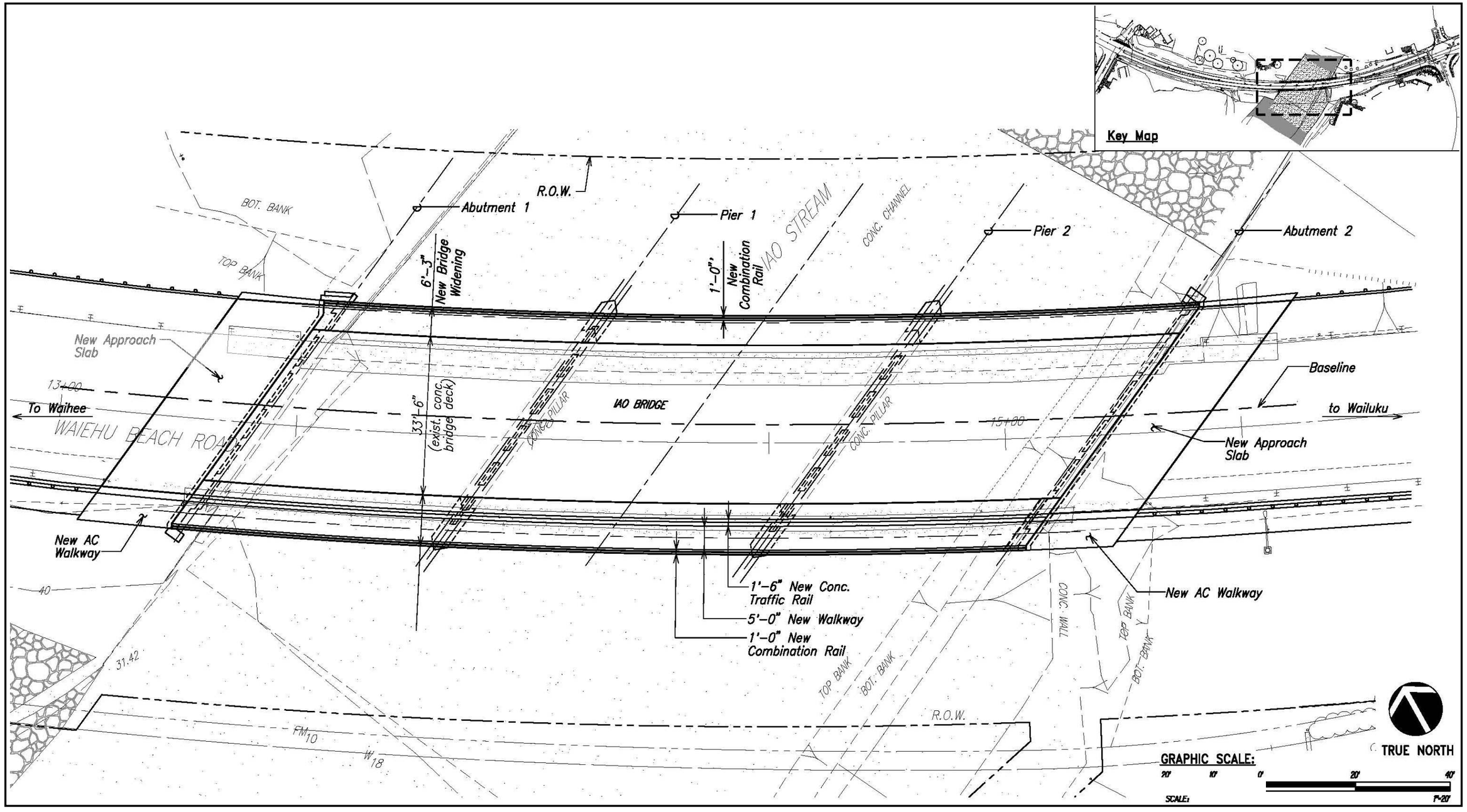
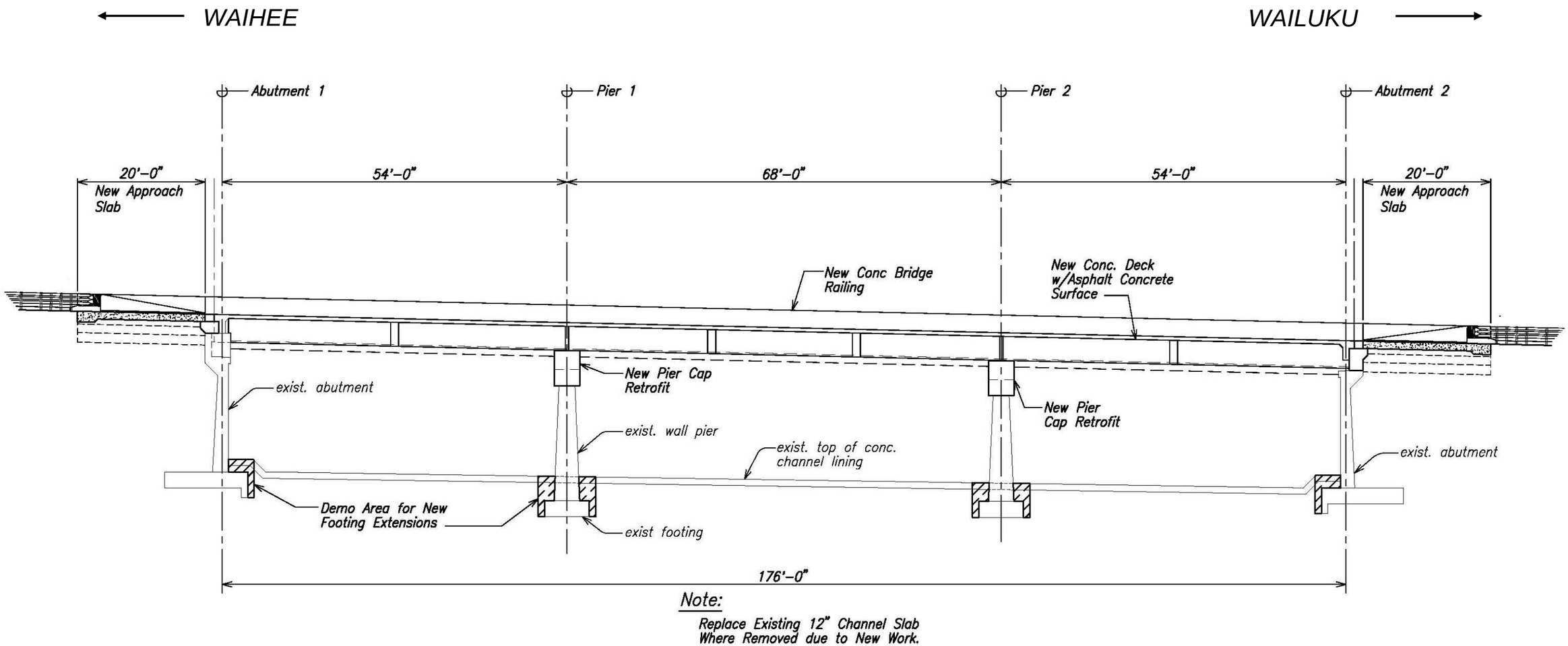


FIGURE 1-9
BRIDGE LAYOUT PLAN

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division



Note:

Replace Existing 12" Channel Slab Where Removed due to New Work.

GRAPHIC SCALE:

16' 0 16' 32'

SCALE: 1/16"=1'-0"

WILSON OKAMOTO CORPORATION

FIGURE 1-10
BRIDGE LONGITUDINAL SECTION ALONG BASELINE

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII

LEGEND

Approximate Area of Abutment
To be Modified.

FIGURE 1-11
PROPOSED EXTENT OF IMPROVEMENTS ON MAUKA SIDE OF ABUTMENT 1

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

LEGEND

Approximate Area of Abutment
To be Modified.

FIGURE 1-12
PROPOSED EXTENT OF IMPROVEMENTS ON MAKAI SIDE OF ABUTMENT 1

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

LEGEND

Approximate Area Abutment
To be Modified.

FIGURE 1-13
PROPOSED EXTENT OF IMPROVEMENTS ON MAUKA SIDE OF ABUTMENT 2

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

LEGEND

Approximate Area of Abutment
To be Modified.

FIGURE 1-14
PROPOSED EXTENT OF IMPROVEMENT ON MAKAI SIDE OF ABUTMENT 2

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

* Piers to be extended by approximately 11 feet.

LEGEND

Approximate Area of Stream Channel
To be Saw Cut

FIGURE 1-15
PROPOSED EXTENT OF IMPROVEMENTS ON MAUKA SIDE OF PIERS 1 AND 2

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

* Piers to be extended by approximately 8 feet.

LEGEND

Approximate Area of Stream Channel
To be Saw Cut

FIGURE 1-16
PROPOSED EXTENT OF IMPROVEMENTS ON MAKAI SIDE OF PIERS 1 AND 2

WAIEHU BEACH ROAD
REHABILITATION OF IAO BRIDGE
State Department of Transportation, Highways Division

1.4 Project Schedule and Cost

The estimated construction cost for the proposed project is approximately $6.5 million. Construction of the project is anticipated to begin at the end of 2011, with completion approximately one year thereafter.

(This page intentionally left blank)

2. DESCRIPTION OF THE EXISTING ENVIRONMENT, PROJECT IMPACTS AND MITIGATION MEASURES

2.1 Climate

The proposed project is situated within the Wailuku District, which is located on the Central Maui where the weather is typically sunny and dry. The area is characterized by abundant sunshine, persistent tradewinds, relatively uniform temperatures, moderate humidity, and infrequent storms throughout the year.

Wailuku area experiences a typical semi-tropical climate, with average monthly temperatures ranging from 67.7 to 81.7 degrees Fahrenheit. Average monthly precipitation is 2.57 inches. The prevailing winds are the northeasterly tradewinds which generally vary from between 13 to 24 miles per hour.

2.2 Geology and Topography

The island of Maui was formed by two large dormant shield volcanoes, East Maui (Haleakala) and West Maui. The broad gently sloping plain connecting the two volcanoes, the Maui isthmus, was formed when lavas of Haleakala banked against the already existing West Maui volcano.

The volcanic rocks of the older West Maui Volcano have been divided into three series. The Wailuku Volcanic Series is the oldest, and is comprised of basaltic lava flows and associated pyroclastic and intrusive rock that built the major shield volcano. The lavas of the Wailuku Volcanic Series generally consist of thinly bedded aa and pahoehoe lava flows of tholeiite, olivine tholeiite, and oceanite. Overlying this unit are lavas of the Honolua Volcanic Series that are mostly aa flows of trachyte and benmoreite, and a little hawaiite. The Honolua eruptions were followed by a long period of erosion until interrupted by a brief interval of renewed volcanism which produced the Lahaina Volcanic Series. These lavas generally consist of olivine-rich basalt and nepheline basanite.

Stream erosion of the West Maui Volcano produced broad alluvial fans that fringe the eastern and southwestern sides of the mountain. Those along the eastern side are partly due to loss of water from the streams to the permeable lavas of Haleakala that have built the Maui isthmus. Lithified calcareous sand dunes rest on the alluvial fans near the shore between Kahului and Waihee, and extend inland almost across the western edge of the Maui isthmus. The dunes were formed by wind blowing sand inland from wide beached exposed during a stand of the sea lower than the present sea level. The project site is located within the northern portion of the Maui isthmus and east of the West Maui Volcano.

Elevations of the existing roadway grade range from 31 to 47 feet above Mean Sea Level (MSL).

<u>Impacts and Mitigation Measures</u>

In the short- and long-term, no significant impacts on geology or overall topography are anticipated during construction and operation of the proposed project. Construction of the proposed project will require cut and fill activities in approach roads for grading and excavations for the new bridge foundation. None of the cuts will

involve further excavation into the dune system on the Waiehu side of the bridge. Grading within the project site will slightly alter the existing topography, however, graded and excavated areas will be backfilled and paved over when the construction is completed.

2.3 Soils

According to the U.S Department of Agriculture, Natural Resources Conservation Service, there are two soil classifications underlying the project site, the Jaucas series and Puuone series (see Figure 2-1). The following soil types are found in the project site:

- Jaucas sand (JaC), 0 to 15% slopes, consists of very deep, excessively drained, very rapidly permeable soils existing where the typical climate is tropical semiarid. They formed in sand-sized fragments of coral and sea shells located on coastal beaches above high tide. Typical profile of this series consists of sand in 0 to 60 inch depth. Competing soil series is Puuone series, which have a cemented sand layer.

- Puuone sand (PZUE), 7 to 30% slopes, consists of excessively drained soils that are formed from coral seashells. Typical profile of this soil series consists of sand in 0 to 20 inch depth, and cemented sand material in 20 to 40 inch depth. The competing soil series is Jaucus soils, which are uniform sand without cementation.

The State of Hawaii Department of Agriculture classification system "Agricultural Lands of Importance to the State of Hawaii" (ALISH) classifies lands into four agricultural types, Prime Lands, Unique Lands, Other Lands, and Unclassified. According to the ALISH, the project site is Unclassified, which commonly indicates that the lands are not suitable for intensive agriculture (see Figure 2-2).

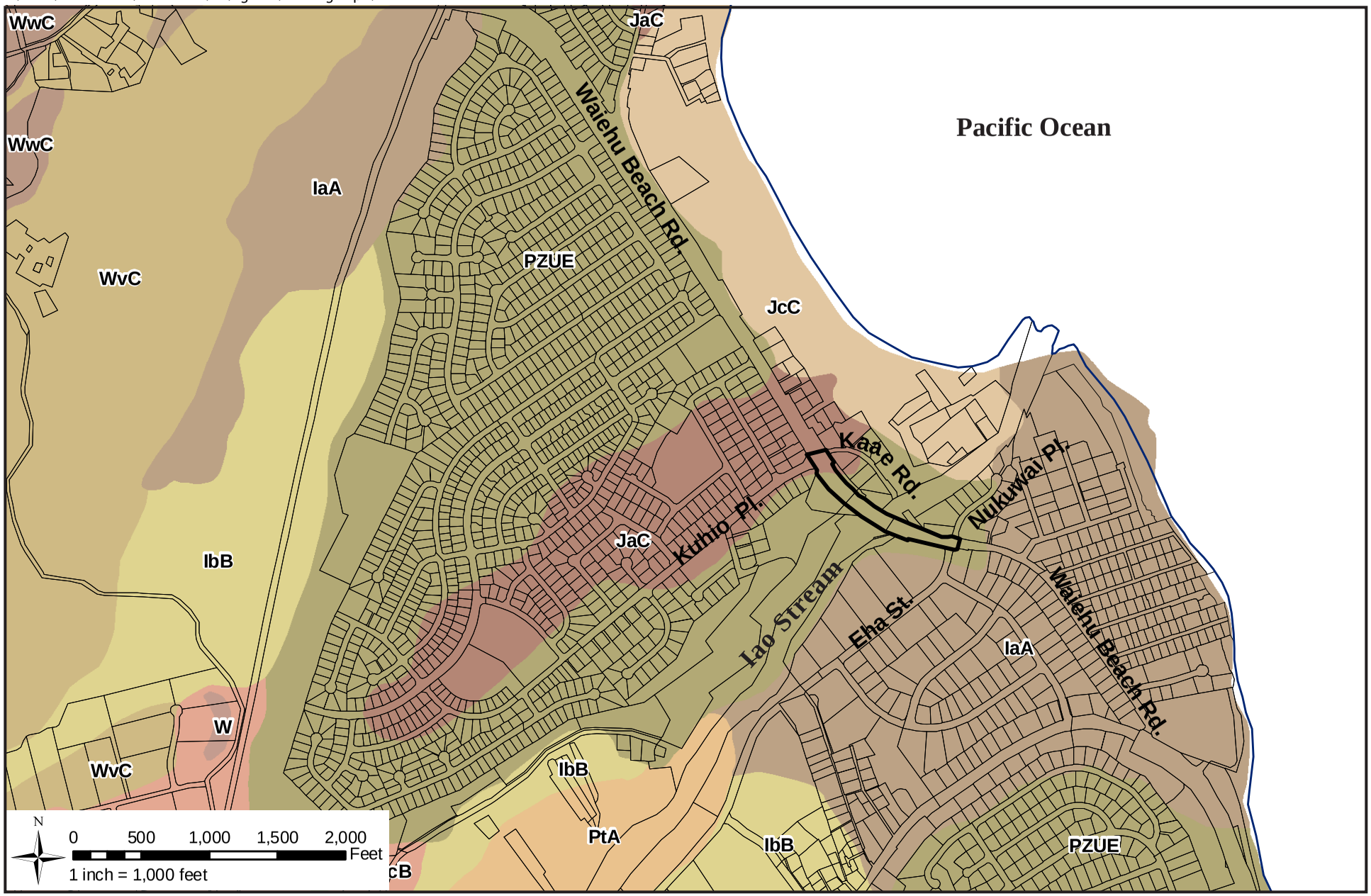
The Detailed Land Classification – Island of Maui, published by the University of Hawaii Land Study Bureau (LSB), evaluates the quality or productive capacity of certain lands on the island using a five-class productivity rating system, with "A" representing the class of the highest productivity and "E" the lowest. Under this system, the entire proposed project site and adjacent lands are assigned "Not Classified."

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on soils are anticipated within the project site and adjacent areas. The project site is currently used as a State Highway (Route 340). The surrounding lands are mainly used for residential, industrial, commercial, and parks/preserves, and do not include agricultural use. Construction and operation of the proposed project will not affect soils and agricultural production in the project vicinity.

Excavation and grading activities associated with construction of the proposed project will be regulated by the County's grading ordinances and the National Pollutant Discharge Elimination System (NPDES) permit requirement administered by the State Department of Health (DOH).

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

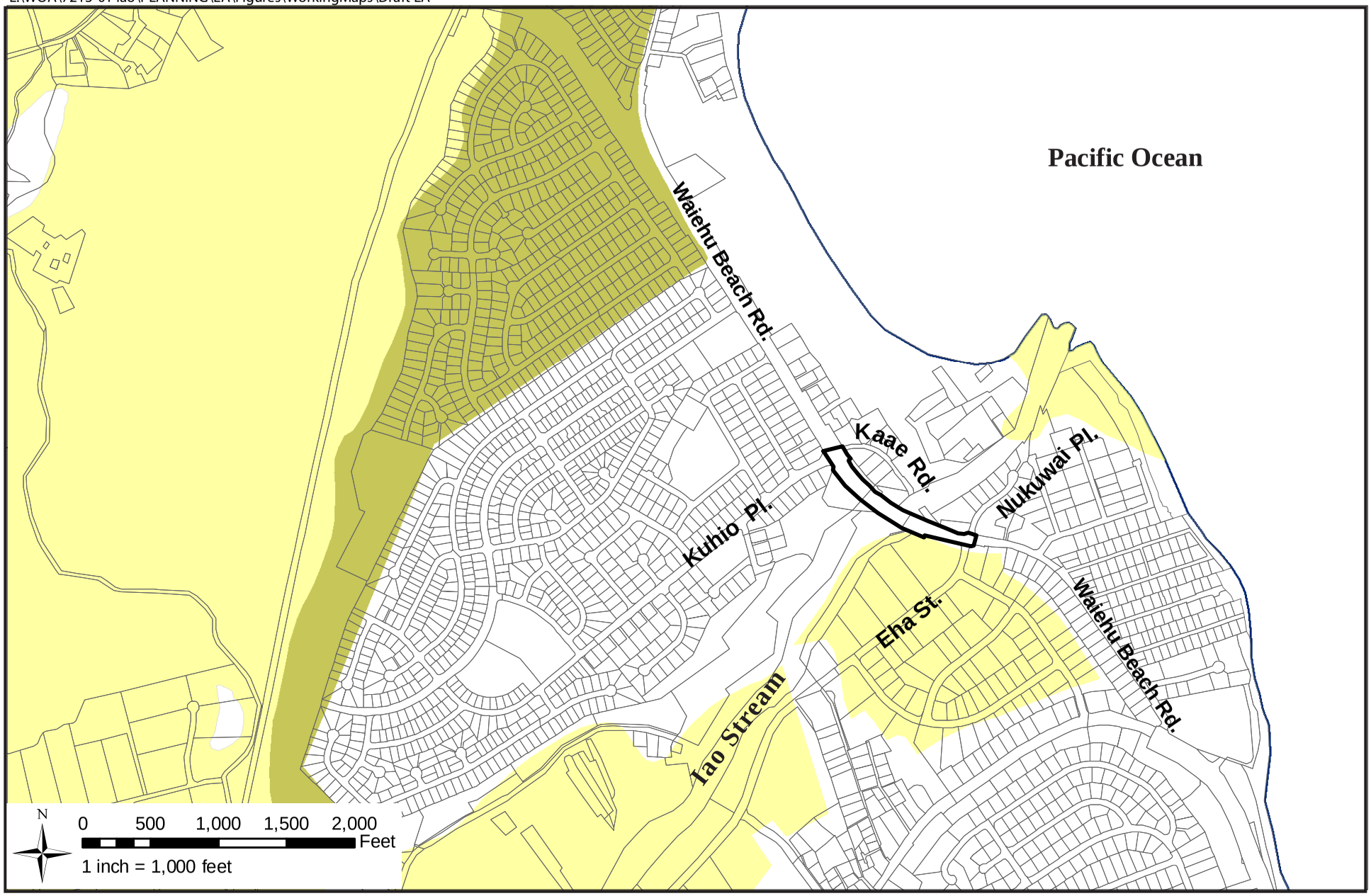
- Project Site
- JaC : Jaucas Sand, 0 to 15% slopes
- PZUE : Puuone Sand, 7 to 30% slopes
- Maui Coastline

FIGURE 2-1
SOILS MAP

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



LEGEND

- Project Site
- Not Classified/No Data
- Prime Lands
- Unique Lands
- Other lands

FIGURE 2-2
AGRICULTURAL LAND IMPORTANCE IN HAWAII (ALISH)

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

A NPDES General Permit for Storm Water Associated with Construction will be required for construction of the proposed project as the area of soil disturbance from activities such as clearing and grubbing, grading and stockpiling will exceed one acre. In conjunction with the NPDES permit, a Best Management Practices (BMP) plan will be prepared for construction activities within the project site. Erosion and sediment control mitigative measures that are typically included in the BMP plan are appropriately stockpiling materials on-site to prevent runoff, covering or stabilizing topsoil stockpiles, use of sediment basins and sediment traps, and establishing re-vegetation or landscaping as early as possible on completed areas.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, is required for "any activity including, but not limited to, the construction or operation of facilities, which may result in any "discharge" into navigable waters". This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Following construction, exposed soils at the project site will have been built over, paved over, or re-vegetated to control erosion.

2.4 Hydrology

The State Department of Land and Natural Resources (DNLR), Commission on Water Resource Management (CWRM) has established surface water hydrologic units and coding system for surface water resource management. The proposed project is located within the Iao surface water hydrologic unit (6024).

The project site traverses the lower portion of Iao Stream, a perennial stream which is located on the windward side of the West Maui Mountains. Iao Stream originates in the upper portion of Iao Valley and flows east to Kahului Bay. The stream is part of the Na Wai Eha Surface Water Management Area which includes four streams in the Wailuku District: Waikapu Stream; Waiehu Stream; Waihee Stream; and, Iao Stream. Any withdrawal, diversion, impoundment, or consumptive use of surface water in the Na Wai Eha Surface Water Management Area will require a Surface Water Use Permit from the CWRM.

A Stream Biological and Water Quality Survey for the project site was conducted by AECOS Inc. in December 2009, to ascertain aquatic resources and assess water quality for the proposed project The AECOS biologists surveyed a 1.5-mile segment of Iao Stream to identify any aquatic biota present and to measure water quality within the project area. The survey area extended from above the Imi Kala Street footbridge, downstream to the stream's outlet at Nehe Point. The Biological and Water Quality Survey is included as Appendix A.

Based on the Water Quality Survey, it was determined that waters during a fresh water flow have depressed oxygen concentrations and elevated nitrate-nitrite concentration levels relative to State of Hawaii water quality criteria. Iao Stream is on the Hawaii DOH, 2006 list of impaired waters in Hawaii, prepared under the Clean Water Act. This listing states that the stream does not meet the state water quality standards for certain parameters, specifically turbidity and trash, based solely on a visual assessment.

The State DNLR, CWRM has also established groundwater hydrologic units and coding system for groundwater resource management. The proposed project is located within the Iao groundwater hydrologic subunit (aquifer system code 60120) of Wailuku ground water hydrologic unit (aquifer system code 601) which has an estimated sustainable yield of 20 million gallons per day (mgd), while the entire island of Maui is estimated to have a sustainable yield of 427 mgd.

Impact and Mitigation Measures

No long-term significant impacts to surface water or groundwater within the project site are anticipated with the construction of the proposed project.

In the short-term, potential water quality impacts to surface and near shore coastal waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Associated with Construction Activity, administered by the State Department of Health (DOH), will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural Best Management Practices (BMPs) such as silt fences and minimizing time of exposure between construction and re-vegetation or paving.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, is required for “any activity including, but not limited to, the construction or operation of facilities, which may result in any “discharge” into navigable waters”. This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Construction activities are not likely to introduce to, nor release from the soil any materials which could adversely affect groundwater. Construction material wastes will be appropriately disposed of and must also be prevented from leaching into receiving bodies of water. Dewatering activity is not anticipated for this project.

2.5 Flood Hazard

According to the Flood Insurance Rate Map (FIRM), Map number 15000300383E and 15000300384E, dated Sept 25, 2009, the project site straddles two flood zones (see Figure 2-3). The Waiehu approach to Iao Stream Bridge lies within “Zone X, other areas” and is characterized as “areas determined to be outside the 0.2% annual chance floodplain.” The Wailuku approach lies within “Zone X, other flood areas” and is characterized as “areas of 0.2% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected be levees from 1% annual chance flood.” Iao Stream Bridge lies over “Zone AE” which is characterized as a “special flood hazard area subject to inundation by the 1% annual chance flood.” Zone AE is also a “floodway,” which is “the channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood height.” The 1% annual flood is also commonly referred to as the 100-year flood or the base flood. The base flood elevation for the Iao Stream Bridge area have

been determined to be between approximately 25 to 29 feet while the bottom of the bridge is at elevation 39 feet, well above the base flood.

The entire project site, makai side of the Waiehu Beach Road, is within the Tsunami Evacuation Zone, as determined by County and State Civil Defense agencies (see Figure 2-4). The Tsunami Evacuation Zone map shows estimated inundation limits for all coastal areas in Hawaii using available historical data. The evacuation zone is an advisory designation meant to foster tsunami preparedness. It does not impose any construction restrictions on proposed development.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on flood hazards in the project area are anticipated.

Construction activities within the respective flood hazard districts will be conducted in accordance with regulations set forth in Section 19.62.060, Maui County Code. Before construction of any development begins within any flood hazard area, flood-related erosion hazard area, or mudslide area, a special flood hazard area development permit shall be obtained from the director of the Department of Planning.

The project will comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), as the project is within a Special Flood Hazard Area.

Studies will be conducted to ensure that any proposed encroachment in the floodway will not result in any increase in the regulatory flood elevations during an occurrence of the regulatory flood. The studies will identify a certified flood elevation and evaluate flooding impacts, including the potential impact of proposed structures on flood elevations.

2.6 Flora and Fauna Resources

A Stream Biological and Water Quality Survey for the project site was conducted by AECOS Inc. in December 2009, to ascertain aquatic resources and assess water quality for the proposed project (refer to Appendix A). The AECOS biologists surveyed a 1.5-mile segment of Iao Stream to identify any aquatic biota present and to measure water quality within the project area. The survey area extended from above the Imi Kala Street footbridge, downstream to the stream's outlet at Nehe Point. The biological findings are summarized below.

Flora: At the bridge project site, stream bank vegetation is sparse upstream and absent downstream of the project. This is due to the nature of the banks being concrete lined. Vegetation upstream includes Guinea grass (*Panicum maximum*), Bermuda grass (*Cyndon dactylon*), wire grass (Eleusine indica), fingergreass (*Chlris barbata*), graceful spurge (*Chamaesyce hypericifolia*), spiny amaranth (*Amaranthus spinosus*), batflower (*Tacca leontopetaloides*), and wedelia (*Sphagneticola trilobata*).

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

Source: Flood Insurance Rate Map, Federal Emergency Management Agency
Panel#: 15000300383E and 15000300384E

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

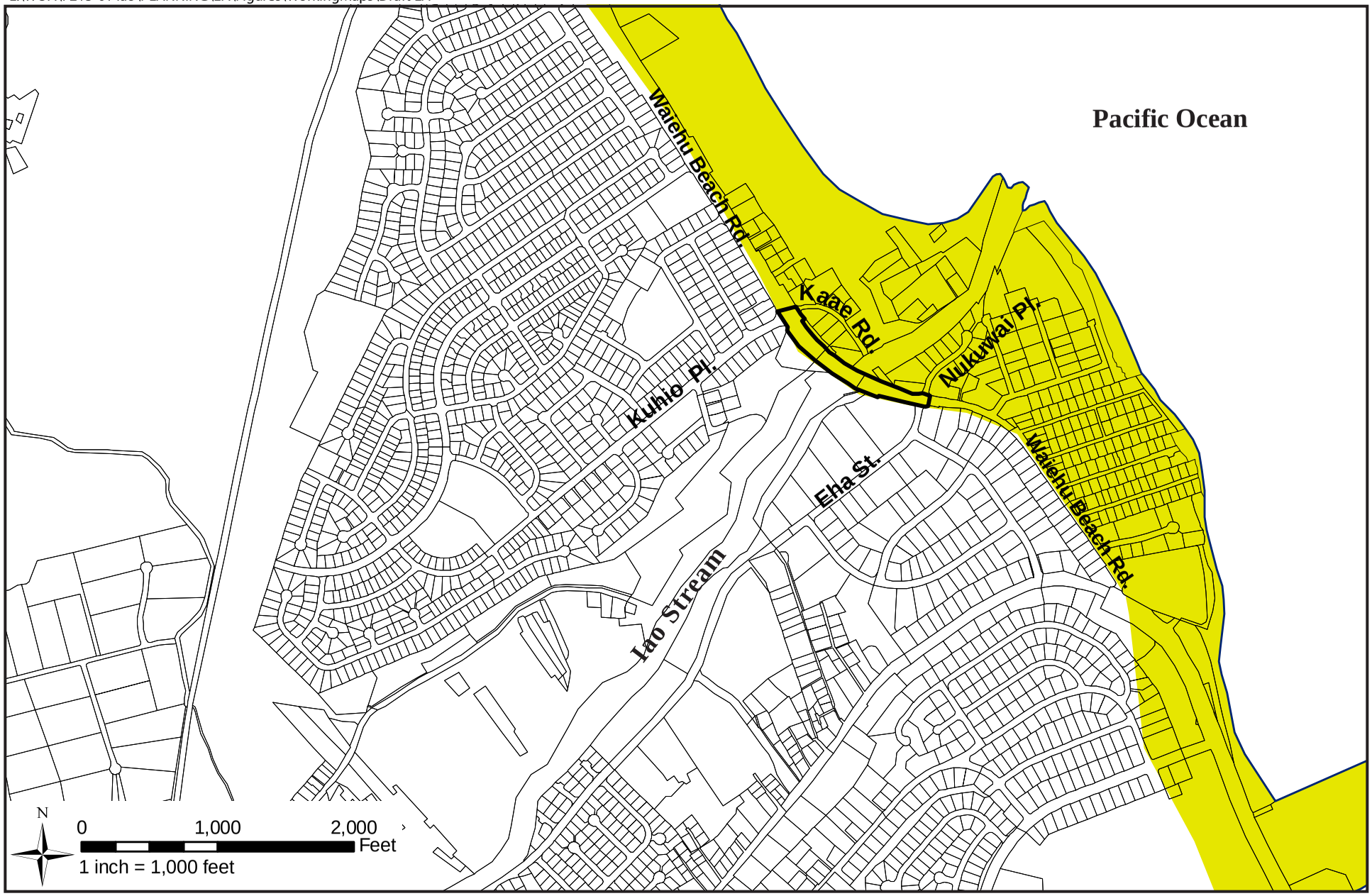
Project Site

FIGURE 2-3
FLOOD INSURANCE RATE MAP (FIRM)

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

- Project Site
- Tsunami Evacuation Zone
- Maui Coastline

FIGURE 2-4
TSUNAMI EVACUATION ZONE

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII

Fauna (Aquatic biota): Historical data indicate that populations of both native and introduced fishes and invertebrates inhabit Iao Stream well upstream of the project site. The presence of native, diadromus oopu (stream gobies) and opae (stream shrimp or prawns) in the upper reaches of the stream means that the stream segment through the project site provides passage up and down the stream during freshets (rainfall events causing water in the stream to flow) for these populations.

At the time of the survey, the marine toad (*Bufo marinus*) and a chlorophyte (alga) from the genus *Stigeoclonium* were the only organisms observed in the stream at the proposed project site at Waiehu Beach Road. A few fishes and invertebrates inhabit the estuarine reach of Iao Stream, downstream from the project site. Mullet (*Mugil cephalus*) and nehu (*Encrasicholina purpurea*) occur in small schools. Crayfish (*Procambarus clarkia;* molts or carcasses only) and dragonfly/damselfly naiads (Order Odonata) were observed.

None of the fishes nor invertebrate species observed is listed as threatened or endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended, or by the State of Hawaii under its endangered species program.

Impacts and Mitigation Measures

In the short-term, during the construction of the proposed project there will be times when construction will take place within the stream bed. During such construction, the project will ensure passage of diadromous fauna through the project site at all times. A Best Management Practices (BMP) plan will be designed and implemented to minimize environmental impacts to water quality and aquatic biota in the vicinity of or downstream of the project site.

In the long-term, no significant impacts from the proposed project are anticipated after the proposed project has been completed.

2.7 Air Quality

Vehicular-related emissions are generated from traffic traveling along roadways in the project vicinity. The State Department of Health Clean Air Branch does not maintain any air quality monitoring stations in Wailuku area. Although there is very little information available, air quality in the project site is generally considered to be good due to the presence of the abundant tradewinds throughout most of the year.

Impacts and Mitigation Measures

In the short-term, during construction of the proposed project, two potential types of air pollution emissions will likely occur, resulting in air quality impacts: 1) airborne dust from construction activities such as grading and excavation within the project site; and 2) exhaust emissions from construction vehicles and equipment from the project site.

Potential air quality impacts during construction of the proposed development will be mitigated by complying with the State DOH Administrative Rules, Title 11, Chapter 60 “Air Pollution Control”. The construction contractor is responsible for complying with the State DOH regulations which prohibit visible dust emissions at property boundaries. Compliance with State regulations will require adequate measures to control airborne dust by methods such as water spraying and sprinkling of loose or exposed soil or ground surface areas and dust-generating equipment during construction. As may be

deemed appropriate, planting of landscaping as soon as possible on completed areas will also help to control dust. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving the equipment and personnel to the site during off-peak hours. Exhaust emissions from construction vehicles are anticipated to have negligible impact on air quality in the project vicinity as the emissions would be relatively small and readily dissipated.

In the long-term, operation of the project will have no significant long-term impact on ambient air quality in the project vicinity. Air quality levels would be most affected by vehicular emissions generated by project-related traffic, however, the elevated vehicular emission concentrations are anticipated to dissipate.

2.8 Noise

Ambient noise in the project area is predominantly attributed to vehicular traffic traveling along the adjacent roadways. Also contributing to the acoustic environment are noises from the parking lot of the adjacent Wailuku Industrial Park, low pitch sounds of waves along the coast, wind, and birds. During regular maintenance of the Iao Stream Flood Control Channel, noises also associate with heavy vehicles in and near the channel would be generated.

Impacts and Mitigation Measures

In the short term, noise from construction activities such as excavation, grading, cutting and paving will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may also increase as a result of operating heavy construction vehicles and other power equipments during the construction period.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, “Community Noise Control” noise control regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor’s responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. Also, the guidelines for hours of heavy equipment operation and noise curfew times as set forth by the DOH noise control rules will be adhered to; or if necessary, a noise permit will be obtained.

In the long-term, no significant noise impact from is anticipated once the proposed project has been completed. Noise from vehicles will continue to be the primary noise source along the project site, however, no adverse noise effects from the project are anticipated since the project will not generate additional traffic in the vicinity.

2.9 Archaeological Resources

An Archaeological Literature Review and Field Inspection Report of the project site was conducted by Cultural Surveys Hawaii, Inc. in August and October 2009, to evaluate the presence of significant historic properties within the project site. The archaeological literature review included studies of archival sources, historic maps, Land Commission Awards, and previous archaeological reports to construct a history of land use and to

determine if archaeological resources have been recorded on or near the property. A field inspection of the project area followed to identify any surface archaeological resources and to investigate and assess the potential for impact to such sites. The inspection also sought to identify any sensitive areas that may require further investigation or mitigation before the project proceeds. The Archaeological Literature Survey and Field Inspection Report is included as Appendix B and is summarized below.

The project area includes a portion of the Iao Stream, an area that provided choice agricultural lands for pre-contact Hawaiians living in the area. The project area is also located in close proximity to the Halekii-Pihana State Monument, which was a political center during and possibly before the 18th century. Moreover, the Iao Stream Bridge was constructed in 1954, which makes it eligible to be recorded as a historic property.

Previous archaeological studies indicate that *taro loi* likely existed on the banks of the stream, but any archaeological remains have been destroyed due to the substantial alteration of the natural landscape and soils during the construction of the Iao Bridge in 1954 and the channelization of the stream for the flood control project of the 1970's. Pre-contact human burials have also been documented in the sand dune system that the project site crosses.

Results from the field inspection confirm sandy soils dominate the project site. Although the majority of the project area has undergone extensive ground alterations, there is a location at the northeastern end of the project site where a guardrail will be installed in these sandy soils. In addition, excavation will take place at both *mauka* and *makai* sides of existing bridge abutments for bridge widening.

Impacts and Mitigation Measures

Due to previous archaeological findings of pre-contact habitation features and cultural deposits, as well as human burials in the vicinity of the project site, and the project site's proximity to the Halekii-Pihana State Monument, archaeological monitoring is recommended during ground disturbing activities for the bridge widening and sidewalk improvements project. Archaeological monitoring is also recommended for ground disturbing activities associated with the installation of the new guardrails and also for ground disturbing activities associated with the widening of the bridge piers. On-call archaeological monitoring is recommended for excavations that take place within the streambed itself as a part of the bridge pier monitoring. An archeological monitoring plan will be submitted to SHPD for review and approval prior to ground disturbance.

The Iao Bridge was built in 1954 and is now 55 years old. It is eligible to be recorded on the State Inventory of Historic Properties. It may also be eligible for nomination and listing on the Hawai'i National Register of Historic Places. Review and recordation of the bridge by the State Historic Preservations Division's Architecture branch may be required.

Table 2-1
Demographic Characteristics Comparison of Wailuku CDP with the County of Maui

Subject	Wailuku CDP		Maui	
	Number	**Percent**	**Number**	**Percent**
Total Population	**12,296**	**100**	**128,094**	**100**
AGE				
Under 5 Years	790	6.4	8,579	6.7
5 – 19 Years	2,378	19.3	27,073	21.1
20 – 64 Years	7,276	59.2	77,813	60.8
65 Years and over	1,852	15.1	14,629	11.4
Median age (years)	38.5	(X)	36.8	(X)
RACE				
White	2,233	18.2	43,421	33.9
Black or African American	29	0.2	509	0.4
American Indian and Alaska Native	44	0.4	479	0.4
Asian	5,174	42.1	39,728	31.0
Native Hawaiian and other Pacific Islander	1,439	11.7	13,730	10.7
Two or more races	3,232	26.3	28,484	22.2
Other	145	1.2	1,743	1.4
HOUSEHOLD (BY TYPE)				
Total Households	**4,535**	**100**	**43,507**	**100**
Family Households (families)	3,016	66.5	29,899	68.7
Married-couple family	2,193	48.4	22,154	50.9
With own children under 18 year	947	20.9	10,171	23.4
Female householder, no husband present	578	12.7	5,200	12.0
With own children under 18 years	268	5.9	2,864	6.6
Nonfamily households	1,519	33.5	13,608	31.3
Average household size	2.71	(X)	2.91	(X)
HOUSING OCCUPANCY AND TENURE				
Total Housing Units	**4,780**	**100**	**56,377**	**100**
Occupied units	4,535	94.9	43,507	77.2
By owner	2,675	59.0	25,039	57.6
By renter	1,860	41.0	18,468	42.2
Vacant units	245	5.1	12,870	22.8
SOCIAL CHARACTERISTICS				
Population 25 years and over	**8,538**	**100**	**85,752**	**100**
High school graduate or higher	7,011	82.1	71,510	83.4
Bachelor's degree or higher	1,845	21.6	19,234	22.4
ECONOMIC CHARACTERISTICS				
Population 16 years and over	**9,712**	**100**	**99,326**	**100**
In labor force	6,004	61.8	66,307	66.8
Median household income (dollars)	45,587	(X)	49,489	(X)
Median family income (dollars)	51,441	(X)	55,277	(X)
Per capita income (dollars)	20,503	(X)	22,033	(X)

Source: Department of Business, Economic Development & Tourism, U.S. Census 2000 Profiles

2.10 Population

The project site is located within the Wailuku Census Designated Place (CDP). Demographic and other information was reviewed from the U.S. Census 2000 for the Wailuku CDP, and the combined socio-economic data from the region is shown on Table 2-1. At the time that this document was prepared, data from the 2010 U.S. Census was not available.

Based upon the data shown on the table, Wailuku CDP has a slightly higher older population than the County. The median age of the population for Wailuku CDP was 38.5 versus 36.8 for the County.

By racial mix, the Wailuku CDP has much lower percentage of Whites (18.2%) than the County (33.9%). Wailuku CDP has more Asians (42.1%) and those with two or more races (26.3%) than the County (31.0% and 22.2% respectively). These three races make up the majority of the population. Native Hawaiian and other Pacific islanders comprise a slightly higher proportion than the County as a whole, with 11.7% and 10.7%, respectively.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on population in the project vicinity is anticipated. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The widening will accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth

2.11 Socio-Economic Characteristics

According to the 2000 Census, median household income and median family income for Wailuku CDP ($45,587 and $51,441 respectively) are slightly lower than for the County ($49,489 and $55,277 respectively). For the educational attainment, High school graduate or higher was 82.1% while bachelor's degree or higher was 21.6% for Wailuku CDP. The County data is generally comparable to the Wailuku CDP data.

Wailuku CDP has a much higher housing occupancy rate, 94.9%, than the County, 77.2%. Housing units in this region are largely occupied by renters at 41.0%. The County data is comparable to the Wailuku CDP data in that a large proportion of housing units are occupied with renters.

Impacts and Mitigation Measures

In the short term, the construction expenditures will provide positive benefits to the local economy. This would include creation of some construction and construction support jobs, and purchase of material from local suppliers.

In the long term, the proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The widening will accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. This will benefit residents in the vicinity, particularly bicyclists and pedestrians crossing Iao Stream Bridge between residential and commercial areas.

2.12 Police, Fire, and Ambulance Services

The project site is located within the Patrol District I – Wailuku of the County of Maui Police Department. The District I - Wailuku Police Station is sited approximately 1.34 miles to the south of the project site along Mahalani Street, ; located near its intersection with West Kaahumanu Avenue.

Wailuku Fire Station is the closest fire station serving in the project vicinity. It is located at the intersection with Main Street and Kinipopo Street. It is approximately 1.45 miles southwest of the project site. Kahului Fire Station is the second closest fire station and is located along Dairy Road at its intersection with Hukilike Street, approximately 2.67 miles southeast of the project site.

Emergency medical service is provided by American Medical Response, a private ambulance service contracted by the County of Maui. The closest ambulance service is located along Hana Highway near the intersection with Haleakala Highway.

Impacts and Mitigation Measures

In the short term, the proposed project may have adverse impacts such as temporary disturbance of traffic, which could adversely affect emergency vehicles access through the project site. During the construction period when only one vehicular lane is available, flagmen or off duty police officers will be present to direct traffic and emergency vehicles.

In the long term, the proposed project will provide positive effects by improving the shared roadway by providing consistent multi-use shoulders where vehicles can pull out to let emergency vehicles pass. By improving traffic safety, the proposed improvements will likely improve emergency access for police, fire, and ambulance through the project site.

2.13 Medical Facilities

The closest hospital to the project site is the Maui Memorial Medical Center (MMMC) located along the Maui Lani Parkway, approximately 1.5 miles south of the project site. MMMC is the largest general hospital in the County of Maui employs more than 1,000 employees, has 200 attending physicians, and holds 231 total beds.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts or increase demand on medical services is anticipated. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand on medical facilities and services.

2.14 Schools

The project site is within the State Department of Education's (DOE) Baldwin complex, which includes Waihee and Wailuku Elementary Schools and Iao Intermediate School, which feed into Baldwin High School. Maui Community College, associated with University of Hawaii community college system, is also located in the project vicinity.

Baldwin High School, which is the closest educational facility, is located over one mile away from the proposed project site.

Impacts and Mitigation Measures

In the short term, the proposed project may have adverse impacts such as temporary disturbance of traffic which could adversely affect access through the project site, however, no significant impact on the educational facilities and its operations is anticipated.

In the long term, no significant impact or increased demand on schools within the project vicinity is anticipated. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand on schools. Safer pedestrian and bicycle assess over Iao Stream Bridge will benefit students who travel along this route.

2.15 Recreational Resources

Halekii-Pihana State Heiau Monument is located southwest of the project site. The County also has several parks located in this Wailuku-Kahului region near the project site.

1. Halekii-Pihana State Heiau Monument: This is a 10.2 acre State Park located along lower portion of the Iao Stream. There are two heiaus (places of worship) remaining within the park. Interpretive signage is provided.
2. Paukukalo Park: This is a 4.7-acre park located at the corner of Kaumualii St. and Kawananakoa St. to the west of the Iao Stream Bridge. This park supports active recreational activities, and includes a softball field, open basketball courts, a multi-purpose field, and a playground area.

3. Papohaku Park This is a 4.7-acre park located in Wailuku residential area along Waena St. This park has a comfort station, a softball field, and a basketball court.
4. Waiehu Terrace Park This is a 4.8 acre park located at the corner of Makaala St. and Alihilani St. to the west from the Iao Stream Bridge. This park has basketball courts, a picnic area, comfort station, and a field for multi-use.
5. Maui Botanical Gardens This is a 3.5-acre garden maintained by the County. There is an amphitheater, picnic areas, and a nursery maintenance building.
6. War Memorial Complex War Memorial Stadium Complex, located along Kaahumanu Avenue, is the largest sports and recreation facility in the Maui Parks system. The complex occupies 51 acres which include a stadium, a multipurpose gymnasium, an open air pool, little league fields, baseball fields, tennis courts, an amphitheater, soccer fields, and a pavilion. County offices are also located within the complex.
7. Wells Community Complex This is a 6.6-acre park located in the mauka side within Wailuku District. There are baseball/softball fields, basketball/tennis courts, picnic areas, a swimming pool, and a comfort station.
8. Mokuhau Park This is a 2.4-acre park located within the residential area along Kahawai St. This grassed park has a baseball field, a multi-purpose field, and basketball courts.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts or increase demand on recreational resources in the project vicinity is anticipated. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The widening will accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand for recreational facilities and parks.

2.16 Solid Waste

The County of Maui, Environmental Management Solid Waste Division Refuse Collection Program collects residential solid waste in the vicinity. Solid waste from residential properties is disposed at three landfill locations: Central Maui Sanitary Landfill, Olowalu Residential Recycling & Refuse Convenience Center, and Hana Sanitary Landfill. Construction waste is disposed at Maui Construction & Demolition Landfill.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts to the municipal solid waste collection and disposal systems is anticipated during the construction of the proposed improvements.

Construction of the project will generate solid waste typical of roadway construction related activities over the short-term. The contractor will be required to remove all debris from the site, and properly dispose it at the landfill in conformance with County regulations. Alternatively, the contractor could dispose of materials such as

demolished concrete and excavated material by finding private parties desiring such materials for fill or other purposes.

2.17 Infrastructure and Utilities

2.17.1 Roadway System

The major roadways which provide vehicular access traversing within and in the nearby vicinity of the proposed project area include:

1. Kaahumanu Avenue (Route 32) is a two-way, two-lane State road extending from the intersection with Hana Highway (Route 36) near Kahului Harbor to Wailuku providing access from East Maui through Central to West Maui.
2. Kahekili Highway (Route 340) is a two-way, two-lane State Highway extending from the intersection with Waiehu Beach Road to Camp Maluhia connecting with Honopiilani Highway (Route 30) in Keawalua.
3. Honoapiilani Highway (Route 30) is a two-way, two to four-lane State Highway extending from the intersection with Kaahumanu Avenue (Route 32) in Wailuku to Keawalua proving access from Central Maui to West Maui.
4. Hana Highway (Route 36) is a two-way, two-lane State Highway extending from the intersection with Kaupakalua Road in north of East Maui to the Kahului Harbor.

Impacts and Mitigation Measures

In the short term, the proposed project may have adverse impacts such as temporary disruption of traffic by temporary closure of one lane of traffic and by the additional vehicles associated with the construction activities. During the construction period when only one vehicular lane is available, flagmen or off duty police officers will be present to direct traffic and emergency vehicles.

In the long term, the proposed project is not anticipated to generate additional vehicles in the project vicinity area. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The widening will accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated increase in the number of vehicles in the project vicinity.

2.17.2 Water System

Water service in the Wailuku-Kahului area is provided by the County of Maui Department of Water Supply (DWS). The DWS operates 13 water systems that serve particular geographic areas. The proposed project is located within the Central Maui water service section.

In the project vicinity there are various water service lines ranging in size from four inches to 18 inches in diameter. Most of these lines are near the Kaae Place/Kuhio Place and Nukuwai Place/Eha Street intersections at either end of the project site. An 18-inch line runs along the mauka side of Waiehu Beach Road.

Impacts and Mitigation Measures

In the short- term, the construction of the proposed project is not anticipated to affect any of the existing water lines within in the project vicinity nor is anticipated to increase demand on the water system in the area. Construction work near the Kaae Place/Kuhio Place and Nukuwai Place/Eha Street intersections and along Waiehu Beach Road is unlikely to require excavation to depths that could impact the existing waterlines.

In the long-term, the proposed project is not anticipated to significantly impact or increase demand on water system in the area. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand for water. The proposed improvements are not anticipated to require using water on a regular basis.

2.17.3 Wastewater System

Wailuku area is served by Maui County sewer lines and sewage pumping stations. Wailuku-Kahului Wastewater Treatment Plant (WWTP) is an activated sludge type secondary treatment facility with a design capacity of 6.0 mgd. Wailuku-Kahului WWTP is located north of Kanaha Pond collecting wastewater from Paukukalo pump station in Wailuku.

In the project vicinity, there is a 10-inch wastewater force main runs along the mauka side of Waiehu Beach Road.

Impacts and Mitigation Measures

In the short- term, the construction of the proposed project is unlikely to require excavation to depths that could impact the existing force main along Waiehu Beach Road.

In the long-term, the proposed project is not anticipated to significantly impact or increase demand on wastewater system in the area. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand on the wastewater system. The proposed improvements will not generate wastewater.

2.17.4 Drainage System

Beginning in the upper elevations of the Iao Valley, the Iao Stream flows eastward towards the Pacific Ocean, discharging into Kahului Bay. The stream has a drainage basin of approximately 10 square miles which begins at the boundary between the Lahaina and Wailuku Judicial districts, extending along the crests of the Kahoolewa and Kapilau Ridges to the Pacific Ocean.

Existing storm drainage facilities in the project area consist generally of a network of storm drainage pipes and culverts of varying sizes. In general, the sandy soils of the overlying project area promote percolation of rainwater into the ground.

In the project vicinity, there are various drainage lines in the roadways, particularly around the Kaae Place/Kuhio Place and Nukuwai Place/Eha Street intersections. These drain lines range in size from 12 inches to 72 inches in diameter.

Impacts and Mitigation Measures

In the short- and long-term, the proposed project is not anticipated to significantly impact or increase demand on use of the storm drainage facilities. Construction work is not anticipated to occur near or at depths that could impact these drainage lines. No change in drainage patterns of the project site are anticipated as a result of the proposed improvements.

2.17.5 Electrical and Communication Systems

Electric power for residential and industrial use in Wailuku is provided by the Maui Electric Company, a subsidiary of Hawaiian Electric Company, Inc. The electrical source for the project area is the Maalaea Power Plant.

Telephone service in the Wailuku area, like the rest of the State, is provided by the Hawaiian Telecom.

Oceanic Time Warner Cable of Hawaii is the local CATV provider in the region.

Overhead lines providing these services and utility poles supporting them are located at the Kaae Place/Kuhio Place and Nukuwai Place/Eha Street intersections.

Impacts and Mitigation Measures

In the short--term, the proposed project is not anticipated to impact electrical or communication services. Construction work will not affect overhead lines or utility poles.

In the long-term, the proposed project is not anticipated to significantly impact or increase demand on water system in the area. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and

associated demand for electric and communication services. The proposed improvements are not anticipated to require electrical and communication services for its operation.

2.17.6 Gas Systems

The Gas Company provides service for residential and commercial uses in the project area.

Impacts and Mitigation Measures

In the short--term, the proposed project is not anticipated to impact gas service lines as construction work is not anticipated to occur at depths that could impact gas service lines.

In the short-term, the proposed project is not anticipated to significantly impact or increase demand on gas and cable services. As the proposed project will involve the new improvements of bridge and approach roads, they are not population generators and thereby will not increase demand on gas and cable services. The proposed improvements are not anticipated to require gas and cable services for its operation.

In the long-term, the proposed project is not anticipated to significantly impact or increase demand for gas service in the area. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway. No additional vehicular lanes are proposed that could increase roadway capacity or traffic flow. Therefore, the proposed project is not anticipated to induce population growth and associated demand for gas service.

(This page intentionally left blank)

3. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

3.1 State Land Use District

The State Land Use Law, Chapter 205, HRS is intended to preserve, protect, and encourage the development of lands in the State for uses that are best suited to the public health and welfare of Hawaii's people. Under Chapter 205, HRS all lands in the State of Hawaii are classified by the State Land Use Commission (LUC) into four major categories referred to as State Land Use Districts. These districts are identified as the Urban District, Rural District, Agricultural District, and Conservation District.

The LUC's Land Use District Boundary Map for the Island of Maui depicts the lands within the Project Area as being designated within the State Agricultural District and State Urban District. Figure 3-1 shows the location of the proposed project improvements in relation to the State Land Use District designations. Permitted uses within the State Agricultural District and State Urban District are prescribed under Title 12, Chapter 205 (Land Use Commission), HRS, and the State Land Use Commission's Administrative Rules prescribed under Title 15, Subtitle 3, Chapter 15 HAR.

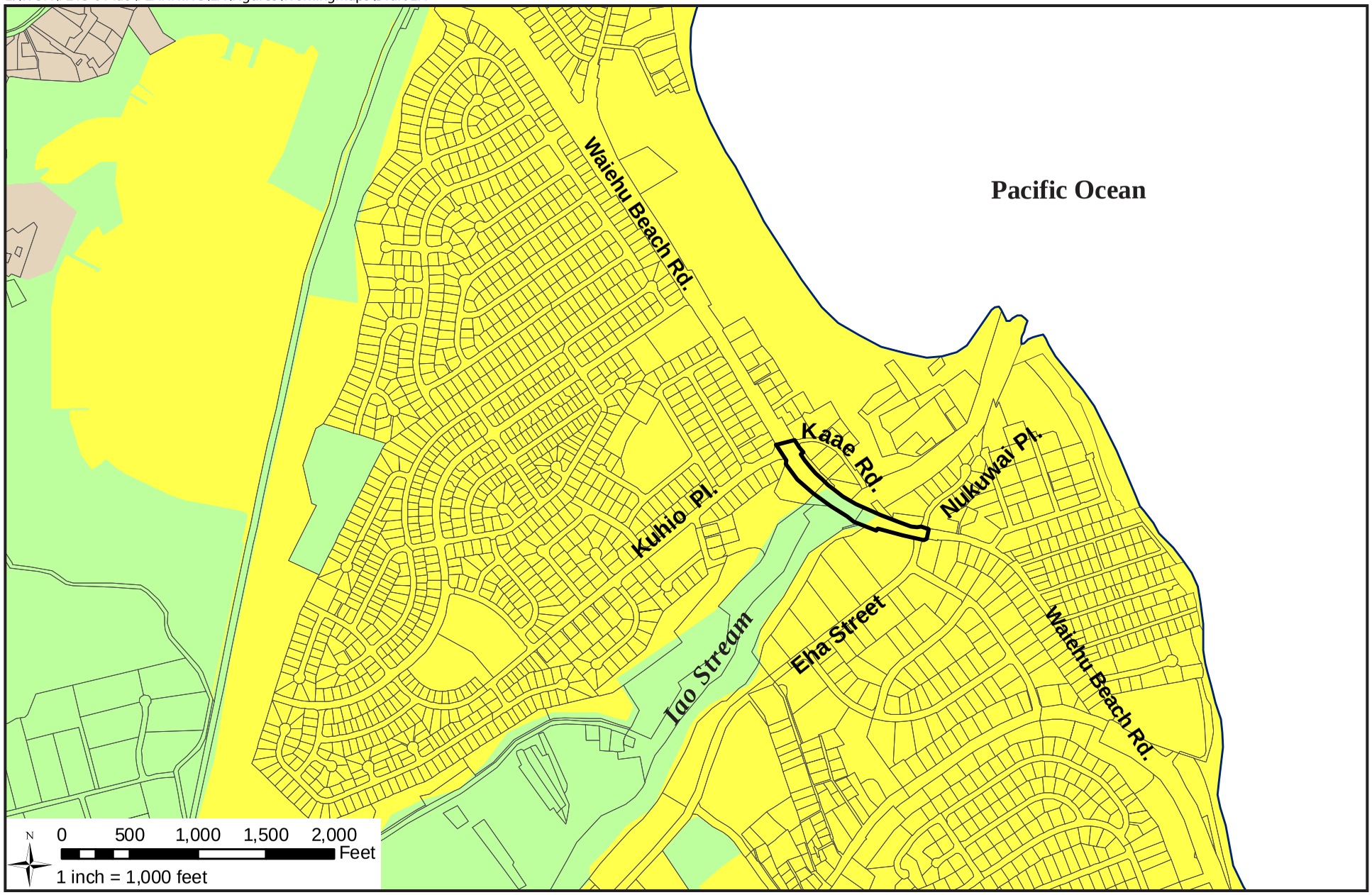
Under §15-15-25, HAR, pertaining to permissible uses within the Agricultural District, permissible uses are determined by the productivity rating as classified by the Land Study Bureau's (LSB) detailed land classification. Land with an overall productivity rating of class A or B shall be those uses set forth in section 205-4.5, HRS while land with an overall productivity rating of class of C, D, E, or U shall be those uses permitted in A and B lands as set forth in section 205-4.5, HRS, and also those uses set forth in section 205-2(d), HRS.

Under the LSB's detailed land classification for the project area, a portion of the project corridor has a soil productivity rating of "U," indicating lands that are unclassified. Therefore, permitted uses within these classified lands are those uses permitted under section 205-4.5, HRS, and also those uses set forth in section 205-2(d), HRS.

Under Chapter 205-4.5 HRS, permitted uses consist of "Public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, or treatment plants, or corporation yards, or other like structures" (Chapter 205-4.5(a)(7), HRS). Therefore, the proposed project is a permitted use within the Agricultural District because public roadways are permitted under Chapter 205-4.5, HRS.

Under §15-15-24, HAR, pertaining to permissible uses within the Urban District, permitted uses include any and all uses permitted by the counties, either by ordinances or rules, and are subject to any commission imposed by the Land Use Commission pursuant to section 205-4(g), HRS. Since roadways, such as the proposed project, are considered an incidental use that is permitted in each of the County's zoning districts, the propose project is a permitted use within the Urban District.

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

- Project Site
- Agricultural
- Conservation
- Rural
- Urban
- Maui Coastline

FIGURE 3-1
STATE LAND USE DISTRICT MAP

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

3.2 Chapter 344, State Environmental Policy

The purpose of Chapter 344, State Environmental Policy is to "establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent of eliminate damage to the environment and the biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii." This section discusses the project's consistency with the pertinent goals, policies, and guidelines described under Chapter 344, HRS.

§ *344-3 Environmental Policy. It shall be the policy of the State, through its programs, authorities, and resources to:*

(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique and natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social economic, and other requirements of the people of Hawaii.

Discussion: The proposed project has been identified on State and County plans as beneficial to the general welfare of the community. The project is consistent with this environmental policy as it will conserve the natural resource of Maui, including visual and scenic resources. The project will not have an adverse impact of natural resources or the environment, as discussed in previous sections of this document. The project is designed to minimize impacts on the land, and best management practices (BMP) will be implemented during construction to control pollution and preserve natural resources.

(2) Enhance the quality of life by:
- *(A) Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;*
- *(B) Creating an opportunities for the residents of Hawaii to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;*
- *(C) Establishing communities which provide a sense of identify, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and*
- *(D) Establishing a commitment on the part of each person to protect and enhance Hawaii's environment and reduce the drain on nonrenewable resources.*

Discussion: The proposed project is consistent with the above policies regarding quality of life. The proposed improvements will widen the roadway approaches and Iao Stream Bridge, which carries Waiehu Beach Road over Iao Stream, and will also rehabilitate the bridge to meet current seismic standards. The widening will accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose

of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway.

3.3 Hawaii Coastal Management Program

The National Coastal Zone Management Program was created through passage of the Coastal Zone Management Act of 1972. Hawaii's Coastal Zone Management (CZM) program, adopted in 1977 as Chapter 205A, HRS, provides a basis for protecting, restoring, and responsibly developing coastal communities and resources. The Hawaii CZM area includes all lands within the state and the areas seaward to the extent of the State's management jurisdiction. A discussion of the project's consistency with the objectives and policies of the CZM program is provided below.

(1) *Recreational Resources*

Objective:
Provide costal recreational opportunities accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

- *(i) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
- *(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the sate for recitation when replacement is not feasible or desirable;*
- *(iii) Providing and managing adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
- *(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
- *(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
- *(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.*
- *(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
- *(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.*

The proposed project is located approximately 0.2 miles from the coastline at its closest point and 0.4 miles at its farthest point. However, given the nature of the project in the long term, will not provide or impact coastal recreational opportunities accessible to the public.

In the short term, certain phases of construction will involve temporary lane closures that will impede traffic flow. Vehicles, bicyclists, and pedestrians traveling to and from coastal recreational activities could experience inconveniences and delays.

Potential water quality impacts by adherence to State water quality regulations governing grading, excavation and stockpiling, an NPDES General Permit for Storm Water Associated with Construction Activity administered by the State DOH will be required to control storm water discharges. Mitigation measures will be instituted following site-specific assessments, incorporating appropriate structural and/or non-structural BMPs such as silt fences and minimizing time of exposure between construction and re-vegetation/re-paving.

(2) Historic Resources

Objective:
Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:
(A) Identify and analyze significant archeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

An Archaeological Literature Review and Field Inspection Report of the project site was conducted to evaluate the presence of significant historic properties within the project site. Due to previous archaeological findings of pre-contact habitation features and cultural deposits, as well as human burials in the vicinity of the project site, and the project site's proximity to the Halekii-Pihana State Monument, archaeological monitoring is recommended during ground disturbing activities for the bridge widening and sidewalk improvement project. Archaeological monitoring is also recommended for ground disturbing activities associated with the installation of the new guardrails and also for ground disturbing activities associated with the widening of the bridge piers. On-call archaeological monitoring is recommended for excavations that take place within the streambed itself as a part of the bridge pier monitoring. For ground disturbing activities, an archeological monitoring plan will be submitted for SHPD's review and approval before start of construction.

Also, since the Iao Bridge was built in 1954 and is now 55 years old, it is eligible to be recorded on the State Inventory of Historic Properties. It may also be eligible for nomination and listing on the Hawaii National Register of Historic Places. Review and recordation of the bridge by the State Historic Preservations Division's Architecture Branch may be required.

(3) *Scenic and open space resources*

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

Policies:
(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments which are not coastal dependant to locate in inland areas.

The proposed project is not anticipated to have significant impacts on notable view planes nor adversely affect important public viewing points or visual resources. As an already existing roadway and bridge, the project will not significantly change the scenic and visual character of the surrounding area.

(4) *Coastal ecosystems*

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

Policies:
(A) Improve the technical basis for natural resource management;
(B) Preserve valuable coastal ecosystem, including reefs, or significant biological or economic importance;
(C) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
(D) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

The proposed project is not expected to adversely impact coastal ecosystems. Potential water quality impacts by adherence to State water quality regulations governing grading, excavation and stockpiling, an NPDES General Permit for Storm Water Associated with Construction Activity administered by the State DOH will be required to control storm water discharges. Mitigation measures will be instituted following site-specific assessments, incorporating appropriate structural and/or non-structural BMPs such as silt fences and minimizing time of exposure between construction and re-vegetation/re-paving.

(5) *Economic Uses*

Objective:
Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:
(A) Concentrate coastal dependant development in appropriate areas;
(B) Ensure that coastal dependent developments such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

The proposed project provides the necessary infrastructure to increase roadway capacity and will promote the efficient movement of people, goods, and services important to the State's economy. The project will provide direct construction and operational jobs and will also have beneficial secondary economic benefits by promoting the procurement of materials and supplies from local vendors.

(6) *Coastal hazards*

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

Policies:
(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject tot storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program;
(D) Prevent coastal flooding from inland projects; and
(E) Develop a coastal point and nonpoint source pollution control program.

According to the Flood Insurance Rate Map (FIRM), Map number 15000300383E and 15000300384E, dated Sept 25, 2009, the project site straddles two flood zones. The Waiehu approach to Iao Stream Bridge lies within "Zone X, other areas" and is characterized as "areas determined to be outside the 0.2% annual chance floodplain." The Wailuku approach lies within "Zone X, other flood areas" and is characterized as "areas of 0.2% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected be levees from 1% annual chance flood." Iao Stream

Bridge lies over "Zone AE" which is characterized as a "special flood hazard area subject to inundation by the 1% annual chance flood." Zone AE is also a "floodway," which is "the channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood height." The 1% annual flood is also commonly referred to as the 100-year flood or the base flood. The base flood elevation for the Iao Stream Bridge area have been determined to be between approximately 25 to 29 feet while the bottom of the bridge is at elevation 39 feet, well above the base flood.

Construction activities within the respective flood hazard districts will be in accordance with regulations set forth in Section 19.62.060, Maui County Code. Before construction of any development begins within any flood hazard area, flood-related erosion hazard area, or mudslide area, a special flood hazard area development permit shall be obtained from the director of the department of planning

The project will also comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), as the project is within a Special Flood Hazard Area.

Studies will be conducted to ensure that any proposed encroachment in the floodway will not result in any increase in the regulatory flood elevations during occurrence of the regulatory flood. The studies will identify a certified flood elevation and evaluate flooding impacts, including the potential impact of proposed structures on flood elevations.

(7) *Managing development*

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

Policies:

(A) *Use, implements, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*

(B) *Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and*

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

The Hawaii State environmental review process, HRS 343, requires project review by government agencies and affords the public the opportunity to provide comments on the proposed project. Applicable State and County requirements will be adhered to in the design and construction of the project.

(8) *Public participation*

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

Policies:

(A) Maintain a public advisory body to identify coastal management problems and to provide policy advise and assistance to the coastal zone management program;

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

(C) *Organize workshops, policy dialogues, and site-specific mediations to respond to costal issues and conflict.*

Government agencies, organizations and the general public are being notified of the proposed project and provided an opportunity to comment on the project through the environmental review process. Short and long term impacts which may result from the construction and operation of the proposed project have been assessed in this EA.

(9) Beach protection

Objective:
Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

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

(C) *Minimize the construction of public erosion-protection structures seaward of the shoreline.*

The proposed project does not involve the construction of improvements in the shoreline setback nor require any shoreline erosion-protection structures.

(10) Marine resources

Objective:
Implement the State's ocean resources management plan.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

(D) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources with the United States exclusive economic zone;

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

(F) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The proposed project is not anticipated to have any adverse impact on marine and coastal resources. Potential water quality impacts to nearshore coastal waters during construction of the project will be mitigated by adherence to State water quality regulations governing grading, excavation, and stockpiling. Adherence to State water quality regulations governing grading, excavation and stockpiling, an NPDES General Permit for Storm Water Associated with Construction Activity administered by the State DOH will be required to control storm water discharges. Mitigation measures will be instituted following site-specific assessments, incorporating appropriate structural and/or non-structural BMPs such as silt fences and minimizing time of exposure between construction and re-vegetation/re-paving.

3.4 Special Management Area Designation

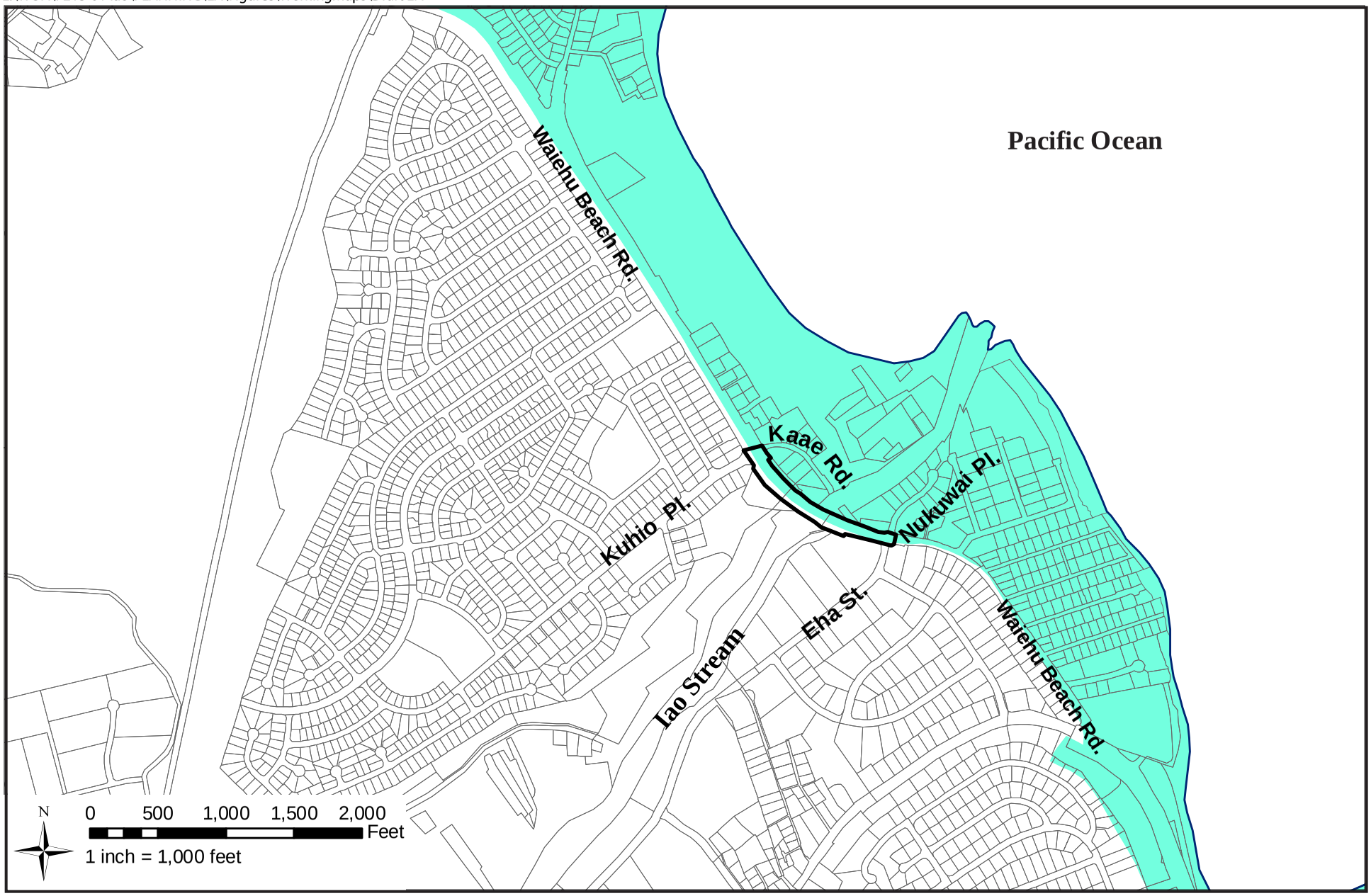
Pursuant to the Hawaii CZM Program, Chapter 205A, HRS, the counties have enacted ordinances establishing Special Management Areas (SMAs). Any "development" within the SMA requires an SMA Use permit administered by the County of Maui Planning Department. Through the SMA permit system, the County assesses and regulates developments proposed for areas located within the SMA and the proposed developments are evaluated for compliance with the CZM objectives and policies and SMA guidelines set forth in Chapter 205A, HRS. As shown previously in Figure 3-2. the project falls within an SMA area, therefore an SMA Use permit will be required for this project. The proposed project is consistent with the CZM objectives and policies as described in Section 3.3 of this document.

3.5 County General Plan

Maui County is currently updating the *General Plan*, with a planning horizon of 2030. As part of the *2030 General Plan Update*, the County adopted a *Countywide Policy Plan* in March 2010, which supersedes the 1990 *General Plan*. The *Countywide Policy Plan* provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future. This includes: (1) a vision statement and core values for the County to the year 2030; (2) an explanation of the plan-making process; (3) a description with supporting background information regarding Maui County today; (4) identification of guiding principles; and (5) a list of countywide goals, objectives, policies, and implementing actions related to the following core themes:

- Protect the Natural Environment
- Preserve Local Cultures and Traditions
- Improve Education
- Strengthen Social and Healthcare Services
- Expand Housing Opportunities for Residents
- Strengthen the Local Economy
- Improve Parks and Public Facilities
- Diversify Transportation Options
- Improve Physical Infrastructure

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

LEGEND

Project Site

Special Management Area (SMA)

FIGURE 3-2
SPECIAL MANAGEMENT AREA (SMA) MAP

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII

- Promote Sustainable Land Use and Growth Management
- Strive for Good Governance

The proposed project is consistent with the following *Countywide Policy Plan* objectives and policies relating to diversifying transportation options:

H. Diversify Transportation Options

Goal: *Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.*

Objective:

1. *Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.*

Policies:

e. *Ensure that roadway systems are safe, efficient, and maintained in good condition.*
f. *Preserve roadway corridors that have historic, scenic, or unique physical attributes that enhance the character and scenic resources of communities.*
g. *Design new roads and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass.*
i. *Evaluate all alternatives to preserve quality of life before widening roads.*

Objective:

2. *Reduce the reliance on the automobile and fossil fuels by encouraging walking, bicycling, and other energy-efficient and safe alternative modes of transportation.*

Policies:

a. *Make walking and bicycling transportation safe and easy between and within communities.*
c. *Design new and retrofit existing rights-of-way with adequate sidewalks, bicycle lanes, or separated multi-use transit corridors.*

Implementing Actions:

a *Design, build, and modify existing bikeways to improve safety and separation from automobiles.*

Furthermore, the County has issued a draft of the *Maui Island Plan.* The purpose of the *Maui Island Plan* is to accomplish the following:

- Assess existing conditions, trends, and issues specific to Maui;
- Provide policy direction for the use and development of land, the extension and improvement of transportation services and infrastructure, the development of community facilities, the expansion of the island's economic base, the provision of housing, and the protection of natural and cultural resources;
- Establish policies to manage change and to direct decisions about future land use and development; and

- Provide the foundation to set capital improvement priorities, revise zoning regulations, and develop other implementation tools.

The proposed project is consistent with or promotes the following *Draft Maui Island Plan* objectives and policies relating to transportation:

Goal:
6.4 An interconnected, efficient, and well maintained, multimodal transportation system.

Objective:
6.4.1 More integrated island-wide transportation and land use planning program that reduces congestion and promotes more efficient (transit-friendly) land use patterns.

Policies:
1. Plan for an integrated multi-modal transportation system comprised of public transit, bicycle, pedestrian, automobile, and other transportation modes.

Objective:
6.4.2 Safe, interconnected roadway, bicycle, and pedestrian networks.

Policies:
1. Ensure that roadway and pedestrian facilities design and level-of-service standards respect the unique character of our communities.
2. Identify and improve hazardous and substandard sections of roadways and bridges, provided that the historical integrity of the roads and bridges are protected.

3.6 Wailuku-Kahului Community Plan

The Wailuku-Kahului Community Plan is one of the nine Community Plans for Maui County that reflects current and anticipated conditions in the Wailuku-Kahului region. The Wailuku-Kahului Community Plan provides recommendations regarding the goals, objectives and policies contained in the General Plan, while recognizing the values and uniqueness of the Wailuku-Kahului area in order to enhance the region's overall living environment.

The proposed project is consistent with the Wailuku-Kahului Community Plan goals, objectives, policies and implementing actions as follows:

Cultural Resources

Goal

Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that:

1. *Provide a sense of history and define a sense of place for the Wailuku-Kahului region; and*
2. *Preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawaii State Constitution, and the Hawaii Supreme Court's PASH opinion, 79 HAW.425 (1995).*

Objectives and Policies

1. *Recognize the importance of historically and archaeologically sensitive sites and encourage their preservation through development project review.*
2. *Protect and preserve historic, cultural and archaeological sites and resources through on-going programs to identify and register important sites, and encourage their restoration. This shall include structures and elements that are a significant and functional part of Hawaii's ethnic and cultural heritage.*
3. *Recognize and respect family ancestral ties to certain sites including burial sites, and establish cultural and educational programs to perpetuate Hawaiian and other ethnic heritages.*

Implementing Actions

4. *Require development projects to identify all cultural resources located within or adjacent to the project area and consult with individuals knowledgeable about such cultural resources prior to application as part of the County development review process. Further, require that all propose activity include recommendations to mitigate potential adverse impacts on cultural resources including site avoidance, adequate buffer areas, and interpretation. Particular attention should be directed toward dune areas, know and probable pre-contact habitation areas, and other sites and areas listed in No. 5 below, with review by the Cultural Resources Commission, where appropriate.*

5. *Significant Wailuku-Kahului region sites and areas include the following:*

   Wahi Pana (Significant Traditional Places)

   a. *Na Wai Eha (Waihee, Waiehu, Wailuku, Waikapu)*
   b. *Waihee Dunes Archaeological Complex*
   c. *Waihee Church*
   d. *Waihee Sugar Mill site*
   e. *Halekii-Pihanakalani heiau*
   f. *Waihee Dune complex*
   g. *Taro Loi in Iao Valley*
   h. *Traditional surfing sites*
   i. *Kanaha Pond*
   j. *Habitation and burial sites along Lower Main Street corridor*
   k. *Waiale Bridge*
   l. *Wailuku Civic Center Historic District*
   m. *Kama Ditch, Spreckles Ditch, and Waihee Ditch*
   n. *Kaahumanu Church*

o. Hale Hoikeike (Bailey House Museum)
p. Alexander House (next to Kaahumanu Church)
q. Waikapu Stone Church Site
r. Wailuku School
s. Puunene School
t. Puu One Sand Dune Formation from Kahului Harbor to Waikapu
u. Coastal sand dunes from Kahului Airport to Baldwin Park.
v. Kahului Railroad System sites (i.e., Roundhouse, Makaweli Rock Crusher Mill Foundation, etc)
w. Chee Kung Tong Society Hall site
x. Maui Jisha Mission
y. Naval Air Station Kahului Airport (NASKA)
z. Puunene Mill/Village
aa. Kahului Railroad Building and Old Kahului Store
bb. Buildings designed by C. W. Dickey-Wailuku Library, the Territorial Building in Wailuku, and the Baldwin Bank (Bank of Hawaii in Kahului)
cc. Wailuku Union Church
dd. Church of the Good Shepheard
ee. Iao Theater
ff. Plantation Manager's Residence in Wailuku
gg. St. Anthony's School
hh. Market Street from Main Street through Happy Valley
ii. Vineyard Street from Market Street to end
jj. Iao Stream

The above list is not comprehensive. It represents some of the well-known sites currently listed in the State inventory of Historic Places and on file with the State and National Registers of Historic Places. Many more sites have not yet been surveyed for historic, archaeological, and cultural significance.

The Department of Planning has (or will obtain from the State Historic Preservation Division) maps indicating the general location of these sites. Planning Department staff will obtain, maintain, and update all pertinent maps, which will be consulted prior to development proposals affecting the above-mentioned areas.

Infrastructure

Goal

Timely and environmentally sound planning, development and maintenance of infrastructure systems which serve to protect and preserve the safety and health of the region's residents, commuters and visitors through the provision of clean water, effective waste disposal and drainage systems, and efficient transportation systems which meet the needs of the community.

Transportation

Objectives and Policies

6. *Enhance circulation by improving road maintenance, improving or providing traffic signals and turning lanes at congested intersections; and by providing street and designation signs. Important intersections include Lono and Papa Avenues, and intersection along Papa Avenue, Wakea Avenue, and North Market Street. Additional turning lanes, traffic signals and roadway improvements in the Wailuku Town core should be designate to facilitate safe traffic movement and be compatible with the traditional character of the area.*
7. *Provide bikeway and walkway systems in the Wailuku-Kahului area which offer safe and pleasant means of access particularly along routes accessing residential district, major community facilities and activity centers, school sites, and the shoreline between Kahului Harbor and Paia.*
8. *Accommodate bicycle and pedestrian ways within planned roadway improvements.*

3.7 County of Maui Zoning

Roadways, such as the proposed project, are considered an incidental use that is permitted in each of the County's zoning districts. Since the proposed alignment falls within existing and designated State and County right-of-ways, there are no specific zoning standards or requirements which would require discretionary review from the Maui Planning Commission or the Maui County Council. County zoning districts adjacent to the project area are shown in Figure 3-3.

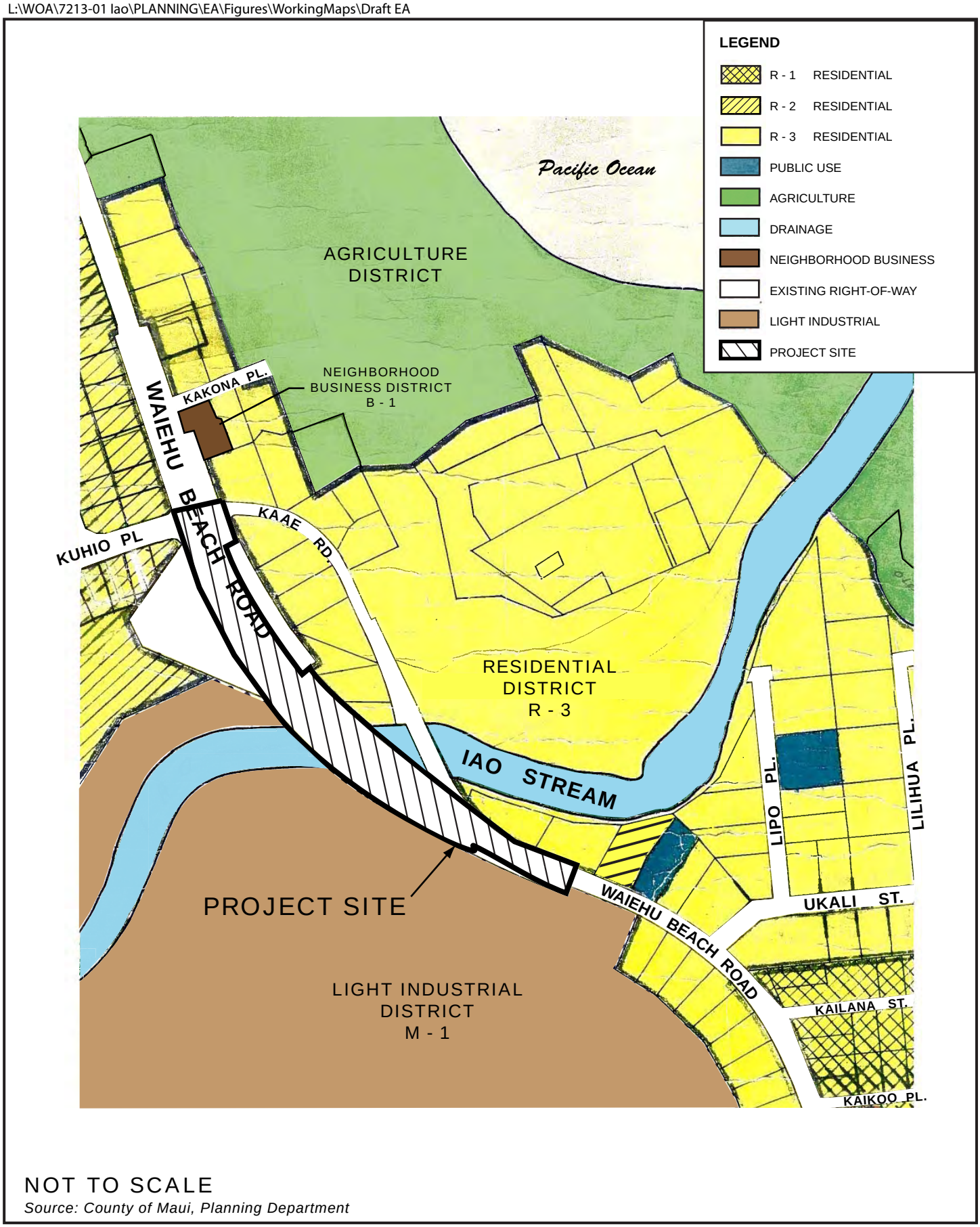
3.8 Maui Long-Range Land Transportation Plan

The 1997 *Final Report, Maui Long-Range Land Transportation Plan* documents the results of the County-wide Transportation Planning Process for Maui County – a joint, long-range transportation planning study conducted by the State Department of Transportation (DOT) and Maui County. The Plan serves as a guide for the development of the major surface transportation facilities and programs to be implemented within Maui County, including highway, transit, and bikeway elements.

An inventory and assessment of the existing roadway system and operating conditions are provided, as well as information on existing land use and socio-economic conditions on Maui. The Plan identifies long-range (to the year 2020) strategies and actions for the development of an integrated inter-modal transportation system that facilitates the efficient movement of people and goods.

Chapter VII of the Plan presents the Recommended Improvement Plan, which includes new highways, bypass highways, roadway extensions, roadway widenings, and improvements to intersections. Table 33 of the Plan provides a prioritized listing of the projects recommended for implementation.

L:\WOA\7213-01 Iao\PLANNING\EA\Figures\WorkingMaps\Draft EA



NOT TO SCALE

Source: County of Maui, Planning Department

FIGURE 3-3
MAUI COUNTY ZONING MAP

WAIEHU BEACH ROAD
REHABILITAITON OF IAO STREAM BRIDGE
State Department of Transportation, Highways Division

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

DEPARTMENT OF TRANSPORTATION • STATE OF HAWAII

Project number S11 involving Waiehu Beach Road from Kahului Beach Road to Kahekili Highway includes the proposed project. The “S” designation indicates that it is a State project and is needed in the 2007 to 2020 timeframe. The description calls for widening the road from two to four lanes. The proposed project is not intended to implement project number S11, which addresses roadway capacity. Instead, it is an independent project intended to accommodate and improve traffic safety for existing motorists, bicyclists and pedestrians in the community who utilize this section of road. The DOT plans to update the MLRLTP in 2012.

(This page intentionally left blank)

4. ALTERNATIVES TO THE PROPOSED ACTION

4.1 No Action Alternative

Under the no action alternative, the widening and associated improvements to Iao Stream Bridge and approach roads would not be pursued. Environmental impacts would be avoided, construction costs spared, and the need for permits precluded. The existing pavement would continue to degrade; substandard safety for motorists, pedestrians, and bicyclists would continue; and the curb height will remain near flush with pavement.

4.2 Alternative 1: Widen on Mauka Side of Existing Bridge

This alternative presents an alignment in which the roadway section of Iao Stream Bridge would have been widened only on the mauka side of the existing bridge structure. The roadway section at the Iao Stream crossing would have been increased to accommodate 12-foot travel lanes, 10-foot wide shoulders, and 5-foot wide sidewalks in each direction. In this alternative, the mauka side of the existing Iao Stream Bridge would have been widened by approximately 20.5-feet.

While this alternative would cost less and would require a shorter construction duration compared to the proposed action because the widening would only occur only on one side of the existing bridge structure, it would require the use of compound curves in order to transition between the existing roadway curvature and the shifting of the roadway centerline in the mauka direction at the Iao Stream Bridge and approaches. This alternative would not be ideal as compound curves are undesirable for highway alignment from a safety perspective. The Hawaii Statewide Uniform Design Manual for Streets and Highways (Manual) states that “compound curve(s) should be avoided” as the element of surprise is introduced to the driver through the winding effect of negotiating a compound curve.”

4.3 Alternative 2: Widen on Makai Side of Existing Bridge

This alternative presents an alignment in which the roadway section would have been widened only on the makai side of the existing bridge structure. The roadway section of the Iao Stream crossing would have been increased to accommodate 12-foot travel lanes, 10-foot wide shoulders, and 5-foot wide sidewalks in each direction. In this alternative, the makai side of the existing Iao Stream Bridge would have been widened by approximately 20.5-feet.

While this alternative would also cost less and require a shorter construction duration than the proposed action, it would require the use of compound curves as in Alternative 1, which was also rejected as a viable alternative.

4.4 Alternative 3: Alternative Alignment – Widened Bridge Approach and Transition to Exiting Roadway

For each of the alternatives, as well as the proposed action, an additional option for the transition of the widened roadway section at the Iao Stream Bridge to the existing roadway section on either side of the bridge approaches was proposed.

The additional option involved transition the widened Iao Stream Bridge roadway section back to the existing roadway section on either side of the bridge in the shortest distance possible. However, the roadway section beyond the project limits would have remained unimproved and the potential hazard to pedestrians and bicyclists would continue to exist.

5. REQUIRED PERMITS AND APPROVALS

The following is a list of permits and approvals, which may be required prior to construction of the proposed project:

Federal

- Department of the Army
  - Department of the Army, Nationwide Permit, Section 404, Clean Water Act

State of Hawaii

- Department of Health
  - Section 401, Clean Water Act, Water Quality Certification
  - National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Stormwater Activities
  - Noise Permit
  - Noise Variance

- Office of Planning
  - Coastal Zone Management (CZM) Federal Consistency Certification

- Department of Transportation
  - Permit to Perform Work Within State Highways

County of Maui

- Department of Planning
  - Special Management Area Permit
  - Special Flood Hazard Area Development Permit

(This page intentionally left blank)

6. ANTICIPATED DETERMINATION OF FONSI

The proposed project involves improvements to and the widening of a 0.24 mile section of Waiehu Beach road and the existing Iao Stream Bridge as well as bringing the entire bridge into compliance with current seismic standards. Potential impacts of the proposed project have been evaluated in accordance with the significance criteria of Section 11-200-12 of the Department of Health's Administrative Rules. Discussion of the project's conformance to the criteria is presented as follows:

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

The proposed project has been designed to avoid impacts to archaeological resources in the project vicinity. An Archaeological Literature Review and Field Inspection Report of the project site was conducted by Cultural Surveys Hawaii, Inc. in which previous archaeological studies indicated that *taro loi* likely existed on the banks of the stream, but any archaeological remains have been destroyed due to the substantial alteration of the natural landscape and soils during the construction of the Iao Bridge in 1954 and the channelization of the stream for the flood control project of the 1970's. Pre-contact human burials have also been documented in the sand dune system that the project site crosses. Although the majority of the project area has undergone extensive ground alterations, there is a location at the northeastern end of the project site where ground disturbance will take place, affecting the sand dune system. However, the amount of cutting is relatively minor. Excavation work on the mauka side of the roadway will involve removal of material from a 2-foot wide swath from the existing roadway shoulder. On the makai side of the roadway, only the toe of the adjacent dune system will be excavated. Excavation on both sides will be less than a foot below existing conditions. For ground disturbing activities, an archeological monitoring plan will be submitted for SHPD's review and approval before start of construction.

There will be no destruction or loss of any significant, endangered, or threatened botanical, faunal, geological, or other natural resources. None of the plant of animal species identified within the project site are threatened or endangered, or are a species of concern, and all can be found in similar environments throughout the island. There is no federally delineated Critical Habitat within or close to the project corridor, thus construction and operation of the proposed project twill not result in any impacts to federally designated Critical Habitat.

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

The proposed project will not curtail the beneficial uses of the environment. Use of the project site for the proposed project would be consistent with its current use as a bridge and a primary rural arterial.

(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's relationship to the environmental policies or goals and guidelines as expressed in Chapter 344 HRS, is discussed in Section 3.2 of this document.

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

In the short term, the project will confer positive benefits in the local area. Direct economic benefits will result from construction expenditures both through the purchase of material from local suppliers and through the employment of local labor, thereby stimulating that sector of the economy. Indirect economic benefits may include benefits to local retailing businesses resulting from construction activities.

There are no significant adverse long-term socio-economic impacts anticipated with the proposed project. The improvements to Waiehu Beach Road and Iao Stream Bridge are not expected to induce growth beyond that which is anticipated for the region. The improvements are intended to benefit the entire Waiehu-Wailuku region without impacting a specific ethnicity or income group. The proposed project will not result in a disproportionately high adverse impact on minority and low-income populations.

(5) Substantially affects public health;

No significant adverse long-term impacts are anticipated with the proposed project.

In the long-term, the proposed project will provide positive effects as the proposed improvements will widen the roadway approaches and Iao Stream Bridge to accommodate multi-use shoulders of consistent width on both sides of the road for bicycles, pedestrians and emergency vehicle pullout. An additional sidewalk on the mauka side will be separated by a guardrail from vehicular traffic. The primary purpose of the improvements is to enhance safety of motorists, bicyclists and pedestrians along this section of roadway.

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

No secondary effects are anticipated with the construction or operation of the proposed project. The project, in and of itself, is not anticipated to affect the population of the Wailuku District. Rather, the project is proposed to fulfill an essential community need to provide safe access to and from the region for vehicles, bicyclists, and pedestrian alike.

(7) Involves a substantial degradation of environmental quality;

The proposed project is not anticipated to involve a substantial degradation of environmental quality.

Construction activities associated with the proposed project will create some adverse short-term impacts such as temporary disruption of traffic, unavoidable noise impacts, and air quality impacts from soil excavation and other ground disturbance activities. The construction contractor(s) will be required to mitigate potential vehicular traffic impacts through appropriate traffic control measures (see Section 2.17.1). Unavoidable construction noise impacts on nearby land uses in the immediate vicinity of the proposed project will be mitigated to some degree by complying with the provisions of the State DOH Administrative Rules, Title 11, Chapter 46, Community Noise Control (see Section). Potential air quality impacts during construction of the proposed project will be mitigated by complying with the State DOH Administrative rules, Title 11, Chapter 60, Air Pollution Control (see Section 2.7).

Potential water quality impacts to Iao Stream and near shore coastal waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. A MPDES General Permit for storm Water Associated with Construction Activity administered by the State DOH will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural BMPs such as silt fences and minimizing time of exposure between construction and re-pavement.
In the long-term, no significant air quality, noise, or water quality impacts are anticipated from the operation of the proposed project.

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

No cumulative effects are anticipated, inasmuch as the proposed project involves improvements to an existing bridge and its approach roadways in an already urbanized setting.

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

No listed, candidate, or proposed rare, threatened, or endangered species of flora or fauna under either the Federal or State endangered species statutes nor any critical habitat units will be disturbed as a result of the proposed project.

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

No long-term significant impacts to air quality within the project site are anticipated with the construction of the proposed project.

During construction of the proposed project, two potential types of air pollution emissions will likely occur, resulting in air quality impacts: 1) airborne dust from construction activities such as grading and excavation within the project site; and 2) exhaust emissions from construction vehicles and equipment from the project site.

Potential air quality impacts during construction of the proposed development will be mitigated by complying with the State DOH Administrative Rules, Title 11, Chapter 60 “Air Pollution Control”. The construction contractor is responsible for complying with the State DOH regulations which prohibit visible dust emissions at property boundaries. Compliance with State regulations will require adequate measures to control airborne dust by methods such as water spraying and sprinkling of loose or exposed soil or ground surface areas and dust-generating equipment during construction. As may be deemed appropriate, planting of landscaping or re-paving as soon as possible on completed areas will also help to control dust. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving the equipment and personnel to the site during off-peak hours. Exhaust emissions from construction vehicles are anticipated to have negligible impact on air quality in the project vicinity as the emissions would be relatively small and readily dissipated.

Operation of the project will have no significant long-term impact on ambient air quality in the project vicinity. Air quality levels would be most affected by vehicular emissions generated

by project-related traffic, however, the elevated vehicular emission concentrations are anticipated to dissipate.

No long-term significant impacts to water quality within the project site are anticipated with the construction of the proposed project.

In the short term, potential water quality impacts to surface and near shore coastal waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Associated with Construction Activity, administered by the State Department of Health (DOH), will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural Best Management Practices (BMPs) such as silt fences and minimizing time of exposure between construction and re-vegetation or paving.

A Water Quality Certification (WQC), issued by the DOH, pursuant to Section 401 of the Clean Water Act, is required for “any activity including, but not limited to, the construction or operation of facilities, which may result in any “discharge” into navigable waters”. This certification is in place to regulate water quality during and after the construction phase of the project to assure discharge will meet State Water Quality Standards.

Construction activities are not likely to introduce to, nor release from the soil any materials which could adversely affect groundwater. Construction material wastes will be appropriately disposed of and must also be prevented from leaching into receiving bodies of water. Dewatering activity is not anticipated for this project.

No long-term significant impacts to noise levels within the project site are anticipated with the construction of the proposed project.

In the short term, noise from construction activities such as excavation, grading, cutting and paving will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may also increase as a result of operating heavy construction vehicles and other power equipments during the construction period.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, “Community Noise Control” noise control regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor’s responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. Also, the guidelines for hours of heavy equipment operation and noise curfew times as set forth by the DOH noise control rules will be adhered to; or if necessary, a noise permit will be obtained.

In the long-term, no significant noise impact from is anticipated once the proposed project has been completed. Noise from vehicles will continue to be the primary noise source along the project site, however, no adverse noise effects from the project are anticipated since the project will not generate additional traffic in the vicinity.

(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;

No short or long-term significant impacts are anticipated as the project site is not located within an environmentally sensitive area.

According to the Flood Insurance Rate Map (FIRM), Map number 15000300383E and 15000300384E, dated Sept 25, 2009, the project site straddles two flood zones. The Waiehu approach to Iao Stream Bridge lies within "Zone X, other areas" and is characterized as "areas determined to be outside the 0.2% annual chance floodplain." The Wailuku approach lies within "Zone X, other flood areas" and is characterized as "areas of 0.2% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected be levees from 1% annual chance flood." Iao Stream Bridge lies over "Zone AE" which is characterized as a "special flood hazard area subject to inundation by the 1% annual chance flood." Zone AE is also a "floodway," which is "the channel of the stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood height." The 1% annual flood is also commonly referred to as the 100-year flood or the base flood. The base flood elevation for the Iao Stream Bridge area have been determined to be between approximately 25 to 29 feet while the bottom of the bridge is at elevation 39 feet, well above the base flood.

The entire project site, makai side of the Waiehu Beach Road, is within the Tsunami Evacuation Zone, as determined by County and State Civil Defense agencies.

Construction activities within the respective flood hazard districts will be conducted in accordance with regulations set forth in Section 19.62.060, Maui County Code. Before construction of any development begins within any flood hazard area, flood-related erosion hazard area, or mudslide area, a special flood hazard area development permit shall be obtained from the director of the Department of Planning.

The project will also comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), as the project is within a Special Flood Hazard Area.

Studies will be conducted to ensure that any proposed encroachment in the floodway will not result in any increase in the regulatory flood elevations during occurrence of the regulatory flood. The studies will identify a certified flood elevation and evaluate flooding impacts, including the potential impact of proposed structures on flood elevations.

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

The proposed project is not anticipated to have significant impacts on notable view planes nor adversely affect important public viewing points or visual resources. As an already existing roadway and bridge, the project will not affect the scenic and visual character of the surrounding area.

(13) Requires substantial energy consumption.

Operation of the proposed project will not result in a significant increase in energy consumption.

7. CONSULTATION

7.1 Pre-Assessment Consultation

The following agencies and organizations were consulted during the preparation of the Draft EA. Of the 17 parties that formally replied during the pre-assessment period, some had no comments while others provided substantive comments as indicated by the ✓ and ✓✓, respectively. All written comments are reproduced herein.

Federal Agencies

✓✓ U.S. Army Corps of Engineers
✓ U.S. Fish and Wildlife Service
✓ U.S. Geological Survey

State Agencies

Department of Accounting and General Services
Department of Business, Economic Development and Tourism (DBEDT)
✓✓ Department of Hawaiian Home Lands
Department of Health (DOH)
DOH, Clean Water Branch
DOH, Environmental Management Division
DOH, Office of Environmental Quality Control
Department of Land and Natural Resources (DLNR)
✓ DLNR, Division of Boating & Ocean Recreation
✓✓ DLNR, Commission on Water resources Management
✓ DLNR, Division of Forestry and Wildlife
✓ DLNR, Division of State Parks
✓✓ DLNR, Engineering Division
✓ DLNR, Land Division
✓✓ DLNR, State Historic Preservation Division
DLNR, Maui/Lanai Island Burial Council
Office of Hawaiian Affairs
University of Hawaii Environmental Center

County of Maui Agencies

Civil Defense Agency
Cultural Resources Commission
Department of Fire and Public Safety
✓ Department of Parks and Recreation
✓✓ Department of Planning
✓✓ Department of Public Works
✓ Department of Transportation
✓✓ Department of Water Supply
Office of the Mayor
✓✓ Police Department

Elected Officials

Councilmember Danny Mateo, Council Chair

7.2 Draft EA Consultation

The following agencies and organizations will be consulted during the public review period of the Draft EA.

Federal Agencies

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Geological Survey

State Agencies

Department of Business, Economic Development and Tourism (DBEDT)
DBEDT, Energy Division
DBEDT, Office of Planning
Department of Hawaiian Homeland
Department of Health (DOH)
Department of Land and Natural Resources (DLNR)
DLNR, State Historic Preservation Division
Office of Hawaiian Affairs
University of Hawaii Environmental Center

County Agencies

Cultural Resources Commission
Department of Environmental Management
Department of Fire and Public Safety
Department of Planning
Department of Public Works
Department of Transportation
Department of Water Supply
Police Department

Elected Officials

Councilmember Danny A. Mateo, Council Chair

Utility Companies

Maui Electric Company
Oceanic Time Warner Cable
The Gas Company
Hawaiian Telcom

Other Interested Parties

Paukukalo Hawaiian Homestead Community Association
Waiehu Kou Community Homestead Association
Waiehu Kou residence Lots, Phase 2 Association
Waiehu Kou Phase 3 Association, Inc.
Waiehu Kou Phase 4
Trust for Public Lands
Wailuku Neighborhood Place

8. REFERENCES

County of Maui. *Countywide Policy Plan*. March 2010.

County of Maui. *Draft Maui Island Plan*. May 2010 (amended).

County of Mau, Maui County Council. *Wailuku-Kahului Community Plan.* 2002.

Environet, Inc. *Draft Environmental Assessment, Iao Stream Flood Control Project, Wailuku, Maui, Hawaii.* Prepared for the United States Army Corps of Engineers, Honolulu Engineering District and the County of Maui, Department of Public Works. March 2009.

Federal Emergency Management Agency, Flood Insurance Rate Map. *Panel Number 15000300383E*. Revised September 25, 2009.

Federal Emergency Management Agency, Flood Insurance Rate Map. *Panel Number 15000300384E*. Revised September 25, 2009.

Fukunaga and Associates. *Final Environmental Assessment, Iao Tank Site Well Development.* Prepared for the County of Maui Department of Water Supply. May 2009.

Geolabs, Inc. *Pre-Final Design Submittal Geotechnical Engineering Exploration, Waiehu Beach Road (Route 3400) Between Mile Posts 1.5 and 1.65, Rehabilitation of Iao Stream Bridge, Wailuku, Maui, Hawaii.* Prepared for Wilson Okamoto Corporation and the State Department of Transportation, Highways Division. September 2010.

Kaku Associates in association with Munekiyo & Arakawa, Inc. *Final Report Maui Long-Range Land Transportation Plan.* Prepared for the State Department of Transportation in cooperation with the County of Maui Department of Public Works and Planning Department. February 1997.

Maui Memorial Medical Center
http://www.mmmc.hhsc.org/

Munekiyo, Arakawa, and Hiraga, Inc. *Final Environmental Assessment, Paukukalo Preschool and Related Improvements.* Prepared for Kamehameha Schools. January 2001.

State Department of Transportation, Highways Division, Design Branch, Highway Design, Unit "E". *Highway Design Section Project Assessment for Waiehu beach Road Rehabilitation of Iao Stream Bridge Route 3400, District of Wailuku, Island of Maui.* May 2004.

U.S. Census Bureau American FactFinder:
http://factfinder.census.gov/home/saff/main.html?_lang=en

United States Department of Agriculture Natural Resource Conservation Service. *Web Soil Survey*. Internet. Available at: http://websoilsurvey.nrcs.usda.gov/app/.

United States Department of Agriculture Natural Resource Conservation Service. *Soil Classification*. Internet. Available at: http://soils.usda.gov/technical/classification/

Wilson Okamoto Corporation. *Concept Design Report, Waiehu Beach Road, Rehabilitation of Iao Stream Bridge, District of Wailuku, Island of Maui, Project NO. BR-STP3400(5)*. Prepared for the State Department of Transportation, Highways Division. April 2007.

APPENDIX A

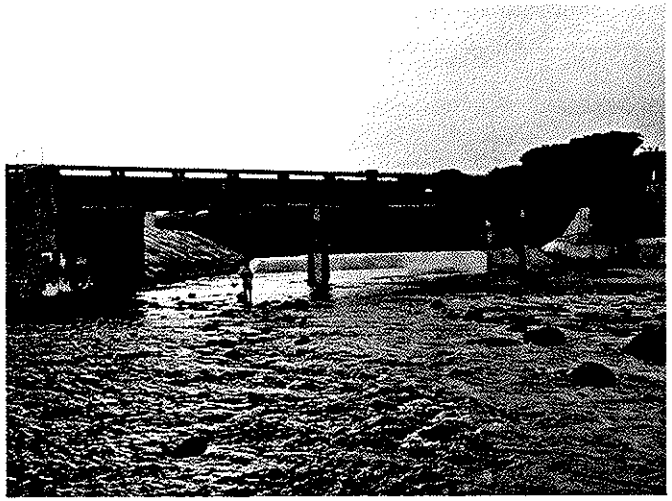
Stream Biological and Water Quality Survey for the Iao Stream Bridge Rehabilitation at Waiehu Beach Road, Maui

AECOS, Inc.

February 2011

AECOS No. 1132

Stream biological and water quality survey for the 'Īao Stream bridge rehabilitation at Waiehu Beach Road, Maui.



Prepared by:

AECOS Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe, Hawai'i 96744-3221

February 9, 2011

Stream biological and water quality survey for the 'Īao Stream bridge rehabilitation at Waiehu Beach Road, Maui

February 9, 2011 No. 1132

Chad Linebaugh
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe , Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

In December 2009, *AECOS*, Inc. biologists conducted biological and water quality surveys of 'Īao Stream near Wailuku, Maui (Fig. 1). The existing T-beam bridge crossing of Waiehu Beach Road is scheduled for rehabilitation. *AECOS*, Inc. was contracted by Wilson Okamoto and Associates, Inc.[1] to ascertain aquatic resources and assess water quality for the proposed project. This report presents findings of those surveys.

Stream Description

'Īao Stream is classified as a perennial stream by the State of Hawai'i, Division of Aquatic Resources and assigned a stream code of 6-2-009. The stream originates on the eastern slopes of the West Maui Mountains, southeast of Pu'u Kukui at an elevation of 2450 ft (817 m). The stream flows 7.3 mi (11.7 km) east-northeast through Wailuku, reaching its outlet to the Pacific Ocean at Nehe Point, approximately 1 mi (1.6 km) northwest of Kahului Harbor. 'Īao Stream waters are diverted for agricultural use at several points, serving the Iao-Waikapu Tunnel, Iao-Maniania Tunnel, Waihee Ditch, Kama Ditch, and the Spreckels ditch that connects the Mill and Waiale Reservoirs (USGS, 2009).

[1] This document will be incorporated into the Environmental Assessment (EA) for the 'Iao Stream Bridge Rehabilitation Project and will become part of the public record.

At the bridge project site, the stream bed consists of a basalt boulders, cobbles, and gravel covering the bottom of a concrete lined channel 164 ft (50 m) wide. The concrete lined stream banks are approximately 15 ft (5 m) in height. Stream bank vegetation is sparse upstream and absent downstream of the project site because of the nature of the banks. Vegetation upstream includes Guinea grass ( ), Bermuda grass ( ), wire grass ( ), fingergrass ( ), graceful spurge (*C*), spiny amaranth ( ), and wedelia ( ).

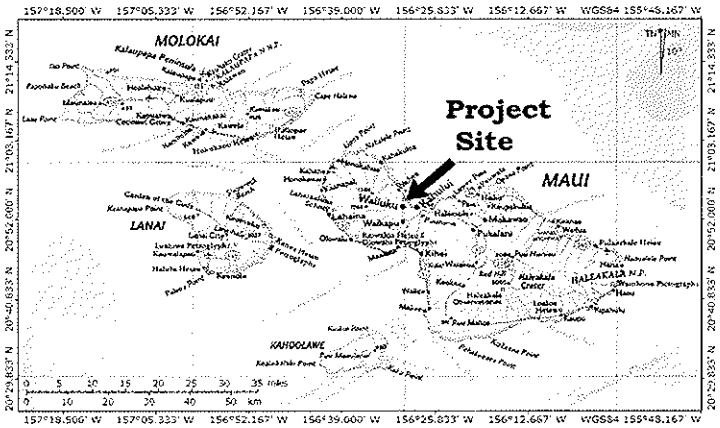


Figure 1. General location of the project near Wailuku, Maui.

Survey Methods

AECOS biologists surveyed a 1.5-mi (2.4-km) segment of 'Īao Stream on December 4, 2009, to identify any aquatic biota present and to measure water quality within the project area. The survey extended from above the Imi Kala St. footbridge, downstream to the stream's outlet at Nehe Point. High stream flow on the survey date precluded looking at areas further upstream for safety reasons. Field measurements of water quality and water quality samples were taken at three station locations in the project area. Table 1 lists analytical methods and instrumentation used in the analysis of water quality.

Table 1. Analytical methods and instruments used for water quality analyses of 'Īao Stream waters sampled on December 4, 2009.

Analysis	Method	Reference	Instrument
Ammonia	EPA 350.1 M	Grasshoff et al. (1986)/ EPA (1993)	Technicon AutoAnalyzer II
Conductivity	SM 2510-B	Standard Methods, 20th Edition (1998)	Hydach pH/conductivity meter
Dissolved Oxygen	SM 4500-O G	Standard Methods 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
Nitrate + Nitrite	EPA 353.2 Rev 2.0	EPA (1993)	Technicon AutoAnalyzer II
pH	SM 4500 H+	Standard Methods 20th Edition (1998)	Hannah pocket pH meter
Temperature	thermister calibrated to NBS. Cert. thermometer SM 2550 B	Standard Methods 20th Edition (1998)	YSI Model 550A Dissolved Oxygen Meter
Total Nitrogen	persulfate digestion/EPA 353.2	Grasshoff et al (1986)/ EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion/EPA 365.1 Rev 2.0	Grasshoff et al. (1986)/EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540 D	Standard Methods 20th Edition (1998)	Mettler H31 balance
Turbidity	EPA 180.1 Rev 2.0	EPA (1993)	Hach 2100N Turbidimeter

EPA. 1993. Methods for the Determination of Inorganic Substances in Environmental Samples. EPA 600/R-93/100.
Grasshoff, K., M. Ehrhardt, & K. Kremling (eds). 1986. Methods of Seawater Analysis (2nd ed). Verlag Chemie, GmbH, Weinheim.
Standard Methods. 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. 1998. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA, & WEF. 1220 p.

Station "Upstream" was located 900 ft (275 m) upstream from the bridge at Waiehu Beach Road. Station "Bridge" was collected a few meters downstream from the bridge slated for rehabilitation. Station "Downstream" was collected 1375 ft (420 m) downstream from Waiehu Beach Road. All water samples were collected on December 4, 2009 and delivered to *AECOS*, Inc. in Kāne'ohe, Hi for laboratory analysis (*AECOS* Log No 25754). An alga was collected near Sta. Bridge for microscopic examination and identification.

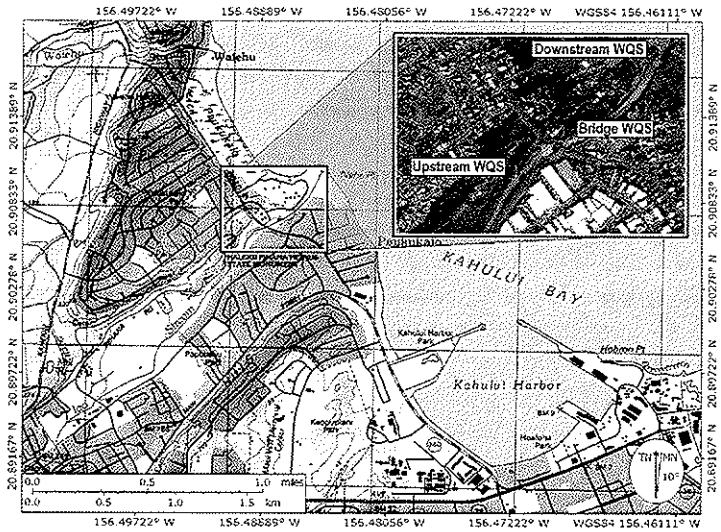


Figure 2. Location of water quality samplinging stations in 'Īao Stream near Waiehu Beach Road, Maui.

Results

Water Quality

Table 2 lists water quality characteristics of 'Īao Stream on December 4, 2009. Stream flow was high, with water flow across the entire width of the channel in most of the survey area. Total suspended solids concentrations and turbidity levels were low, reflecting the good underwater visibility experienced during the survey. Dissolved oxygen concentrations appeared slightly low for such brisk flowing surface water. Sta. "Downstream" had elevated pH for stream water. Nitrate-nitrite concentrations at all sampled stations were elevated, whereas total nitrogen and total phosphorus levels are low.

Table 2. Water quality characteristics of 'Īao Stream on December 4, 2009.

Station	Time (hh:mm)	Temp. (°C)	Dissolved Oxygen (mg/l)	Dissolved Oxygen (% sat.)	pH --	Conductivity (µmhos/cm)
Upstream	1548	22.4	6.86	79	7.58	111
Bridge	1532	22.8	6.83	79	7.88	112
Downstream	1459	23.5	6.72	79	8.41	114

	TSS (mg/l)	Turbidity (ntu)	Ammonia (µg/l)	Nitrate + Nitrite (µg/l)	Total N (µg/l)	Total P (µg/l)
Upstream	1.0	1.04	<4	87	178	17
Bridge	1.5	1.02	<4	92	160	17
Downstream	0.8	1.40	<4	95	147	18

Aquatic Biota

A list of aquatic biota identified from 'Īao Stream on December 4, 2009, is presented in Table 4. The marine toad ( ) and a chlorophyte (sp.) were the only organisms observed in the stream at the proposed project site at Waiehu Beach Road. A few fishes and invertebrates inhabit the estuarine reach of 'Īao Stream, downstream from the project site. Mullet ( ) and ( ) occur in small schools. Crayfish (; molts or carcasses only) and dragonfly/damselfly naiads (Order Odonata) were seen.

Assessment

Stream waters, as determined on December 4, 2009 during a freshet flow event, have depressed oxygen concentrations and elevated nitrate-nitrite con-

Table 3. Checklist of aquatic biota observed on December 4, 2009 by *AECOS*, Inc. biologists or reported (DAR, 2009) from the lower reach of 'Īao Stream, Maui.

PHYLUM, CLASS, ORDER, FAMILY	Common name	Abundance	Status	Notes
	ALGAE			
CHLOROPHYTA, CHLOROPHYCEAE, CHAETOPHORALES CHAETOPHORACEAE				
Kuetzing sp.	green algae	R	Ind.	<2>
	INVERTEBRATES			
MOLLUSCA, GASTROPODA BASOMMATOPHORA LYMNAEIDAE				
unid.	lymnaeid snail	--	Nat.	<3>
ARTHROPODA, INSECTA, DIPTERA CHIRONOMIDAE				
unid.	midge	--	Nat.	<3>
ARTHROPODA, INSECTA, ODONATA				
unid.	naiad	R	--	<1>
COENAGRIONIDAE				
sp.	damselfly	--	End.	<3>
ARTHROPODA, MALACOSTRACA, DECOPODA ATYIDAE				
J.W.Randall	mountain shrimp;	--	End.	<3>
CAMBARIDAE				
Girard	American crayfish	R	Nat.	<1>
	FISHES			
CHORDATA, ACTINOPTERYGII ENGRAULIDAE				
Fowler	Hawaiian anchovy;	O	End.	<1>
MUGILIDAE				
L.	mullet ;	O	Ind.	<1>
KUHLIDAE				
Gill sp.	flagtail; *'āholehole*	--	Ind.	<3>

Table 3 (continued).

PHYLUM, CLASS, ORDER, FAMILY Genus species	Common name	Abundance	Status	Notes
GOBIIDAE				
Valciennes	*ākea*	--	Ind.	<3>
Gill		--	End.	<3>
Gill	*'o'opu nōpili*	--	End.	<3>
	AMPHIBIANS			
CHORDATA, AMPHIBIA, ANURA BUFONIDAE				
L.	cane toad	R	Nat.	<1>
	BIRDS			
CHORDATA, AVES, CICONIIFORMES CHARADRIIDAE				
J.F.Gmelin.	golden plover; *kōlea*	R	Ind.	<1>

KEY TO SYMBOLS USED:
- Abundance categories:
  - R – Rare – only one or two individuals observed.
  - U – Uncommon – several to a dozen individuals observed.
  - O – Occasional – seen irregularly in small numbers
  - C – Common -observed everywhere, although generally not in large numbers.
  - A – Abundant – observed in large numbers and widely distributed.
- Status categories:
  - End – Endemic – species found only in Hawaii
  - Ind. – Indigenous – species found in Hawaii and elsewhere
  - Nat. – Naturalized – species were introduced to Hawaii intentionally, or accidentally.
- Identification codes:
  - <1> – field identification on December 4, 2009
  - <2> – sample specimen collected December 4, 2009 and identified by microscopic examination.
  - <3> – reported historically present by Division of Aquatic Resources (DAR, 2009)

centrations relative to State of Hawai'i water quality criteria for streams (Table 4). A single sampling event does not imply impairment for these parameters, as a geometric mean of at least three sampling events would be required to determine compliance. However, 'Īao Stream is listed on the Hawai'i Department of Health, 2006 list of impaired waters in Hawai'i (HDOH, 2006), prepared under Clean Water Act §303(d). This listing states that the stream does not meet the state water quality standards for certain parameters, specifically turbidity and trash based solely on a visual assessment.

An aquatic macrofauna community was not present at the project site during the December 4, 2009 survey. The only aquatic species encountered was a

chlorophyte (alga), from the genus . A few estuarine species are present farther downstream from the project, a short distance inland from the ocean. Historical data (DAR, 2009) indicate that populations of both native and introduced fishes and invertebrates inhabit 'Īao Stream well upstream of the project site. The presence of native, diadromous (stream gobies) and (stream shrimp or prawns) in the upper reaches of the steam means that the stream segment through the project site provides passage up and down the stream—at least during freshets—for these populations.

Table 4. State of Hawai'i water quality criteria for streams (geometric mean values) for wet (Nov. 1-Apr. 30) and dry (May 1-Oct. 31) seasons from HAR §11-54-05.2(b).

Parameter	Total Nitrogen (µg N/l)	Nitrate + Nitrite (µg N/l)	Total Phosphorus (µg P/l)	Turbidity (NTU)	Total Suspended Solids (mg/l)
Not to exceed given value					
(dry season)	180.0	30.0	30.0	2.0	10.0
(wet season)	250.0	70.0	50.0	5.0	20.0
Not to exceed more than 10% of the time					
(dry season)	380.0	90.0	60.0	5.5	30.0
(wet season)	520.0	180.0	100.0	15.0	50.0
Not to exceed more than 2% of the time					
(dry season)	600.0	170.0	80.0	10.0	55.0
(wet season)	800.0	300.0	150.0	25.0	80.0

- pH – shall not deviate more than 0.5 units from ambient and not be lower than 5.5 nor higher than 8.0.
- Dissolved oxygen – not less than 80% saturation.
- Temperature – shall not vary more than 1 °C from ambient.
- Conductivity – not more than 300 micromhos/cm.

None of the fishes nor invertebrate species observed during these surveys is listed as threatened or endangered by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended, or by the State of Hawaii under its endangered species program (DLNR 1998; USFWS, 2009). However, the construction phase will need to guarantee passage of diadromous fauna

through the project site at all times. A Best Management Practices (BMP) plan should be designed and implemented to minimize environmental impacts to water quality and aquatic biota in the vicinity of or downstream of the project site.

References

Division of Aquatic Resources (DAR). 2009. Atlas of Hawaiian Watershed & Their Aquatic Resources. Island of Maui, Wailuku Watersheds, 'Īao Stream. URL: http://www.hawaiiwatershedatlas.com/watersheds/maui/62009.pdf; last accessed on December 1, 2009.

Hawai'i Department of Health (HDOH). 2004. Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards. 62 pp.

Hawai'i Department of Land and Natural Resources (DLNR). 1998. Indigenous Wildlife, Endangered and Threatened Wildlife and Plants, and Introduced Wild Birds. Department of Land and Natural Resources. State of Hawai'i. Administrative Rule §13-134-1 through §13-134-10, dated March 02, 1998.

U.S. Fish & Wildlife Service (USFWS). 2009. Endangered and Threatened Wildlife and Plants. 50CFR 17:11 and 17:12. Available online at URL: http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=HI&status=listed; last accessed on Jan 5, 2010.

U.S. Geological Society (USGS). 2009. Recent hydrologic conditions, 'Īao and Waihee aquifer areas, Maui, Hawaii. Pacific Islands Water Science Center. Available online at URL: http://hi.water.usgs.gov/recent/iao/; last accessed on April 1, 2010.

APPENDIX B

Archaeological Literature Review and Field Inspection for the Iao Bridge Widening and Sidewalk Improvements Project
Wailuku Ahupuaa, Wailuku District, Maui Island

Cultural Surveys Hawaii

March 2010

Archaeological Literature Review and Field Inspection for the ʻĪao Bridge Widening and Sidewalk Improvements Project
Wailuku Ahupuaʻa, Wailuku District, Maui Island
TMK: (2) 3-4-30

Prepared for

Wilson Okamoto Corporation

Prepared by

Colleen Medeiros Dagan B.S.,

Tanya L. Lee-Greig

and

Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.

Wailuku, Hawaiʻi

(Job Code: WAIEHU 1)

March 2010

Oʻahu Office
P.O. Box 1114
Kailua, Hawaiʻi 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
16 S. Market Street, Suite 2N
Wailuku, Hawaiʻi 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Archaeological Literature Review and Field Inspection for the ʻĪao Bridge Widening and Sidewalk Improvements Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island. TMK (2) 3-4-30 (Dagan and Hammatt, 2009)
Date	March 2010
Project Number (s)	Wilson Okamoto Corporation (WOC) Project No. 7213-01 Hawaii State Department of Transportation Project No.BR-STP-3400(5) Cultural Surveys Hawaiʻi, Inc. Job Code: Waiehu 1
Permit Number	CSH completed the literature review and field inspection under state archaeological permit No. 0920 issued by the Department of Land & Natural Resources/State Historic Preservation Division (DLNR/SHPD) per Hawaiʻi Administrative Rules (HAR) Chapter 13-13-282.
Project Agencies	Federal: Federal Highway Administration (FHWA) State: Hawaiʻi Department of Transportation (HDOT) Hawaiʻi Department of Land and Natural Resources /State Historic Preservation Division (DLNR/SHPD)
Land Jurisdiction	Hawaiʻi State Department of Transportation (HDOT)
Project Location	TMK (2) 3-4-30, Wailuku Ahupuaʻa, Wailuku District, Island of Maui.
Project Acreage and Description	The project area includes approximately 0.77 acres. The HDOT will be widening a portion of Waiehu Beach Road which includes the ʻĪao Bridge and the roadway from Kaae Place to Nukuwai Place. All improvements will be conducted within the existing right-of-way.
Project Area of Potential Effect (APE)	The APE for this project includes the Waiehu Beach Road right-of-way from Kaae Place to Nukuwai Place and includes the ʻĪao Bridge and a portion of the ʻĪao stream channel which the bridge spans. The approximate area of disturbance for the project is 0.77 acres.

Project Historic Preservation Regulatory Context	Due to FHWA funding, this project is considered a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the federal Department of Transportation Act (DTA). As an HDOT project within state lands, the project is additionally subject to State of Hawai'i environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/Hawai'i Administrative Rules (HAR) Chapter 13-13-275, respectively]. This document is intended to assist in the project planning efforts and historic preservation review process. This literature review and field inspection does not fulfill SHPD requirements of an archaeological inventory survey as mandated by Hawai'i Administrative Rules (HAR) 13-276-5.
Document Purpose	This document has been requested by the client, Wilson Okamoto Cooperation to provide guidance in the planning process in regard to State Historic Preservation Division requirements.
Fieldwork Effort	Mrs. Colleen Medeiros Dagan B.S. performed a field inspection of the project area on August 26 and October 8, 2009. A total of six man hours were utilized for these inspections.
Identified /Cultural Resources	'Īao Bridge constructed in 1954.
Discussion of Project Effect and Mitigation Recommendation	Due to previous archaeological findings of pre-contact habitation features and cultural deposits as well as human burials in the vicinity of the project area, and due to the project area's proximity to the Halekii-Pihana State Monument, archaeological monitoring is recommended during ground disturbing activities for the bridge widening and sidewalk improvements project. The 'Īao Bridge was built in 1954 and is now 55 years old. It is eligible to be recorded on the State Inventory of History Properties. It may also be eligible for nomination and listing on the Hawai'i and National Registers of Historic Places. Review and recordation of this bridge by the State Historic Preservations Division's Architecture branch may be required.

Table of Contents

Management Summary i
Section 1 Introduction 1
1.1 Project Background 1
1.2 Scope of Work 4
1.3 Environmental Setting 4
1.3.1 Natural Environment 4
1.3.2 Built Environment 7
Section 2 Methods 10
2.1 Field Methods 10
2.2 Document Review 10
Section 3 Background Research 11
3.1 Traditional and Historic Background 12
3.1.1 Habitation and Subsistence 12
3.1.2 Politics and Warfare 13
3.1.3 1800 to 1850 14
3.1.4 1850s to 1900 19
3.2 'Īao Stream and Bridge Projects 23
3.2.1 The Postwar Years 1945-1955 23
3.2.2 1960 to Present 24
3.3 Modern Land Use 26
3.4 Previous Archaeological Research 26
3.5 Background Summary and Predictive Model 33
Section 4 Field Inspection Results 34
Section 5 Summary and Mitigation Recommendations 39
5.1 Recommendations 39
Section 6 References Cited 40

List of Figures

Figure 1. USGS Topographic map showing the project area location. 2
Figure 2. TMK map showing current project area. 3
Figure 3. Lithified dune sand at northwestern end of project area. 5
Figure 4. Soil Survey Map over topographic map of project area. 6
Figure 5. Wailuku Town Center view south. 7
Figure 6. Waiehu Beach Road and 'Īao Bridge view east. 8
Figure 7. Waiehu Beach Road and 'Īao Bridge view northeast. 8
Figure 8. Neighboring Okinawan Cultural Center view east. 9
Figure 9. Adjacent residence view northeast. 9
Figure 10. The present project area is located between the Wailuku Town Center and the Paukukalo Hawaiian Home Lands subdivision. Each region of Na Wai 'Eha is delineated by blue lines that run from the high mountain ridges in the West Maui Mountains to the alluvial soils of north Maui. 11
Figure 11. Land Claim Awards near the project area. 18
Figure 12. A photograph of the Wailuku Sugar Company mill, taken about 1880, at the western edge of the 'Īao Stream meander (collection of Robert Hill). 20
Figure 13. A Kahului Railroad Company train transporting bagged sugar from Wailuku to the Kahului Harbor (*Locomotive Engineering*, Vol. XIII, No. 11, Nov. 1900, New York). 21
Figure 14. A photograph of Wailuku, taken about 1890 by an unknown photographer, shows the buildings in the upland areas of the ahupua'a from the white steeple of Ka'ahumanu Church (far left) to the Wailuku Sugar Company mill (white smokestack, right) (collection of Robert Hill). 23
Figure 15. A portion of the Wailuku (1998) U.S.G.S. 7.5 minute topographic quadrangle showing the location of the current project area and nearby archaeological studies 31
Figure 16. Sand visible at neighboring property. 34
Figure 17. Lithified dune sand and talus. 35
Figure 18. Talus pile at northwestern end of project area. 35
Figure 19. Pihana heiau from 'Īao Bridge view west. 36
Figure 20. Ground surface consists of sandy fill material. 36
Figure 21. Channelized stream view east to Nehe Point. 37
Figure 22. 'Īao Bridge and stream channel. Chain link fencing on western railing of bridge. 38
Figure 23. 'Īao Bridge view west, graffiti visible and seismic rockers visible atop bridge piers. ..38

List of Tables

Table 1. Land Commission Awards and Grants in the Vicinity of the Current Project Area 16
Table 2. Previous Archaeological and Historical Studies in Wailuku and Waiehu Ahupua'a 27

Section 1 Introduction

1.1 Project Background

Cultural Surveys Hawai'i, Inc. was contracted by Wilson Okamoto Corporation to perform an archaeological literature review and field inspection for the Hawaii State Department of Transportation (HDOT) for the 'Īao Bridge widening project, Wailuku Ahupua'a, Island of Maui (TMK (2) 3-4-30) (Figure 1 and Figure 2). The Area of Potential effect or APE, hereafter referred to as the "project area", for this project is situated between the Wailuku Town Center and the Paukukalo Hawaiian Home Lands subdivision and includes the Waiehu Beach Road right-of-way from Kaae Place to Nukuwai Place. The 'Īao Bridge is located within the project area. In addition to the 'Īao Bridge widening, the project includes sidewalk improvements from Kaae Place to Nukuwai Place

The portion of the 'Īao Stream that crosses the project area was heavily modified during the 1970's for the 'Īao Stream Flood Control Project. The stream was bed was excavated and the stream walls were heightened and reinforced with concrete. Today, a channelized stream exists.

Three alternatives for the bridge widening were considered: Alternatives A, B, and C. Alternative A was recommended in the Concept Design Report (Wilson Okamoto Corporation 2007) and has been chosen as the construction design. This bridge widening design would increase the bridge width 10 feet 3 inches on both the *mauka* and *makai* sides. The roadway would be increased to 12 foot wide travel lanes, shoulders increased to 10 feet wide and sidewalks on both sided would increase to a five foot width. On the Waiehu end of the existing bridge Waiehu Beach Road cuts through a lithified sand dune. Minimal cut of this dune will be required on the *mauka* side of the roadway and may be required on the *makai* side as well. Construction of this alternative will also include extending the concrete pier supports, bridge abutments and footings on both sides of the structure, increasing seismic strengthening of the structure. All construction and engineering improvements will be accomplished within the existing road right-of-way.

In addition to the bridge widening, two options for improvements to roadway and sidewalks approaching the bridge were considered and Option 1 was chosen as the preferred Option. Option 1 would continue widening improvements from the bridge to the intersections with Kaae Place and Nukuwai Place. This option would increase the roadway and excavation work but it would also improve highway safety.

Due to federal funding through the Federal Highways Administration (FHWA), this project is considered a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the federal Department of Transportation Act (DTA). As an HDOT project within state lands, the project is additionally subject to State of Hawai'i environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/Hawai'i Administrative Rules (HAR) Chapter 13-13-275, respectively]. This document is intended to assist in the project planning and facilitate the historic preservation review process. This literature review and field inspection does not fulfill SHPD requirements of an archaeological inventory survey as mandated by Hawai'i Administrative Rules (HAR) 13-276-5.

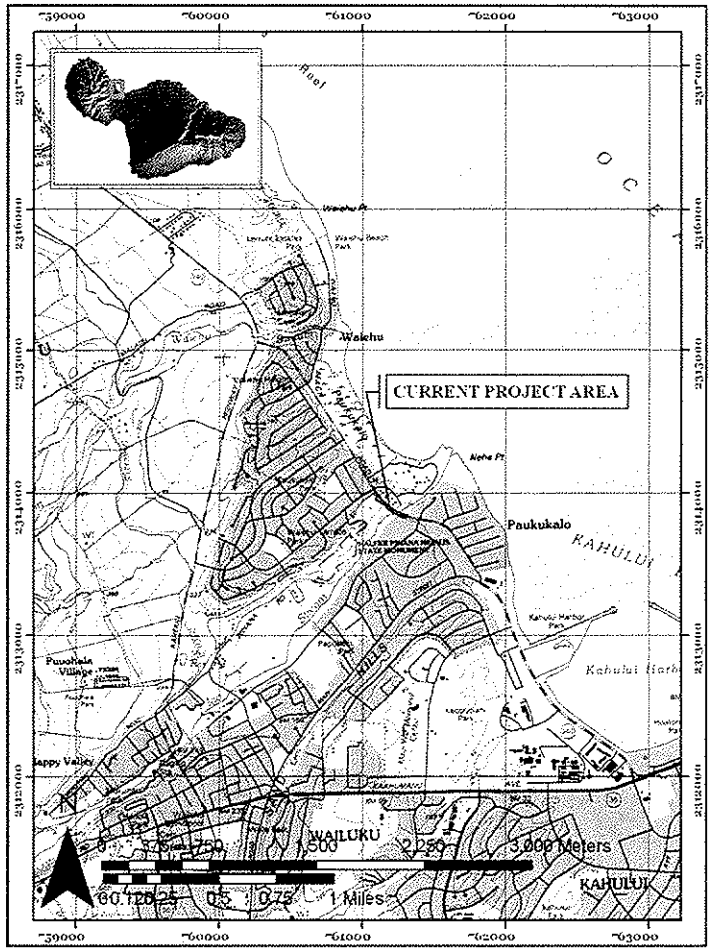


Figure 1. USGS Topographic map showing the project area location.

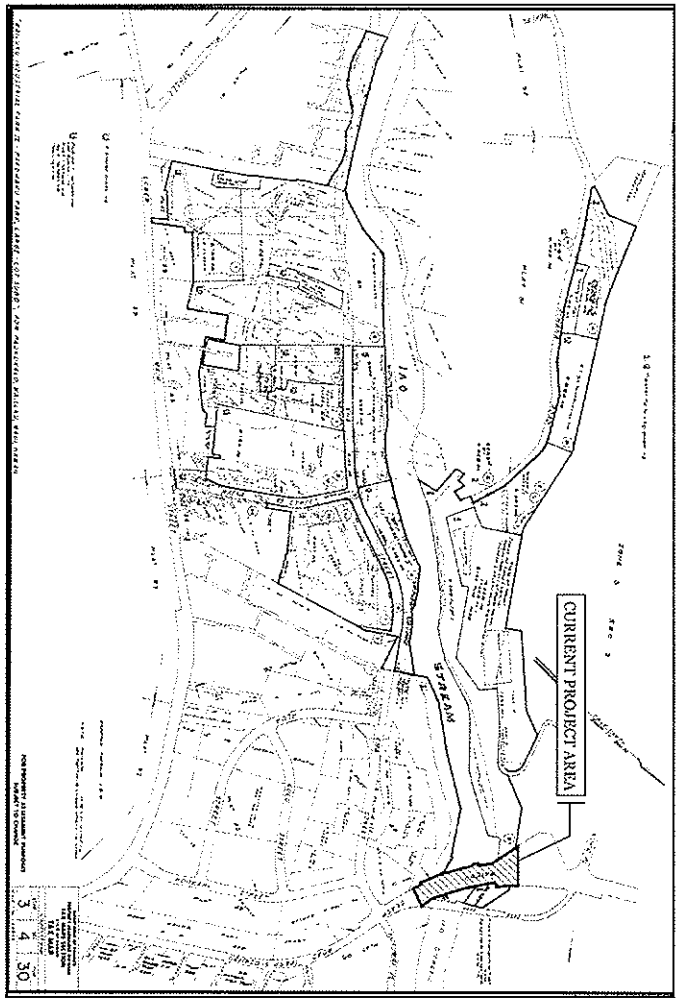


Figure 2. TMK map showing current project area.

1.2 Scope of Work

The scope of work for this archaeological literature review and field inspection included:

1) Historical research, including study of archival sources, historic maps, Land Commission Awards and previous archeological reports, to construct a history of land use and to determine if archaeological resources have been recorded either on or near the property.
2) Field inspection of the project area to identify any surface archaeological resources and to investigate and assess the potential for impact to such sites. This assessment identified sensitive areas that required further investigation or mitigation before the project proceeds.
3) Preparation of a report to include the results of the historical research and the field work with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

1.3 Environmental Setting

1.3.1 Natural Environment

The current project area is situated approximately 0.40 kilometers (km) (approximately 0.25 mile) to the west of the coastline, overlying alluvial deposits approximately 40 feet to feet above mean sea level (AMSL). Most of the alluvial deposits in Wailuku are derived from the igneous rocks of the Wailuku Volcanic Series, the shield building and oldest exposed lavas of the West Maui Mountains. The Wailuku Volcanic Series consists primarily of thin *pahoehoe* and *a'a* lava flows of basaltic lavas that are considered to be of late Pliocene to early Pleistocene age, approximately 1.3 million years old, as determined by the potassium-argon method of dating. The shield building activity of the Wailuku Volcanic Series was followed by the Honolua Volcanic Series during the Pleistocene epoch with little apparent break in time. A considerable number of vents along the north and northeast rift zones of West Maui produced lava flows during this latter series of volcanic activity, covering the older Wailuku Series lavas on the northeast flank just north and south of Waiehu Valley (Macdonald et al. 1983). The end of the Honolua Volcanic Series on West Maui was followed by a long period of erosion during which the deep valleys were formed and most of the older alluvium and colluvium that chokes the heads of these valleys was deposited, likely owing to a rise in sea level and consequent reduction in stream gradient.

The project area is located within the Pulehu-Ewa-Jaucas soil association. Geographically these soils are associated with 'Iao and Jaucas soils (Foote et al. 1972:117). These soils consist of deep and nearly level to moderately sloping, well-drained and excessively drained soils with moderately fine textured to coarse textured subsoil or underlying material found in alluvial fans or basins (Foote et al. 1972: General Soil Map Maui Island). The project area is in PZUE or Puuone sand with a 7 to 30 percent slope. At the time of the 1972 soil survey, lands consisting of this soil were used for pasture and home sites (Foote et al. 1972:117) (Figure 3 and Figure 4).

Average annual rainfall is 20 to 30 inches, falling mostly in the winter. The heavy annual rainfall at the summit of the West Maui Mountains, approximately 350 inches a year (Giambelluca et al. 1986). Prior to stream diversion for sugar cane, the 'Īao Stream was a perennially stream. Average annual temperatures range from a maximum of about 85° F in late summer to a minimum of about 60° F in mid-winter (Stearns 1942: 27) with typical trade winds out of the northeast. Vegetation within the project area consists of *kiawe* (*Prosopis pallida*) and short grasses.

Figure 3. Lithified dune sand at northwestern end of project area.

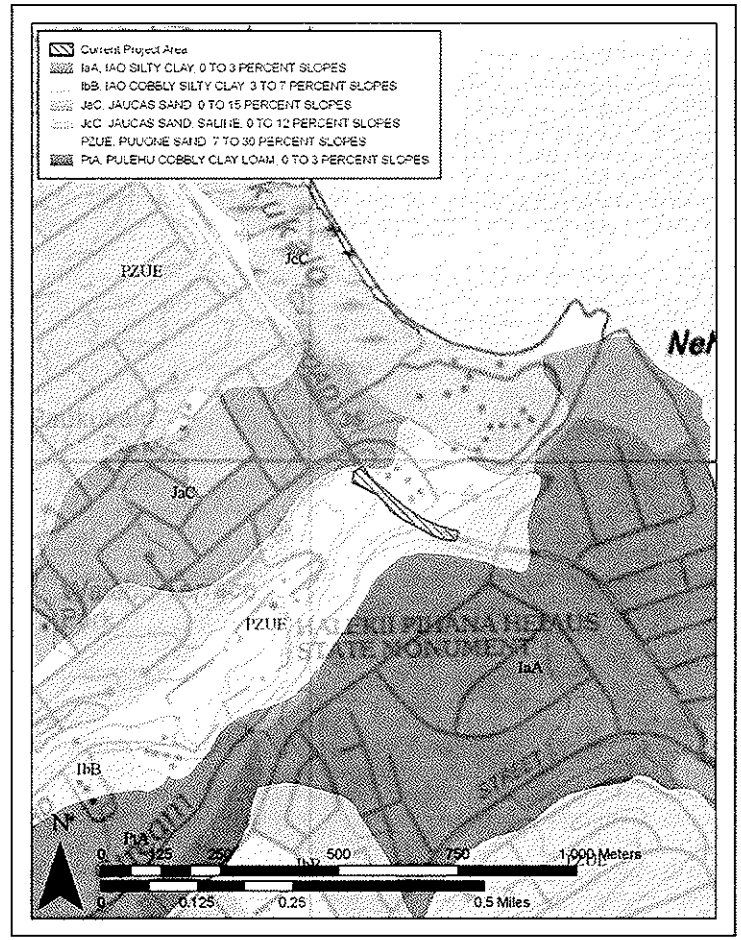


Figure 4. Soil Survey Map over topographic map of project area.

1.3.2 Built Environment

The project area includes the 'Īao Stream Bridge which carries Waiehu Beach Road over 'Īao Stream. The bridge is situated centrally between the Department of Hawaiian Home Lands Paukukalo subdivision and the Wailuku Town Center. The Wailuku Town Center, south of the project area, is a small strip mall that consists of a Sac-N-Save grocery store, a McDonalds and other assorted shops. The Town Center is located within Wailuku Industrial Park, a typical industrial park with large warehouses for automotive, carpet and industrial business. On the west side of Waiehu Beach Road there are residential homes and to the east is the Maui Okinawan Cultural Center (Figure 5, Figure 6, Figure 7, Figure 8 and Figure 9).

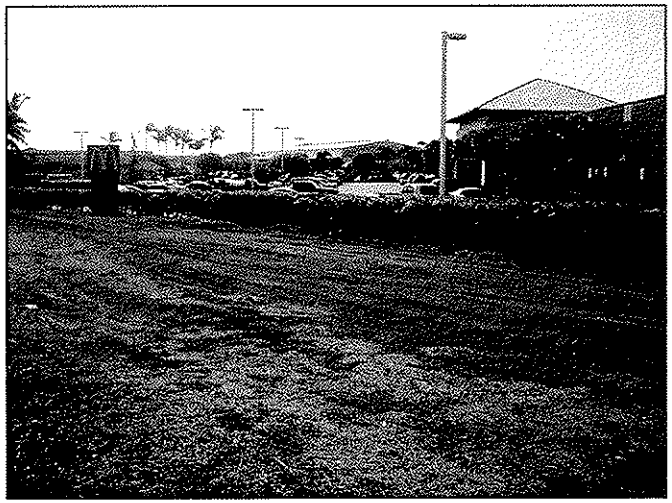


Figure 5. Wailuku Town Center view south.

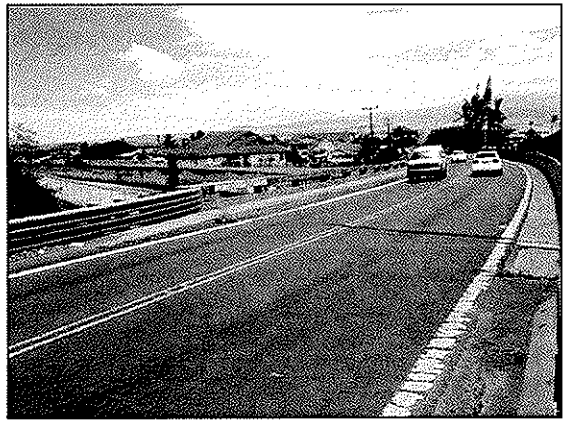


Figure 6. Waiehu Beach Road and 'Īao Bridge view east.

Figure 7. Waiehu Beach Road and 'Īao Bridge view northeast

Figure 8. Neighboring Okinawan Cultural Center view east.

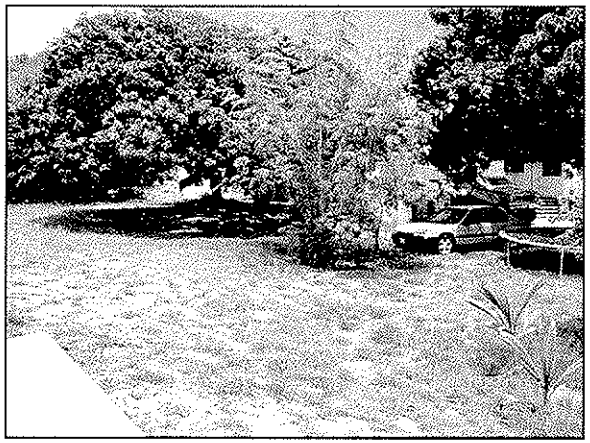


Figure 9. Adjacent residence view northeast.

Section 2 Methods

2.1 Field Methods

Mrs. Colleen Medeiros Dagan B.S. conducted a pedestrian field inspection for the bridge widening project August 26, 2009 under the supervision of Cultural Surveys Hawaii, Inc. (CHS) principal archaeologist Hallett H. Hammatt Ph. D. An additional site visit was conducted on October 8, 2009 by Mrs. Dagan, accompanied by Tanya Lee-Greig CSH Maui Office manager, and WOC personnel: Mrs. Laura Mau, Mr. Earl Matsukawa, Mr. Evan Kawashima and Ms. Yukino Tanaka.

A total of five man hours were utilized for the filed inspection and site visit.

The August 26, 2009 pedestrian inspection included the approximate footprint of the project area. The exposed ground surface was inspected for evidence of cultural materials. Soils within the project area were also inspected. During the site visit with the WOC team, specific construction details were discussed as the party observed the different areas to be impacted.

2.2 Document Review

Background research included a review of previous archaeological studies on file at SHPD/DLNR and a review of documents and maps at the Cultural Surveys Hawai'i library. Land Commission Award documentation was consulted using the Waihona 'Āina online database. Historic research of the 'Īao Bridge was conducted with the support of the Maui Department of Transportation office resources.

Section 3 Background Research

The current project area is located in Wailuku Ahupua'a, Wailuku District, Maui Island (Figure 10). Located within one of five centers of traditional settlement (Handy et al. 1991:272), Wailuku Ahupua'a is a part of an *'okana* or sub-district (Moffat and Fitzpatrick 1995:23) of Maui referred to as Na Wai 'Eha, or "The Four Waters" (Handy et al. 1991:496). Geographically and culturally, Na Wai 'Eha consists of four deep valley streams that supply water to four distinct areas of taro land in near-shore valleys (Handy et al. 1991: 272).

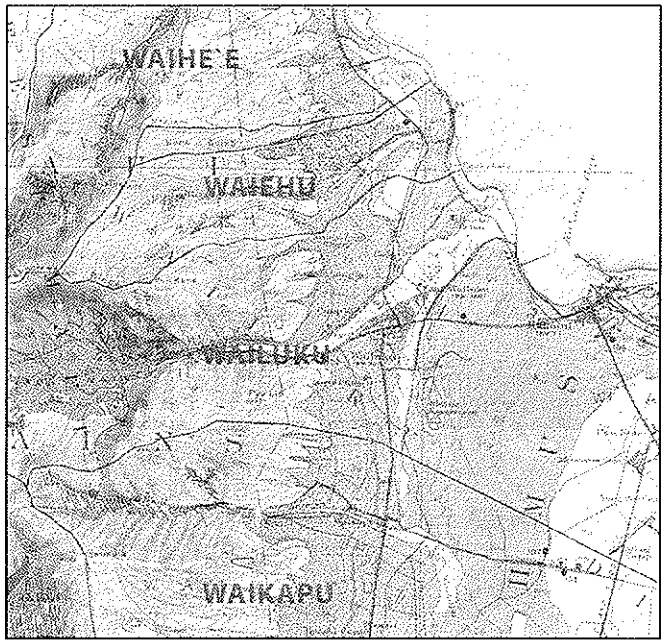


Figure 10. The present project area is located between the Wailuku Town Center and the Paukukalo Hawaiian Home Lands subdivision. Each region of Na Wai 'Eha is delineated by blue lines that run from the high mountain ridges in the West Maui Mountains to the alluvial soils of north Maui.

3.1 Traditional and Historic Background

The English Reverend Henry T. Cheever travelled to the Sandwich Islands and landed at Maui in 1843, almost twenty five years after the passing of Kamehameha I and the adoption of Christianity among the Hawaiians. In his travels, Cheever came upon the region of Na Wai 'Eha, four valleys of north Maui renowned for their fertile agricultural settlements. These four valleys were the subject of many legends and sayings. Cheever recounts his observations, and explains the origin of the name Wailuku, based on the order of battle between Maui's chief Kalanikupule and the success of the invading army of Hawai'i's Kamehameha I:

> There are, in this region, four streams in succession from the different gorges of the mountain, significantly named, it is thought, from the events of battle, which have transpired upon them. Waikapu – The water where the conch was blown and the engagement began. Waiehu – The water where the combatants smoked with dust and perspiration. Wailuku – The water of destruction, where the battle began to be fierce and fatal. Waihee – The water of total rout and defeat, where the army melted away (Cheever 1851:59).

King David Kalākaua, in his collection of Hawaiian oral traditions *The Legends and Myths of Hawaii*, recounts a "remarkable event [that] had occurred at Wailuku" during the late 14th or 15th century when Wakalana, the principal chief of West Maui, was in residence there. According to Kalākaua (1990) there was an "appearance in the [Hawaiian] group of a vessel bearing people of a strange race, described by tradition as 'white, with bright, shining eyes'":

> It was a Japanese vessel that had been dismantled by a typhoon, driven toward the North American coast until it encountered the northwest trade-winds, and then helplessly blown southward to the coast of Maui...It was hazardous to approach the wreck too nearly, but Wakalana succeeded in rescuing from the waves and returning to Wailuku with five persons, but not before he saw the last fragment of the wreck disappear in the abyss of raging waters. (Kalākaua 1990:182-183)

3.1.1 Habitation and Subsistence

"From Waihe'e to Wailuku Valley, in ancient times was the largest continuous area of wet-taro cultivation in the islands" (Handy et al. 1991:496). The high degree of cultivation within Wailuku Ahupua'a, along the flood plain of 'Īao Stream, and its near neighbors gives evidence that a substantial population would have been established in the region during the pre-contact period. Historical documentation also mentions the Wailuku spring, from which the ahupua'a gets its name. The Wailuku spring was located "several hundred yards from the base of Pihana" [*heiau*] and was reserved for *ali'i* crops (Thrum 1908: 46).

While Hawaiian traditions do not relate the size of the Wailuku population in terms of pre-contact demography, density and distribution can be inferred by the number and locations of Land Commission Awards (LCAs) as well as traditional accounts of Wailuku Ahupua'a as a seat of political power. It is interesting to note, however, that the LCAs within Wailuku Ahupua'a are clearly clustered along the valley floor and flood plain of 'Īao Stream, as well as upon the alluvial fans extending from the base of the West Maui Mountains, in comparison to the area noted as "Sand Hills" and surrounding sand dunes.

3.1.2 Politics and Warfare

The *moku* of Wailuku and Hāna comprised the two rival societies on Maui Island. It was only in the mid-16th century, during the reign of the Wailuku chief Pi'ilani, that the "Hana chiefs finally acknowledged the West Maui king's rule" (Cordy 1981:210). By the second half of the 18th century, Maui *ali'i* - including the ruling chief Kahekili - are reported to have been residing at Wailuku, with the chiefs of Wailuku enjoying the surf of Kehu and Ka'akau (Kamakau 1992:83).

While the chiefly intra-island rivalry between East and West Maui was settled, the political rivalry between the *ali'i* of Hawai'i Island and Maui Island continued. Where Hāna had been the primary stage of battle, Wailuku would come to take a central role in the fight for political gain during the latter part of the 18th century. It was in the sand hills of Wailuku that Kahekili and his forces from O'ahu and Maui would do battle with the armies of Kalani'opu'u, chief of Hawai'i, that had invaded Maui.

Following a losing battle at Kaupō in 1775, Kalani'opu'u dedicated several war *heiau* on Hawai'i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* (priest) Kaleopu'upu'u who directed construction of the *heiau* of Kaluli and Pu'uohala on the north side of Wailuku. When Kaluli Heiau was completed Kaleopu'upu' said to Kahekili:

> This is the house of your god; open the sluice gate that the fish may enter. [Kamakau 1992: 85].

In the year 1776, the warriors of Kalani'opu'u landed at Keoneo'o'io where their war canoes extended to Mākena at Honua'ula and proceeded to ravage the countryside. Kalani'opu'u himself went on to Kīheipuko'a at Kealia with additional forces that stretched to Kapa'ahu – 800 strong and eager to drink the waters of Wailuku:

> Across the plains of Pu'u'ainako (Can-trash-hill) and Kama'oma'o shone the feather cloaks of the soldiers ... Ka-hekili was at Kalanihale just below Kihahale and above the plateau of Ka'ilipoe at Pohakuaokahi ... Kaleopu'upu'u [said] to Ka-hekili, "The fish have entered the sluice; draw in the net." [Kamakau 1992:85]

The forces of Kahekili descended on and destroyed the soldiers of Kalaniopu'u, slaying the Alapa (elite soldiers of Kalaniopu'u) on the sand hills at the southeast of Kalua:

> ...the Maui army had the advantage of a well chosen position. The Hawaiians had to fight uphill or else drift down to the sand hills. In either case advance was difficult ... There was a full day of savage fighting, marked by inhuman acts of awful brutality. The native account of the battle says: "It was not a war characterized by deeds of princely courtesy." Many noted names of valiant chiefs were never again mentioned in Hawaiian story. The story and the life ended together in this Wailuku battle. [Westervelt 1977:139-140]

Only two men escaped to Kīheipuko'a in Kīhei to tell Kalaniopu'u the news of their defeat. According to Westervelt, the battle that took place received the name in Hawaiian history - "The furious destruction at Kakanilua" - Kakanilua was the name of the sand hills below Wailuku. After a second day of warfare, Kalaniopu'u sued for peace and was granted such by Kahekili and his messengers at Kīheipuko'a (Kamakau 1992:88-89). Kalaniopu'u returned to Hawai'i Island.

A few years later, Kahekili was again at Wailuku when Capt. James Cook and his ships *Resolution* and *Discovery* encountered Maui. Cook first sighted the island on November 26, 1778; his ship *Resolution* positioned three miles off Kahului, he recorded in his logbook:

> In the country was an elevated saddle hill, whose summit appeared above the clouds. From this hill, the land fell in a gentle slope, and terminated in a steep rocky coast, against which the sea broke in a dreadful surf. Finding that we could not weather the island, I bore up, and ranged along the coast to the Westward. It was not long before we saw people on several parts of the shore, and some houses and plantations. The country seemed to be both well wooded and watered; and running streams were seen falling into the sea in various places. (in Speakman 1978:23)

Cook records that the Hawaiians who came out in canoes to trade for supplies appeared "to be of the same nation with the inhabitants of the islands more to leeward [*i.e.* O'ahu and Kaua'i] which we had already visited [ten months earlier in January 1778]; and ... they knew of our having been there" (in Speakman 1978:23-24).

The battle of Kepaniwai, fought in 'Īao Valley in 1790, would be the last great conflict on Maui. Kamehameha's victory over Kahekili consolidated his control of Maui. It is said that Kamehameha visited Pihana *heiau* before this battle (Thrum 1908). With the peace engendered during Kamehameha's reign, no further accounts of events and life at Wailuku are recorded in the remainder of the 18th century.

3.1.3 1800 to 1850

The initial documentation of life in Wailuku during the first half of the 19th century was recorded by the Protestant missionaries who established their station at Wailuku in 1832. The missionary census of 1831-1832 recorded a total population of 2,256 in Wailuku Ahupua'a, comprising 918 adult males, 860 adult females, and 478 children (Schmitt 1973:18). By the time of the 1840 census, the Wailuku population had dropped to 1,364, representing a diminution of 892 (Schmitt 1973:38).

An account by one of the missionaries in Wailuku, Rev. Richard Armstrong, gives a vivid picture of a tsunami at Kahului where the "entire village of 26 native grass houses" was carried away; in his journal entry of Nov. 8, 1837, Armstrong records:

> A strange phenomenon appeared last evening in our neighborhood. About seven o'clock in the evening, the waves of the ocean just opposite our station, at a small harbor [*i.e.* Kahului], gradually receded from the shore to a distance of some 15 or 20 rods leaving multitudes of fishes upon the ground, so that the children observing it ran and picked up some of them; leaving a small schooner also, which was at anchor in the harbor, without sufficient water to float her completely, and the wave slowly formed itself as it were into an embankment, or as the natives said, a "steep precipice." Then, as if having collected strength enough for the onset, the wave rushed back upon the beach, overflowed the banks, and carried away the entire village of 26 native grass houses with all their effects and inhabitants, some 40 or 50 rods inland, throwing most of the wrecks of houses, broken canoes, fowls, beasts, men, women, and children into a small lake

> of perhaps three miles circumference, which lay immediately inland from the village.
>
> The rush of the wave was so sudden and unexpected, that the inhabitants of the village, unlike Lot in Sodom, had no warning whatever, except a few who seeing the sea receding from the shore suspected a corresponding reflux, and fled inland in season. But it is not easy for water to baffle a Hawaiian, this being the element with which he is most familiar. Some swam single handed with the waves. Others took their children in their arms. Others the sick on their backs and bore them up until the waters ceased from the earth. One man took his old mother on his back and swam with her until he reached the dry land, but, laying her down on the ground, he found she was dead. Another poor old woman, having no one to assist her, and it being dark got into the small lake and was drowned. These are all the lives that were lost. (*Maui News* Nov. 10, 1937)

Armstrong also recorded that the "overflow was confined to less than two miles of coast" and noted a report that "a similar overflow occurred shortly after the death of Kamehameha I, but no houses were destroyed or lives lost."

Three years later, Armstrong reported on the first effort to grow sugar at Wailuku; in a letter dated July 7, 1840 he wrote:

> By request of the King I have taken some part in inducing the people about me to plant sugar cane. A fine crop of 60 or 70 acres is now on the ground ripe, and a noble water mill set up by a Chinaman is about going into operation to grind it. I keep one plow a-going constantly with a view to the support of the schools. We shall get in 10 acres of cane the present season. (*Maui News* March 22, 1941)

One of the schools to be supported was likely the girls' school which had opened at Wailuku in 1836 (Kamakau 1992:405).

At the mid-19th century *Māhele*, the *ahupua'a* of Wailuku was declared Crown Land. Subsequent *kuleana* awards to individuals were made of parcels within the *ahupua'a*. As mentioned previously, a map of 1882 shows that the majority of the Land Commission Awards (LCAs) were focused along the flood plain of the 'Īao Valley Stream, as well as *mauka* of the area identified as the "Sandhills". The disposition of these awards may reflect a continuation into the post-contact era of the traditional Hawaiian settlement of Wailuku.

The following table presents the LCA located adjacent to the current 'Īao Bridge location. These ten claims include a total of 164 taro *lo'i*, two inland ponds, eight *kula* or pasture lots, eight houses, several *lauhala* clusters and six claims include *poalima lo'i*. The individuals who made these claims were clearly dependant on the 'Īao Stream. An early survey of the 'Īao Stream shows a many taro *lo'i* along the stream (Waihona 'Aina 2002) (Figure 11).

Table 1. Land Commission Awards and Grants in the Vicinity of the Current Project Area

Land Claim Award/ or Grant	Claimant	'Ili of Wailuku and Waiehu	Land Use	Landscape Features	Amount of Land Claimed
LCA: 3234C	Kaianui	Nehe, Paukukalo, Piilani	4 *lo'i*, and 2 ponds	Two *loko*, or ponds, and a wall/fence	Four *'āpana*
LCA: 3464	Kamakaoolea	Nehe, Papohaku	17 *lo'i*, one *kula*, and one house lot. This claim contains a *Poalima lo'i*.	Wall/fence and Stream/*Muliwai* three *lauhala* trees	Six *'āpana*
LCA: 3482	Kaiakailoa	Nehe	14 *lo'i*, a *kula*, and a house	An edifice, a *lauhala* tree, a *Muliwai*/Stream and a cattle pen.	One *'āpana*
LCA: 3386	Pehuino	Kuhimana, Paukukalo, Kapaaloa, Pauniu, Holu	28 *lo'i*, one *kula*, a house lot. and one *pō'alima lo'i*	Wall/fence and three *lokoia*/fishponds.	Five *'āpana*. (one apana containing two lo'i were disputed by Kaianui)
LCA: 3476	Kahula	Nehe	35 *lo'i*, one *kula*, one house and one *poalima lo'i*	Two *lauhala* trees	Six *'āpana*
LCA: 8559B*M	William C. Lunalilo, Kanaina, Charles for King	Ahupua'a of Waiehu 2.	A house lot	A government road traverses the *ahupua'a*	Several ahupua'a13 *'āpana*
LCA: 2481	Kalawekua, wahine	Nehe	12 *lo'i*, one *kula*, contains a *poalima lo'i* also referred to as a *haku one lo'i*.	Wall/fence	One *'āpana*
LCA: 3462	Kalomi	Ohia, Kaluaolena, Halawa and	37 *lo'i*, one house lot and a *kula* lot. Four		Three *'āpana*

Land Claim Award/ or Grant	Claimant	'Ili of Wailuku and Waichu	Land Use	Landscape Features	Amount of Land Claimed
		Ahikuli	*poalima*		
LCA: 3463	Kalaiwahea	Nehe	10 *lo'i*, a house lot, a *poalima*, and a wall/fence.		Three *'āpana*
LCA: 3471	Kekumamaawa for Nalehu	Nehe, Lamalii, Pohoiki	37 *lo'i*, one house lot, *poalima lo'i*, and *kula* lots.	*Lauhala* trees	Seven *'āpana*

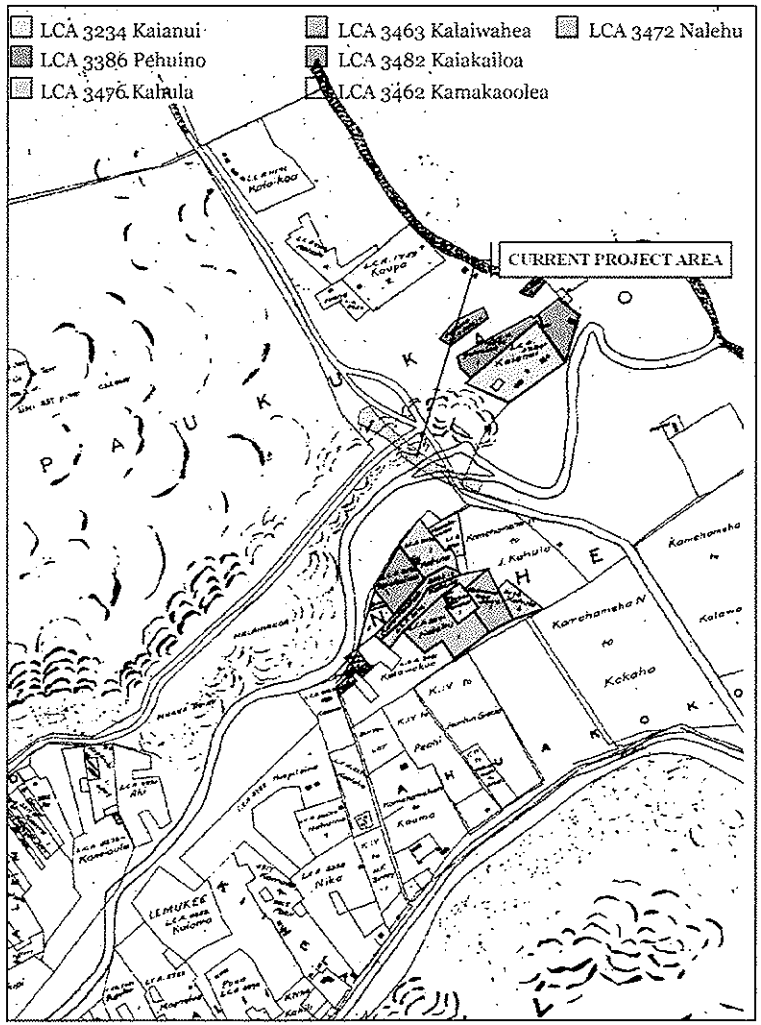


Figure 11. Land Claim Awards near the project area.

In 1823, a Chinese merchant named Hungtai established the first sugar mill in Wailuku. It is probable that the cane used was native cane growing in the neighborhood, which was carried by mule to the mill. Hungtai took his own life in 1841, and little is known about the fate of his business. It is known that he sold white sugar, and white sugar-based syrup in Wailuku (Dorrance 2000). By 1849, a number of simple mills were in operation on Maui, powered by oxen moving small sets of wooden rollers. Large try-pots brought by whalers were used to boil the extracted molasses without regard to crystallization and sugar recovery. The resulting thick syrup, an essential ingredient in the manufacture of rum, was sold primarily from sales to whalers (Wadsworth 1936).

In the mid-1840's, when the English Reverend Henry Cheever first travelled to the missionary station at Wailuku, he commented on refreshing trade winds and lush greenery, as opposed to dusty and hot conditions at the missionary station in Lahaina.

> As you get into the valley and vega of Wailuku, you see numerous remains of old kihapais, or cultivated lots, and divisions of land now waste, showing how much more and extensive formerly was the cultivation, and proportionally numerous the people, than now. It is so all through this foodful region. From accounts kept one year by Mr. Green (Reverend Jonathan Smith Green), he estimated that the births were to the deaths as one to five; and he says the population has fallen off very greatly since the time he was first settled here [1832] (Cheever 1851:92).

His remarks continued:

> The whole valley of Wailuku, cultivated terrace after terrace, gleaming with running waters and standing pools, is a spectacle of uncommon beauty to one that has a position a little above it (Cheever 1851:93).

3.1.4 1850s to 1900

The second half of the 19th century was marked by commercial development within Wailuku Ahupua'a. Teams of oxen and horses pulled freight between the town of Wailuku and the ship landing at Kahului. The Wailuku Sugar Company was organized in 1862 by James Robinson & Company, Thomas Cumming, J. Fuller and C. Brewer and Company (Figure 12). That same year, Thomas Hobron purchased land in Waihe'e Valley for the cultivation of sugar cane. "Christopher Lewis became the first owner of the Waihee Plantation, and L.L. Tolbert was its first manager" (Kelly et al 1978:12). A sugar mill in Waihe'e was constructed in 1863, and the first production figures for the crop of 1865 were promising - 757 tons of sugar and 45,000 gallons of molasses. The mill manager was Samuel T. Alexander, and the mill's head foreman was Henry P. Baldwin, both of whom would resign in the late 1860's to establish their own small sugar enterprise in Sunnyside (lower Makawao).

Constructed between June and September 1879, the Wailuku and Kahului Railroad carried passengers and freight from the sugar enterprises of Wailuku to the port of Kahului. Success was instantaneous, and Thomas Hobron's family partnership with his two sons-in-law, William H. Bailey and William Owen Smith, made plans to expand the railroad to include sugar mills at Spreckelsville and Pā'ia (Figure 13). In 1881, King David Kalākaua signed papers that created the Kahului Railroad Company and that designated Hobron's railroad as an official "common

carrier" for passenger traffic. In 1886, Hobron's railroad was sold to the Wilder Steamship Company which subsequently applied for and received, in 1889, authorization from the Hawaiian government to engage in maritime shipping operations. Ten years later, in 1899, the Kahului Railroad Company was once again sold, this time to the Hawaiian Commercial & Sugar Company, now headed by Henry P. Baldwin and Samuel T. Alexander.

Following his success in building the Honomanū Ditch linking East Maui water sources with his sugar fields in the central isthmus, sugar grower Claus Spreckels engineered the Waihe'e Ditch (also named the Spreckels Ditch) in 1882, to tap water resources from West Maui. The 15-mile-long ditch started at the 435 foot elevation of Waihe'e Stream, and carried 60 million gallons of water (per 24-hour day) to the Wai'ale Reservoir at the 214 foot elevation of Wailuku. Spreckels became the first plantation owner to irrigate his fields with mountain water from both East and West Maui (Wilcox 1996). By 1888, the Spreckels plantation covered 28,000 acres, making it the largest sugar plantation in the world.

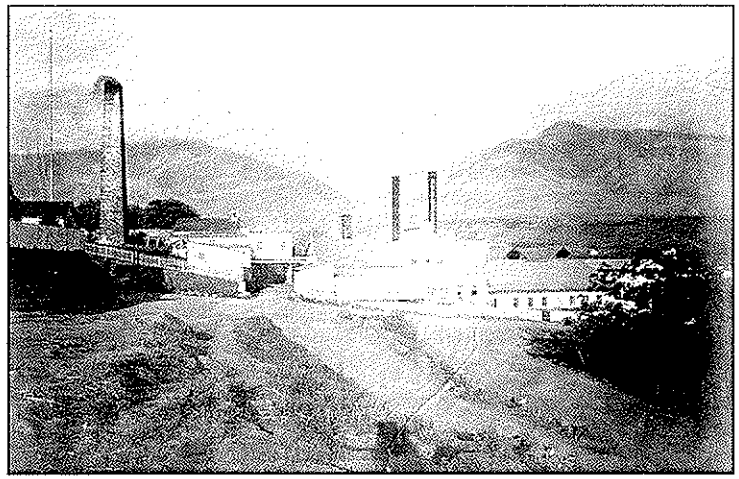


Figure 12. A photograph of the Wailuku Sugar Company mill, taken about 1880, at the western edge of the 'Īao Stream meander (collection of Robert Hill).

Government censuses document the growth of the population of Wailuku during the decades of the latter 19th century: in 1853 the total population was recorded as 4,463, in 1872 it had dropped to 3,002; in 1878 it had risen to 4,186; in 1890 it was 6,708; and by 1900 the population was 7,953 (Schmitt 1973:12-13). The censuses reflect the influx of immigrant workers to the burgeoning sugar plantations of Maui. An early photograph, *ca.* 1890, of the view from the Wailuku sand hills, shows sugar cane fields encompassing all sides of the town of Wailuku with a church in the foreground and 'Īao Valley in the background (Figure 14)

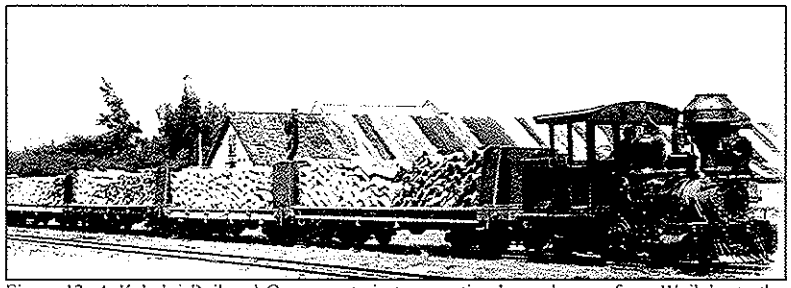


Figure 13. A Kahului Railroad Company train transporting bagged sugar from Wailuku to the Kahului Harbor (*Locomotive Engineering*, Vol. XIII, No. 11, Nov. 1900, New York).

By 1900, Wailuku had a system drawing water from 'Īao Valley to a reservoir in town, a newspaper, and three hotels. A power plant was planned for Kahului to supply electricity to Wailuku. But 1900 was also the year in which the bubonic plague broke out in Kahului; the first death recorded as caused by the plague occurring on Saturday, February 4th. An article in the *Maui News* of February 17, 1900 announced:

> The plague has reached Maui. Six deaths have occurred and the whole of Chinatown [in Kahului] is a heap of ashes. The people of Maui are aroused to action and feel confident of being able to control and stamp out the pest in a short time...
>
> ...Sheriff Baldwin at once established a strict quarantine at Kahului which is still maintained. The Maui Board of Health met at once and selected a site for a pest house and one for a detention camp, the latter being established at the race track of the Maui Racing Association...
>
> ...by noon on Monday [Feb. 13] the detention camp was ready for its occupants. Over 200 Chinese, Japanese and natives were fumigated and dressed in new suits, and at two o'clock the procession quickly moved out to their new quarters.
>
> Scarcely had they reached their destination before everything was prepared for the destruction of their old quarters. At three o'clock a cloud of dust and broken timbers leaped into the air, accompanied by the savage roar of dynamite; then another and another, being the exterior houses of the doomed district. Soon dense volumes of smoke, through which pierced yellow shafts of flame, told that the work of destruction was begun. In two hours the whole block from the Kahului saloon to the Custom House was a heap of glowing ashes. The breeze was from the sea and no trouble was experienced in holding the fire within the prescribed district. Kahului town was entirely cordoned off with corrugated iron fences and, before the year was out, the plague had been eradicated (Maui News 1900).

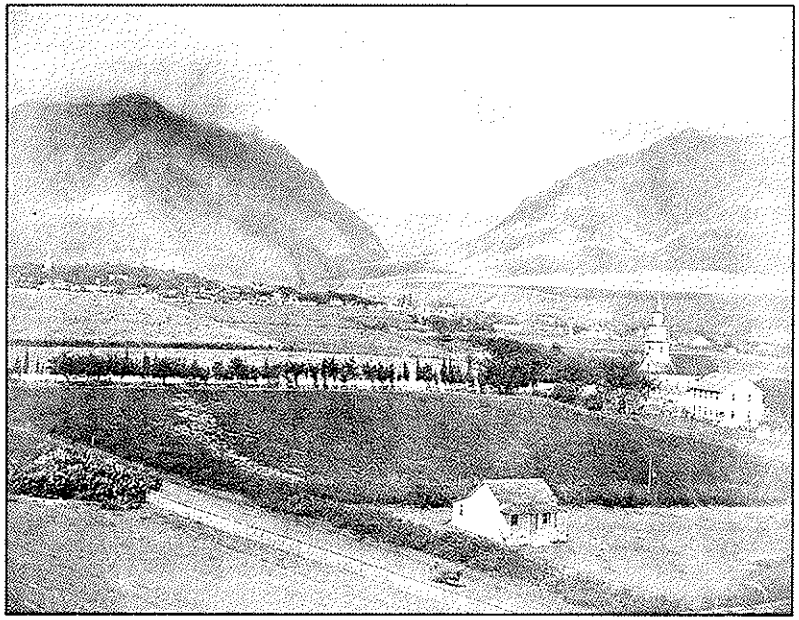


Figure 14. A photograph of Wailuku, taken about 1890 by an unknown photographer, shows the buildings in the upland areas of the ahupua'a from the white steeple of Ka'ahumanu Church (far left) to the Wailuku Sugar Company mill (white smokestack, right) (collection of Robert Hill).

3.2 'Īao Stream and Bridge Projects

3.2.1 The Postwar Years 1945-1955

Following the end of World War II in 1945, the Territorial Highway Department began a series of road improvements in Wailuku that included the construction of a new steel beam bridge to cross the 'Īao Stream at North Market Street, and a new concrete bridge to cross the 'Īao Stream at Waiehu Beach Road. Prior to these projects, the North Market Street crossing was made on a wood trestle bridge, and the Waiehu Beach Road crossing was by way of a stone-and-concrete ford through the stream bed itself. Completing these two crossings called for the construction of a new bridge to cross the Waiehu Stream and the realignment of Waiehu Beach Road by way of a new intersection with Kahekili Highway.

The overall improvement to this circuit of roadways required the relocation of a major section of Waiehu Beach Road and the construction of a new bridge to cross Waiehu Stream. The first project undertaken by the Territorial Highway Department was the North Market Street bridge. Designed in 1948 and completed in 1949, the new steel beam bridge improved traffic between the outlying areas of Waihe'e and Waiehu, and in-town employers such as the Wailuku Sugar Company and the County of Maui. The project was aided by Federal Highway funds (Federal Aid Project No. S-27[1]) and included concrete sidewalks on both edges of the bridge. The sidewalks were extended into Wailuku Town and into Happy Valley (Territorial Highway Dept. 1949).

The reinforced concrete piles supporting the bridge were linked to the steel structure of the bridge by a series of expansion joints; railings were of concrete. Structures in the vicinity of the North Market Street bridge included a restaurant and a rooming house that remain today. The restaurant just north of the bridge, recently known as "Aki's Hawaiian Food", was named the "Happy Valley Tavern" when the bridge was constructed. The present day "Happy Valley Hale" was known then as the "Iron Bridge Hotel."

The next phase of road improvements for Wailuku would occur at the current project area and included the construction of a bridge across the 'Īao Stream at Waiehu Beach Road. Designed in 1952 and completed in 1954, the bridge replaced a concrete/boulder ford located in the stream bed. The bridge project, Federal Aid Project No. S-247(1), included large-scale improvements to the approaches on either end of the bridge, consisting of massive revetments and embankments to properly channel the flow of the 'Īao Stream. A new access roadway was constructed at Kauahe'e Road, a road which led west to an encampment for the Hawai'i National Guard. Approximately 4/10ths of a mile of Waiehu Beach Road was relocated west of the 'Īao Stream ford during the project, which vastly improved access to Lower Main Street from Waihe'e (Territorial Highway Dept. 1954).

All piers, abutments and road surfaces were constructed of reinforced concrete. The bridge structure sits on reinforced concrete piles that are topped with rockers: a mechanism designed to distribute weight and move with the forces of an earthquake. Each concrete pile in the 'Īao Stream was designed to allow the stream flow to pass the bridge with a minimum of restriction.

Other postwar road projects on Maui involved the resurfacing of existing central Maui roadways damaged by the military during WWII. In the 1950's, federal highway funds were utilized for road improvements to the McGregor Point portion of the Honoapiilani Highway, including Maui's first tunnel (completed in 1951), and improvements to the Hāna Highway in the vicinity of the Kahului Airport.

3.2.2 1960 to Present

The last phase to improve roads between Wailuku and Waihe'e was the construction of the Waiehu Stream bridge and the realignment of the Waiehu Beach Road inland (west) to meet Kahekili Highway at the stream crossing. This Federal Aid project (No. S-0341[3]) was designed in 1966 and completed in 1967 by the State Department of Transportation Highways Division. Over 7/10ths of a mile of the Waiehu Beach Road was realigned to provide a direct access to the Kahekili Highway. A new roadway intersection was combined with the demolition of an existing bridge, resulting in a change in the alignment of the Waiehu Stream. According to project plans,

no existing industrial or residential structures were located in the vicinity of this construction (State Dept. of Transportation 1967).

The realignment of Kahekili Highway, accomplished in conjunction with the Waiehu Beach Road improvements, also made possible the segregation of the residential areas of Waiehu located along the access road to the Waiehu golf course from vehicular traffic destined for Waihe'e or Kahului. Previous to the realignment of Waiehu Stream, two fords crossing the stream wash were subject to occasional washouts which caused the isolation of the coastal region of Waiehu until the fords could be cleared of debris and rain water had subsided.

The impact of the roadway improvements completed across the 'Īao and Waiehu Streams between 1949 and 1967 meant that access to central Maui from the Waihe'e region could be accomplished either by way of Kahului or Wailuku in any weather. Travel between the outlying areas and 'Īao Jr. High School and Baldwin High School was vastly improved.

A small number of nearby residences were impacted by the construction of the Waiehu Beach Road bridge. Those along the eastern portion of Kauahe'e Road lost access to Lower Main Street by way of the ford, but were relieved of the burden of attempting the crossing in bad weather.

Following the construction of the North Market Street bridge, a large rain storm on November 30, 1950 caused serious erosion to the river bank upstream of the bridge. The flow of water was massive, resulting in the drowning of a Wailuku man who was swept into the stream (Saito 2009). The Maui County Department of Public Works constructed concrete reinforced walls just upstream of the bridge, a project that cost $70,000. This work also included the construction of a concrete-reinforced lining beneath the bridge. A follow-on contract to further modify the stream channel with more linings and walls cost the County an additional $345,000. By the mid-1970's, the U.S. Army Corps of Engineers had begun a $12,112,000 project to channel the flow of the 'Īao Stream from the North Market Street bridge to the ocean. The concrete walls and stream floor spillways of this project, which include the portion beneath the 'Īao Bridge, can be seen today (Saito 2009).

Following Statehood, additional federal highway funds were used to improve the Lower Kula Highway, South Kihei Road, and the Hana Highway as far east as Kailua.

As part of the Statewide Transportation Improvement Program for the fiscal years 2008 through 2011, the County of Maui Department of Public Works, Department of Planning and Department of Transportation will work in conjunction with the State on the proposed project MS20; the rehabilitation of the Waiehu Beach Road bridge at 'Īao Stream. This proposed project is a "System Preservation Project" of the State of Hawaii, to be funded primarily with federal money (Highways Division 2007). The project comes as part of a State program to retrofit bridges to better withstand earthquakes (Nakaso 2007).

3.3 Modern Land Use

Today, the 'Īao Bridge is located centrally between the Wailuku Town Center to the south, residential housing on both northeast and southeast side and Hawaiian homestead Paukukalo subdivision to the northwest. Separating the 'Īao Stream and the Paukukalo subdivision is the Halekii-Pihana State Monument. It is located approximately 274 meters or 900 feet southwest of the project area and consists of two ancient *heiau*, the Halekii *heiau* and the Pihana *heiau*. The *heiau* are located atop a lithified sand dune west of the 'Īao Stream approximately 20 meters above the natural streambed. In 1959 these *heiau* and 10.2 acres of land upon which they are situated became state property and the State Monument was established (Yent 1983).

In addition to their cultural significance as war temples during the time of Kamehameha's conquering of the islands, several other great Maui rulers have close associations with these *heiau*. In their research for excavations at this State Monument, Mr. Michael Kolb and Mr. Charles Keau (1990) explain that the sacred wife of Kamehameha I, Keopuolani, was born at Halekii and Kamehameha Nui, an uncle of Kamehameha I and former ruler of Maui was "laid in state" here before being taken to his final burial place. Kahekili lived here for a time and his father Kekaulike died here in 1736 (Kolb 1990; 4).

3.4 Previous Archaeological Research

The present project area is located near the boundary of Wailuku and the adjacent Waiehu Ahupua'a. Previous archaeological studies in the surrounding portions of Wailuku and Waiehu are relevant to predicting archaeological resources within the project area. These are summarized in Table 2; archaeological studies nearest the current project area depicted in Figure 15.

The early urbanization of significant parts of Wailuku Ahupua'a, for example the shoreline, fringes of 'Īao Valley, the Kahului Harbor area, and various residential and commercial areas, has altered much of the landscape and probably eradicated much of the surface archaeological remains. To our knowledge, the earliest dated cultural material comes from a test excavation along the shoreline at the east side of Kahului Airport. Here, in 1991, cultural material in sand deposits was dated to around A. D. 600-800. These deposits may be the only remnant of the pioneering phase of Polynesian settlement identified within the *ahupua'a* to date (Toenjes et al. 1991).

A work of Theresa Donham, entitled "Site Patterns in the Lower 'Īao Valley, Wailuku" (Donham 1996) notes the crucial importance of the 'Īao Stream in the formation of settlement in the *ahupua'a*. Additionally, there are sheltered bays and two known fishponds, Mau'oni and Kanahā (SIHP 50-50-05-1783). Based on the heavy concentration of known historic properties within the narrow corridor of Lower Main Street (Connolly 1973; D. Fredericksen and W. Fredericksen 1992; D. Fredericksen et al. 1995; E. Fredericksen and D. Fredericksen 1996; and E. Fredericksen et al. 1995), it is postulated that permanent settlement was heavily concentrated along the base of the dunes on either side of 'Īao Valley. On the dunes of the northwest side of the valley lie the two major *heiau* (temples), Haleki'i and Pihana. *Heiau* are also reported for the toe of the dune on the southeast side of the valley (Toenjes et al. 1991:2).

More important to the present project area is the proximity of the Wailuku Dune on the southeast side of 'Īao Valley, which crests at 330 feet above sea level and proceeds away from the valley itself. The dunes form a northeast-to-southwest line, eventually rising to an elevation of about 500 feet and extending all the way to Waikapū. While isolated and clustered Hawaiian burials appear to be a general pattern throughout the dune environment of Wailuku and other dunes in adjoining *ahupua'a,* evidence of habitation would be expected to be scattered rather than concentrated (Pantaleo et al. 2007). Previous archaeological research along the perimeter and within the sand hills of Wailuku indicates the presence of subsurface cultural deposits and human burials dating to both the pre-contact and historic era. Relevant to the present study area is the research and monitoring conducted within the Maui Lani Development Area, located to the south and southwest, and Keopuolani Park (commonly referred to as Maui Central Park) to the immediate east. From 1990 up to the present, both habitation remnants and multiple human burial sites have been recorded within the Maui Lani Development Area, verifying the culturally sensitive nature of the nearby sand dune environment.

The earliest archaeological studies of Waiehu and Wailuku (Stokes 1918; Thrum 1908 and 1915; Walker 1931) were a part of island-wide studies and tended to focus on monumental architecture and areas of human interment. Some of the first documented included numerous burials on the long sandy ridge near the shore northeast of Waiehu Town, an adze grinding stone at Wawaekanaka and a former fishpond at Kapoho northeast of Waiehu Town.

The interim period from 1930 to 1978 saw only sporadic archaeological activity in the Waiehu and Wailuku area. The most notable historic property identified during this time period was an extensive discontinuous midden scatter (SIHP no. 50-50-04-1189) extending from the Waiehu Golf Course on the south to north of Kalepa Gulch (Kirch 1966). This site was later subdivided into the "Waiehu Midden" site on the shore at the southern extreme of Waiehu Ahupua'a (SIHP no. 50-50-04-1796) and the "Waiehu Midden" which retained the earlier (SIHP no. 50-50-04-1189.

Connolly and Hommon (1973) conducted a comprehensive survey for the State of Hawai'i Inventory of Historic Properties. During this survey, supplemental recordation and historic property number assignment to the following properties identified by Walker (1931) was completed: Kealakaihonua Heiau at Kapokea (Kapokea Heiau) – SIHP No 50-50-04-32, the *heiau* at Kapoho – SIHP No 50-50-4-33, and the Wawaekanaka Grindstone a large flat boulder with nine ground depressions – SIHP No. 50-50-4-1191. In 1974, J. C. Wright filled out Hawaii Register of Historic Places site forms for Waiehu Town (SIHP No 50-50-04-1501), noting its "limited architectural and historic interest" and assigning a "marginal" evaluation and a form for the East Maui Irrigation Ditches (Spreckels Ditch; SIHP No. 50-50-4-1508).

Table 2. Previous Archaeological and Historical Studies in Wailuku and Waiehu Ahupua'a

Study	Location	Type of Study	Findings
Thrum 1908-1915	Island-wide	*Heiau*-study	Identifies numerous *heiau,* including Wailuku's Pihana Heiau
Stokes 1918	Island-wide	Reconnaissance	Records numerous sites, primarily *heiau,* including those in Wailuku District

Study	Location	Type of Study	Findings
Walker 1931	Island-wide	Reconnaissance	Identifies nine sites (28-36) in Waiehu and five (37-41) in Waiehu - mostly *heiau*
Kirch 1966	Waiehu Area	Reconnaissance	Identification of an extensive discontinuous midden scatter extending from the Waiehu Golf Course on the south to north of Kalepa Gulch.
Hommon and Connolly 1973	State Register of Historic Places	Survey	Limited fieldwork on four sites: Waiehu Dune Burials(-1185), Waiehu Golf Course burials (-1188), burial cave (-1186), and Waiehu midden scatter (-1189)
Keau and Murray 1977	Paukukalo Hawaiian Home Lands, Phase III	Archaeological Walk Through Survey	Identified features I-IX which included basalt cobble cairns believed to be gravesites and historic and prehistoric artifacts.
Kelly, Sinoto, and Cordy 1978	Waiehu Heights Subdivision	Survey, Data Recovery	Documented over twenty historic coffin burials exposed during heavy equipment disturbance in dune area
Han 1979	South of Waiehu Point on coast	Archaeological Reconnaissance Survey	Identified a burial and walled terrace
Han 1982	South of Waiehu Point on coast	Archaeological Investigations	Revisited earlier project area identifying four additional sites. Describes 20th century house site, limestone quarry and several incomplete burials
Bordner 1983	Waiehu Housing Development, Environmental Impact Study Corp.	Survey and excavation	Historic Military features only
Yent 1983-1984	Halekii-Pihana State Monument: Phase I, Waiehu	Survey and Test Coring	Halekii (-4592), *'ili'ili* stones, marine shell, charcoal. Pihana (-4592): *'ili'ili* stones, marine shell, human and pig bone, and a human burial that remains in *situ*
Trembly 1987	Waiehu Planned Development	Monitoring	Remains of six individuals that were exposed and displaced during construction activity along Waiehu Beach Road

Study	Location	Type of Study	Findings
Donham 1992	Maui Homeless Shelter	Human Skeletal Remains Discovered	SIHP-2916, TMK (2) 3-8-46:21
Folk and Hammatt 1992	South of Waiehu Point on coast	Archaeological survey & sub-surface testing	Identified one site consisting of two buried charcoal lenses. Reports two carbon dates
SHPD burials files November 26th, 1992	Waiehu Sand Dunes	SHPD burials files	Eroding burials reported Waiehu Sand Dunes Site 50-50-04-1185
SHPD burials files January 4, 1993 (Griffin. Annie)	Paukukalo, Wailuku, Maui	Inadvertent Burial Discovery	TMK (2) 3-4-29:22 SIHP 50-04-3139. Burial assessment conducted December 30, 1992 located at 480 Lilihua St.
SHPD Burials Files November 23, 1994 (Kolb, Michael)	Pihana Heiau Site Wailuku, Maui	Human Skeletal Remains	TMK (2) 3-4-30:4. Human skeletal remains found at Pihana Heiau, SIHP 50-04-592, Feature 43.
SHPD burials files March 15th, 1995	Waiehu Sand Dunes	SHPD burials files	Eroding burials reported Waiehu Sand Dunes Site 50-50-04-1185
SHPD burials files June 1996	Waiehu Sand Dunes	SHPD burials files	Eroding burials (28 individuals) reported at Waiehu Sand Dunes Site 50-50-04-1185
Fredericksen 1997	Waiehu Kou Phase II	Monitoring Report	Notes extensive impact of post-contact agricultural activities
SHPD burials files Febuary 4th, 1997	Waiehu Sand Dunes	SHPD burials files	Account of B.P.Bishop Museum repatriation assoc. with Waiehu Sand Dunes Site 50-50-04-1185
Chaffee, Dunn, Asbury-Smith and Spear 1998	Wailuku Parkside Property	Archaeological Inventory Survey	40 backhoe trenches excavated produced no cultural material. Heavily disturbed soils.
Sterling 1998	Island-wide	Compendium	Quite thorough compendium
Rechtman 1999	Lower Main Street Jack in the Box Restaurant, Wailuku, Maui	Monitoring Report	No archaeological deposits or human remains likely due to the location in the flood plain of 'Īao Stream.
Fredericksen and Fredericksen 1999 (draft)	Seaward of Waiehu Kou Subdivisions	Archaeological Inventory Survey	Identified two burials assoc. with site 50-50-04-4731; five carbon dates suggest occupation from the 13th century.

Study	Location	Type of Study	Findings
Fredericksen 2000	Corridor *Mauka* of Kahekili Hwy	Letter Report, On Reconnaissance	Identifies modified outcrop and an old access road
Frederickson and Madeus 2005	Waiehu Ahupua'a	Archaeological Inventory Survey of an approximate two-acre parcel	Identified a site which consisted of earthen and rock terraces, several taro *lo'i*, a rock and concrete-lined *auwai*, a 1920's plantation home and associated structures. Artifacts that were documented consisted of an *ulu maika* stone and small amounts of portable remains.
Lee-Greig 2006	Paukukalo, Wailuku, Maui	Archaeological Field Inspection	TMK (2) 3-4-028:016. Previously disturbed soils that include indigenous and historic era materials.

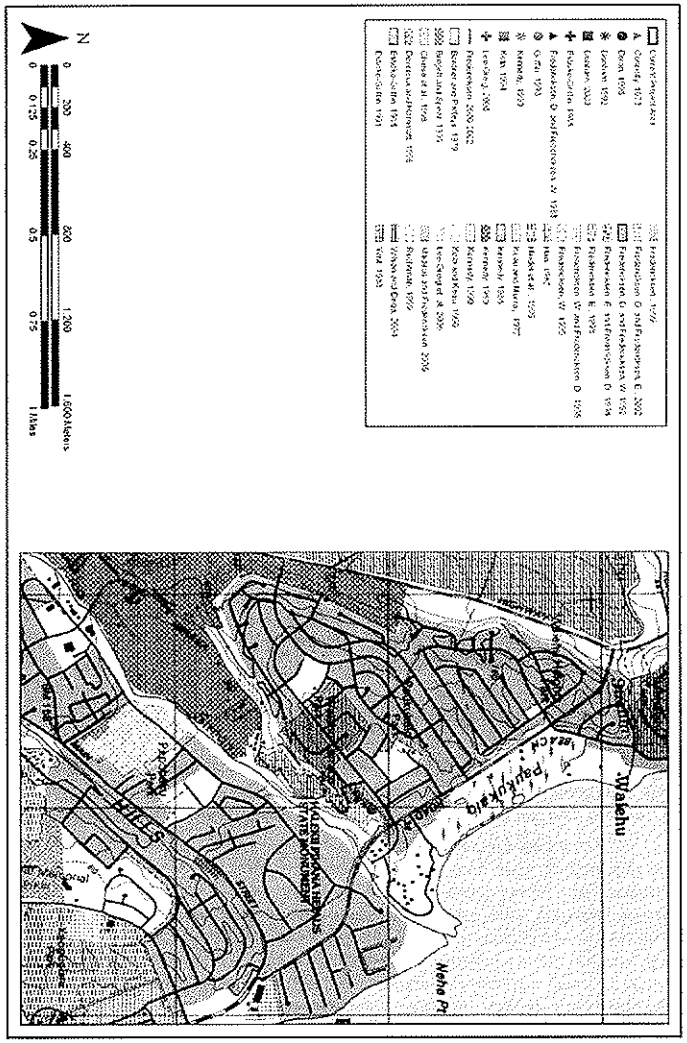


Figure 15. A portion of the Wailuku (1998) U.S.G.S. 7.5 minute topographic quadrangle showing the location of the current project area and nearby archaeological studies

The Paukukalo Hawaiian Home Lands subdivision lies approximately 243 meters from the project area. The subdivision and the project area are separated by Waiehu Beach Road and the sand dune on which Pihana and Halekii *heiau* are located. Several pre-contact burials have been discovered eroding from this dune and within the subdivision. In addition, midden scatters, cave features and rock cairns have also been discovered in the subdivision, along the northern edge of this sand dune. The following documents report on the above mentioned discoveries: Bordner and Patteys 1979a and b, Awai 1986, Estioko-Griffin 1988a and b, D. Fredericksen and W. Fredericksen 1988, Dixon 1996, Kennedy 1990, Estioko-Griffin 1990 and Estioko-Griffin 1991.

Han (1979 and 1982) carried out two studies at Waiehu Heights Subdivision Phase IV (south of Waiehu Point on the coast) identifying six historic properties including a burial, two scatters of human bone, a walled terrace (early 20th century), a limestone quarry and a midden scatter.

Folk & Hammatt (1992) carried out sub-surface testing south of Waiehu Point on the coast identifying two buried charcoal lenses (designated SIHP No. 50-50-04-3115) which yielded carbon date ages of AD 1430-1660 and AD 1350-1655.

The files of the State Historic Preservation Division burials program report (November 26, 1992) eroding burials at the Waiehu Golf Course sand dunes (SIHP No. 50-50-04-1185). Few details are documented.

The files of the State Historic Preservation Division burials program report (March 15, 1995) eroding burials at the Waiehu Golf Course sand dunes (SHIP No. 50-50-04-1185). Few details are documented.

The files of the State Historic Preservation Division burials program report (June 1996) eroding burials at the Waiehu Golf Course sand dunes (SIHP No. 50-50-04-1185). Remains from twenty-eight individuals were reported.

E. Fredericksen (1997) carried out archaeological monitoring of the Waiehu Kou Phase II subdivision finding no significant cultural deposits and noting the extensive impact of post-contact agricultural activities.

The files of the State Historic Preservation Division burials program report (Febuary 4, 1997) the repatriation of human remains from the Bernice Pauahi Bishop Museum associated with the Waiehu Golf Course sand dunes (SIHP site number: 50-50-04-1185). Few details are documented.

E Fredericksen and D. Fredericksen (1999, draft) carried out an inventory survey on an approximate 1,110 meters long by 18 meter wide drainage and diversion easement corridor and portions of two proposed retention basins. This study identified two human burials associated with SIHP No. 50-50-04-4731 an extensive dune site on the *mauka* (leeward) side of the large coastal dune that contains the Waiehu Municipal Golf Course. The results of five carbon dates suggested occupation from as early as the 13th century. Archaeological monitoring was recommended.

3.5 Background Summary and Predictive Model

Background historic research documents the major role of Wailuku Ahupua'a in traditional Hawaiian times. In the vicinity of the present project area, two major *heiau* give evidence of the significance of this portion of the ahupua'a. Mid-nineteenth century *Mahele* records indicate that the area surrounding the 'Īao Stream, including the present project area, were places of intensive agriculture and habitation. Archaeological properties associated with such activities would include *lo'i* terracing, water diversion systems in the form of traditional *auwai*, and platforms and terraces reflective of temporary and or permanent habitation. Along with the potential for encountering structural features is the potential for uncovering human burial remains.

However, the historical record has also documented the urbanization of this portion of Wailuku, including the development of modern roadways, commercial and residential area, and the construction of the current 'Īao Bridge (in 1954) and the 'Īao Stream drainage (in the 1970's).

Previous archaeological studies in the vicinity of the project area have documented numerous human burials in sand deposits.

Based on the above considerations, it is predicable that the present project area contains no surface archaeological resources related to traditional Hawaiian culture. However, subsurface cultural deposits, including human burials, may be present in the project area. Additionally, the 'Īao Bridge itself is over fifty years old and may be evaluated as a historic property.

Section 4 Field Inspection Results

On August 26 Colleen Medeiros Dagan, B.S. conducted a pedestrian field inspection of the 'Īao Bridge and surrounding project area. An additional site visit with both CSH archaeologists and WOC planners and engineers was conducted on October 8, 2009. Critical areas of disturbance were identified during this site visit.

The project area is located in the Wailuku sand dune system. Sand eroding from the dune was clearly visible at neighboring properties (Figure 16). Directly northwest of the bridge is a lithified portion of the dune. This section of the dune was cut through during the original construction of Waiehu Beach Road. Talus from this lithified dune is visible on the shoulder of the roadway. Some of this talus appeared to have been cleared from the roadway and piled at the northwestern end of the bridge (Figure 17 and Figure 18). The Halekii-Pihana State Monument is located atop this large dune. (Figure 19).

The ground surface near the eastern end of the bridge consists of sand/fill material, likely brought in or recycled during the original flood control dredging. The channelized streambed was dry. The stream exits into the ocean at Nehe Point (Figure 20 and Figure 21). Overall, the project area has been heavily disturbed and built-out. No cultural material was observed on the ground surface of the project area.

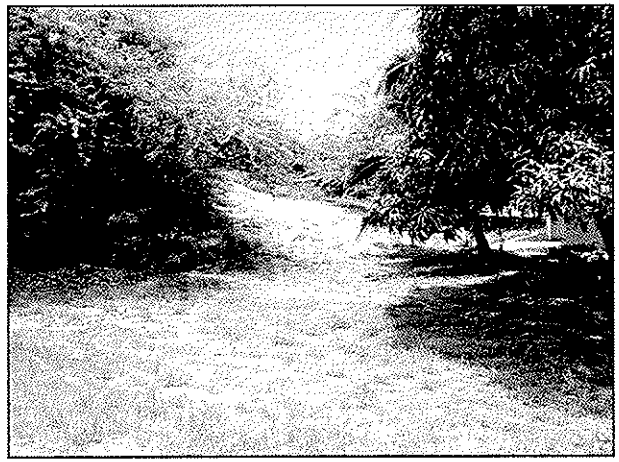


Figure 16. Sand visible at neighboring property.

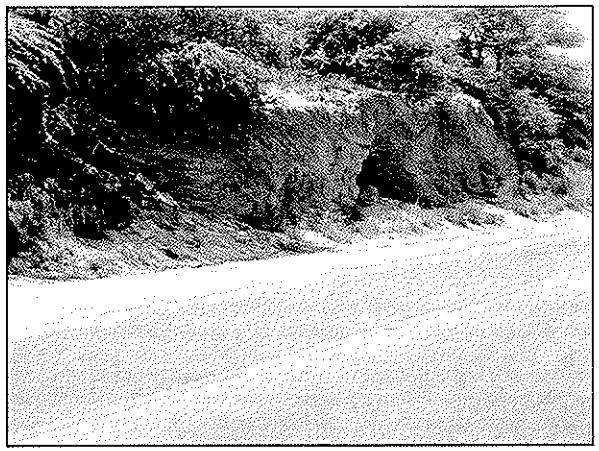


Figure 17. Lithified dune sand and talus.

Figure 18. Talus pile at northwestern end of project area.

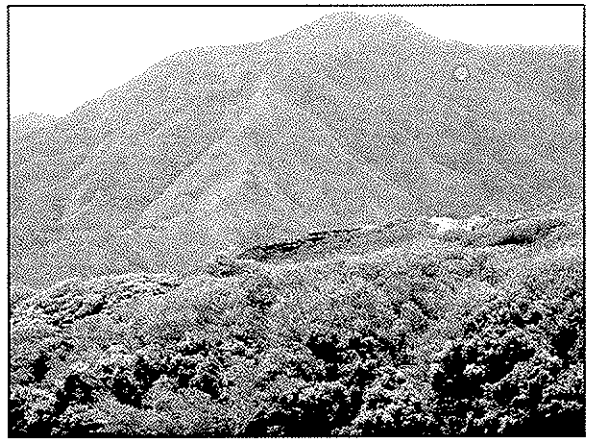


Figure 19. Pihana heiau from 'Īao Bridge view west.

Figure 20. Ground surface consists of sandy fill material.

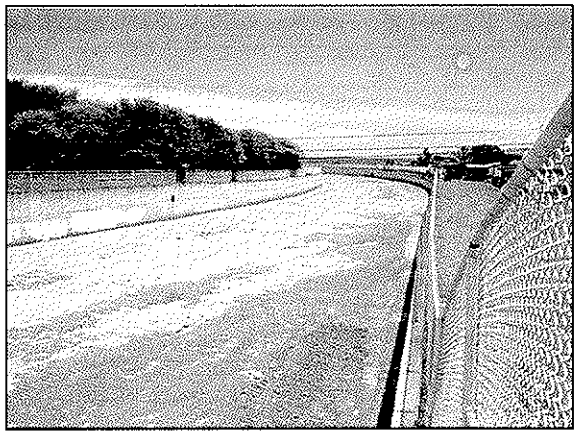


Figure 21. Channelized stream view east to Nehe Point.

During the site visit of October 8, 2009, WOC personnel identified areas where excavations for the bridge project will occur. The first area is located at the northeastern end of the project area where the guardrail will need to be set back approximately 10 feet (Figure 16). The second area would be on either end of both bridge abutments, to accommodate bridge widening. And lastly, excavations will be made to accommodate widening of those bridge piers located within the stream channel.

The bridge itself appeared to be in good condition. The piers of the bridge were painted with graffiti. A chain link fence has been constructed atop the western bridge railing for safety. The guardrail on the southern end of the bridge partially covers the construction date marked on the bridge. However, as the historic background section of this report indicates, the bridge was constructed in 1954, making it eligible to be recorded as a historic property as defined by the Hawai'i Revised Statutes (HRS) §6E-2. Construction dates of the guardrail and fence are unknown.

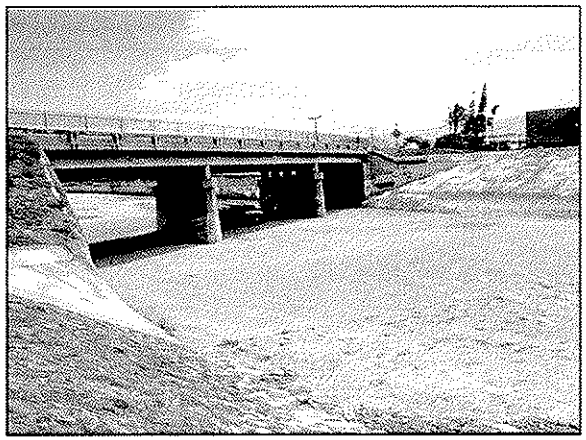


Figure 22. 'Īao Bridge and stream channel. Chain link fencing on western railing of bridge.

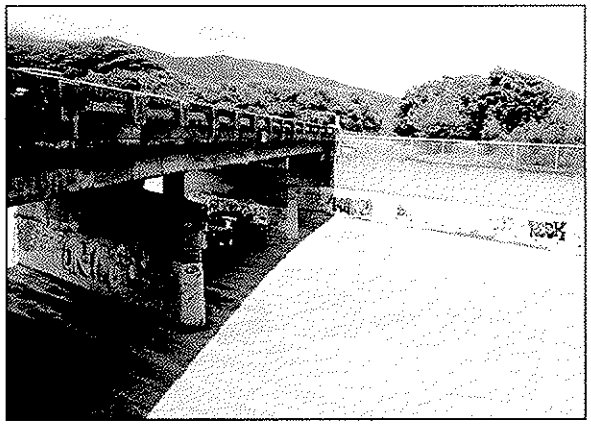


Figure 23. 'Īao Bridge view west, graffiti visible and seismic rockers visible atop bridge piers.

Section 5 Summary and Mitigation Recommendations

In summary, the current project area includes a portion of the 'Īao Stream, one of the streams and valleys of Na Wai Eha. The 'Īao Stream and valley provided choice agricultural lands for pre-contact Hawaiians living in the area. The project area is also located in close proximity to the Halekii-Pihana State Monument and the Pihana *heiau* itself can be seen from the bridge. This location was a political center during and possibly before the 18th century. It has been recorded that Maui *ali'i* including Kahekili lived and surfed in Wailuku (Kamakau 1992: 83).

Research of previous archaeological studies indicates that taro *lo'i* likely existed on the banks of the stream within the project area but with the construction of the 'Īao Bridge in 1954 and the channelization of the stream for the flood control project in the 1970's, any archaeological remains have been destroyed due to the substantial alteration of the natural landscape and soils. Pre-contact human burials have also been documented in the sand dune system which the current project area crosses.

Results from the field inspection confirm sandy soils dominate the project area. Although the majority of the project area has undergone extensive ground alterations, there is a location at the northeastern end of the project area where a new guardrail will be installed in these sandy soils. In addition, excavation will take place at both *mauka* and *makai* sides of existing bridge abutments for bridge widening.

The bridge itself appeared to be in good condition. This bridge was constructed in 1954 and is eligible to be recorded as a historic property.

5.1 Recommendations

Due to previous archeological findings of pre-contact habitation features and cultural deposits as well as human burials in the vicinity of the project area, and due to the project area's proximity to the Halekii-Pihana State Monument, archaeological monitoring is recommended during ground disturbing activities for the bridge widening and sidewalk improvements project.

It is understood that the guardrail on the northeastern end of the roadway will need to be installed approximately 10 feet *makai* of the existing guardrail. Archaeological monitoring is recommended for ground disturbing activities associated with the installation of the new guardrail. In addition, bridge piers will be widened from existing bridge abutments in both *mauka* and *makai* directions approximately 10 feet. An archaeological monitor is recommended for ground disturbing activities associated with this pier widening. On-call archaeological monitoring is recommended for excavations that take place within the streambed itself as a part of bridge pier widening.

The 'Īao Bridge was built in 1954 and is now 55 years old. It is eligible to be recorded on the State Inventory of Historic Properties. It may also be eligible for nomination and listing on the Hawai'i National Register of Historic Places. Review and recordation of this bridge by the State Historic Preservations Division's Architecture branch may be required.

Section 6 References Cited

Awai, Dan
1986 Location of Reburied Human Remains-DHHL Lands Paukukalo, Wailuku, Maui (TMK: (2) 3-3-06: 42)

Bordner, Richard and Charles Patteys
1979a Archaeological Surface Survey, Paukukalo House Lots, Unit 3. Wailuku, Maui, Hawaii (TMK: (2) 3-3-06: 41, 52 [formerly 86])

1879b Archaeological Reconnaissance of Paukukalo Residence Lots, Unit 3.

Chaffee, David B., Amy E. Dunn, Pam Asbury-Smith and Robert L. Spear
1998 An Archaeological Inventory Survey of the Proposed Wailuku Parkside Property, Wailuku, Maui Island, Hawaii [TMK 3-4-30: Portion 23; 3-4-30: 19]

Cheever, Rev. Henry T.
1851 Life in the Sandwich Isles. Richard Bentley, London.

Connolly, Robert III
1973 State Historic Register Survey, State Historic Preservation Division files.

1974 Phase I Archaeological Survey of 'Īao Valley Flood-Control Project Area, Maui, Ms. Report 100374, B.P. Bishop Museum, Honolulu.

Cordy, Ross
1978 Archaeological Reconnaissance Survey of Portions of Waihe'e Valley, Maui, and Lumaha'i Valley, Kaua'i, B.P. Bishop Museum Ms. 090178, Honolulu, Part of Cultural Reconnaissance of Hydroelectric Power Plant Sites, Waihe'e Valley, Maui, Lumaha'i Valley, Kaua'i, Historical Survey by Kelly and Hee.

1981 A Study of Prehistoric Social Change: The Development of Complex Societies in the Hawaiian Islands. Academic Press, New York.

Dean, Arthur L.
1950 Alexander & Baldwin, Ltd. and the Predecessor Partnerships, Alexander & Baldwin, Ltd., Honolulu.

Dixon, Boyd
1996 Inadvertent Discovery of Human Remains at 741 Kuhio Place, Wailuku, Maui. State Site 50-50-04-1812/TMK: 3-3-06:47.

Donham, Theresa K.
1990 Archaeological Inventory Survey Maui Palms Hotel Site Land of Wailuku, Wailuku District, Island of Maui (TMK 3-7-03). Paul H. Rosendahl, Ph.D., Inc., Hilo, HI.

1992 Human Skeletal Remains Discovered At the Maui Homeless Shelter Construction Site (50-50-04-2916), Wailuku, Maui (TMK 3-8-46:21). State Historic Preservation Division - Maui, Wailuku, HI.

1994 Recovery of Burials Inadvertently Disturbed During Construction Home Maid Bakery Expansion Project, Wailuku, Island of Maui, SIHP Site 50-50-04-3556

(TMK: 3-8-37:49). Maui Island Archaeologist, DLNR-Historic Preservation Division, Wailuku, HI.

1996 *Site Patterns in the Lower Iao Valley, Wailuku.* Paper presented at the Ninth Annual Conference of the Society for Hawaiian Archaeology, Wailea, Maui, HI.

1999 In-Progress Report: Archaeological Survey of the Poka Property, 'Ili of Kolea, Waihe'e, Maui (TMK:3-2-02:2, 7 & 11) State Historic Preservation Division.

Dorrance, William H.

2000 *Sugar Islands, The 165-Year Story of Sugar in Hawai'i*, Mutual Publishing LLC, Honolulu.

Estioko-Griffin, Agnes

1988a Field Inspection of the Paukukalo Residence Lots, Phase III, Dept. of Hawaiian Home Lands, Paukukalo, Wailuku, Maui TMK (2) 3-3-06:52

1988b Human Burial Found in Phase III, Paukukalo Residential Lots (Site 50-04-1810), Wailuku, Maui TMK (2) 3-3-06:52.

1990 Field Inspection of Waiehu Development Increment C (HFDC), Paukukalo, Wailuku, Maui.

1991 Archaeological Surface Assessment of a 3.1 Acre Parcel, Proposed Phase 4 Residential Lots Paukukalo, Wailuku, Maui TMK: 3-3-06:52 por.

Folk, William H. and Hallett H. Hammatt

1992 Archaeological Survey and Sub-surface Testing at Waiehu, Maui,(TMK-2-13:05) Cultural Surveys Hawai'i, Kailua, Hawai'i.

Foote, Donald E., E.L. Hill, S. Nakamura and F. Stephens

1972 Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lana'i, State of Hawai'i, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.

Fredericksen, Erik

1997 Letter Report on Archaeological Monitoring Conducted During Soils Testing at the Proposed Waiehu Kou Phase II Subdivision (TMK: 3-2-13:01) Xamanek Researches

2000 Letter Report on an Archaeological Reconnaissance Survey of a Proposed Easement Corridor for a County of Maui 16-inch Waterline in North Waihe'e, Maui, Hawai'i. Xamanek Researches

Fredericksen E. and D. Fredericksen

1999 Archaeological Inventory Survey of a Drainage and Diversion Easement Corridor for the Department of Hawai'ian Home Lands, Waiehu Kou 2 Residential Development, Waiehu Ahupua'a Wailuku District, Maui Island (TMK: 3-2-01: por. 03) Draft Xamanek Researches

Fredericksen D. and E. Fredericksen

2002 An Archaeological Inventory Survey of The Y. Hata Property in Wailuku Ahupua'a, Wailuku District, Island of Maui (TMK: 3-4-27: 01).

Fredericksen, Erik M., Demaris L. Fredericksen, and Walter Fredericksen

1995 Report on Subsurface Inventory Survey at Lower Main and Mill Street, Wailuku Ahupua'a, Wailuku District, Island of Maui, (TMK: 3-4-39:por. 81, 82, 83). Xamanek Researches, Pukalani, HI.

Fredericksen, Demaris and Walter Fredericksen

1988 Report on the Burial Found in the Paukukalo Residential Lots, Phase III (Site 04-1812)

Giambelluca, T.W., Nullet, M.A., and Schroeder, T.A.

1986 *Hawaii Rainfall Atlas, Report R76.* Hawaii Division of Water and Land Development, Department of Land and Natural Resources, Honolulu.

Han, Toni L.

1979 Archaeological Reconnaissance Survey at Waiehu Heights Subdivision Phase IV. Ms., Department of Anthropology, B.P. Bishop Museum, Honolulu, Hawai'i.

1982 Archaeological Investigations of a Portion of the Waiehu Dune Area, Waiehu, Maui, Department of Anthropology, B.P. Bishop Museum, Honolulu, Hawai'i.

Handy, E.S. Craighill, Elizabeth G. Handy and Mary Kawena Pukui

1995 Native Planters In Old Hawaii Their Life, Lore, and Environment. Bishop Museum Press, Honolulu, HI.

Handy, E.S. Craighill, Elizabeth G. Handy, and Mary K. Pukui

1991 *Native Planters in Old Hawaii Their Life, Lore, and Environment.* Bernice P. Bishop Museum Bulletin 233, Revised Edition. Bishop Museum Press, Honolulu, HI.

Highways Division, State Department of Transportation

2007 Statewide Transportation Improvement Program, Fiscal Years 2008, 2009, 2010 and 2011 (2012 and 2013 Illustrative Years), State of Hawaii Department of Transportation Highways Division Planning Branch, 869 Punchbowl Street, Room 301, Honolulu, HI 96813.

Hill, Robert R., Tanya Lee-Greig and Hallett Hammatt

2009 Archaeological Monitoring Plan for the County of Maui Backflow Preventer Project Wailuku Ahupua'a, Wailuku District, Maui Island TMK (2) 3-4-008:042 (por.).

Juvik, Sonia P. and James O. Juvik, Editors, Chief Cartographer, Thomas R. Paradise

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

Kalākaua, David

1990 *The Legends and Myths of Hawaii.* Charles Webster and Co., New York.

Kamakau, Samuel Manaiakalani

1992 Ruling Chiefs of Hawai'i, Revised Edition, The Kamehameha Schools Press, Honolulu, Hawai'i.

Kelly, Marion, Clayton Hee and Ross Cordy

1978 Cultural Reconnaissance of Hydroelectric Power Plant Sites: Waihe'e Valley, Maui, Lumaha'i Valley, Kaua'i: Historical Survey by Marion Kelly and Clayton Hee; Archaeological Survey by Ross Cordy, Archaeological Research Center Hawai'i, Inc. Honolulu, Hawai'i.

Kennedy, Joseph
1983 An Archaeological Walk-Through Reconnaissance at Wailuku Project District #3 and Piihana #4, Wailuku, Maui.

1990 Letter to Mr. Greg Schenk Re. Inventory Survey of TMK: 3-4-30:11 Subdivision "C" Located at Paukukalo, Wailuku, Island of Maui.

Kirch, Patrick V.
1966 Waiehu Ms., B.P. Bishop Museum, Honolulu, Hawai'i

Kolb, Michael J., Charles Keau
1990 Preliminary Report of Excavations at Halekii-Pihana Heiau State Monument, Wailuku, Maui.

Lee-Greig, Tanya, Hallett Hammatt
2006 An Archaeological Field Inspection of TMK: (2) 3-4-028: 016, Paukūkalo, Wailuku Ahupua'a, Wailuku District, Maui Island.

Macdonald, G.A., A.T. Abbott and Frank L. Peterson
1983 *Volcanoes in the Sea*, Second Edition, University of Hawaii Press, Honolulu, Hawai'i.

Maui News
1937 Missionary Description of the Destruction of Kahului Villages, Maui News Issue of November 10, 1937, Page 8, Column 3.

1941 Early Sugar Growing in Wailuku in 1840 Described, Issue of March 22, 1941, Page 8, Column 3.

Moffat, Riley M. and Gary L. Fitzpatrick
1995 Palapala'āina: Surveying the Mahele. Editions Limited, Honolulu.

Nakaso, Dan
2007 Hawaii Infrastructure Getting Quake Retrofits, article, Honolulu Advertiser, November 12, 2007.

Pantaleo, Jeffrey, Diane Guerierro, and Lisa Rotunno-Hazuka
2007 Archaeological Inventory Survey Report Maui Lani Development Phase VI, Maui Lani Parkway and Kuikahi Drive Extension Wailuku Ahupua'a, Wailuku District Island of Maui TMK 3-8-7: 133, 154 and 155 (formerly 3-8-07: 131 por.). Prepared for Maui Lani Partners. Archaeological Services Hawaii, LLC, Wailuku, HI.

Rechtman, Robert B.
1999 Archaeological Monitoring for the Lower Main Street Jack in the Box Restaurant. Land of Wailuku, Wailuku District, Island of Maui (TMK: (2) 3-4-043:01, 02)

Saito, Norman
2009 Personal communication, retired civil engineer of Maui County.

Schmitt, Robert C.
1973 The Missionary Censuses of Hawaii, Pacific Anthropological Records, 20,

SHPD (State Historic Preservation Division) Burial Sites Program

n.d. (c.1996) Draft Burial Treatment Plan: Waiehu Golf Course Sand Dune, Site 50-50-04-1185 Wai'ehu, Wailuku District, Maui, Hawai'i.

Speakman, Cummins E.
1978 Mowee: An Informal History of the Hawaiian Island. Peabody Museum of Salem, Salem, Mass.

State Department of Transportation
1967 "As Built" Plans of Waiehu Beach Road, Federal Aid secondary Project No. S-0341(3), District of Wailuku, Island of Maui, State of Hawai'i Department of Transportation Highways Division, Honolulu.

Stearns, Harold T.
1942 *Part I General Geology and Ground-water Resources of the Island of Maui, Hawaii.* Geology and Ground-water Resources of the Island of Maui, Hawaii Including Haleakala Section, Hawaii National Park. Compiled by Harold T. Stearns and Gordon A. MacDonald in cooperation with the Geological Survey, United States Department of the Interior. Advertiser Publishing Co., Ltd. Honolulu, HI.

Sterling, Elspeth P.

1998 Sites of Maui, Bishop Museum Press, Honolulu, Hawai'i.

Stokes, J. F. G.

c. 1918 Fieldnotes, Report on the *Heiau* of Maui, Maui Sites Notes, Ms. Anthropology Department Records, B. P. Bishop Museum

Territorial Highway Department

1949 Plans of the Iao Bridge, Federal Aid Secondary Project No. S-27(1), District of Wailuku, Island of Maui, Territorial Highway Department, Honolulu.

1954 Plans of Iao Bridge and Approaches, Federal Aid secondary Project No. S-247 (1), District of Wailuku, Island of Maui, Territorial Highway Department, Honolulu.

Thrum, Thomas G.

1908, 1917 "Hawaiian Annual for 1909 and 1918"

Toenjes, James H., William Folk, and Hallett H. Hammatt
1991 *Archaeological Testing of Subsurface Deposits, Proposed Approach Clear Zone, North End of Runway 2-20, Kahului Airport, Kahului, Maui.* Cultural Surveys Hawaii, Kailua, HI.

U.S. Department of Agriculture, Natural Resources Conservation Service

2006 *Soil Survey Geographic (SSURGO) database for Island of Maui, Hawaii* [online database] Fort Worth, TX. URL:<http://www.ftw.nrcs.usda.gov/ssur_data.html>

Wadsworth, H.A.

1936 A Historical Summary of Irrigation in Hawaii, article, appearing in *The Planters Monthly*, a publication of the Hawaii Sugar Planters Association, University of Hawaii, Honolulu.

Walker, Winslow

1931 Archaeology of Maui, Manuscript at B.P. Bishop Museum, Honolulu, Hawai'i.

Westervelt, William D.

1977 *Hawaiian Historical Legends.* Charles E. Tuttle, Rutland, VT.

Wilcox, Carol

1996 *'Sugar Water, Hawaii's Plantation Ditches*, A Kolowalu Book, University of Hawai'i Press, Honolulu.

Wright, J. C.

1974 "Waihe'e District" Hawaii Register of Historic Places, Short Form.

Yent, Martha

1983 Halekii-Pihana State Monument: Phase I, Archaeological Testing and Development of Interpretive Themes. Division of State Parks.

APPENDIX C

Pre-consultation Comment And Response Letters

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

REPLY TO
ATTENTION OF: CEPOH-EC-T

October 23, 2009

Civil Works Technical Branch

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Thank you for the opportunity to review and comment on the Pre-Assessment Consultation for the Rehabilitation of Iao Stream Bridge Project (BR-STP-3400-5), Wailuku, Maui (no tax map keys provided). According to the Flood Insurance Rate Map, panel 150030190D dated March 16, 1995, the project site is located in the following flood hazard zones:

a. Zone C. Areas of minimal flooding.

b. Zone A6. Areas of the 100-year/1% annual chance flood where the base flood elevation is approximately 29 feet above mean sea level datum.

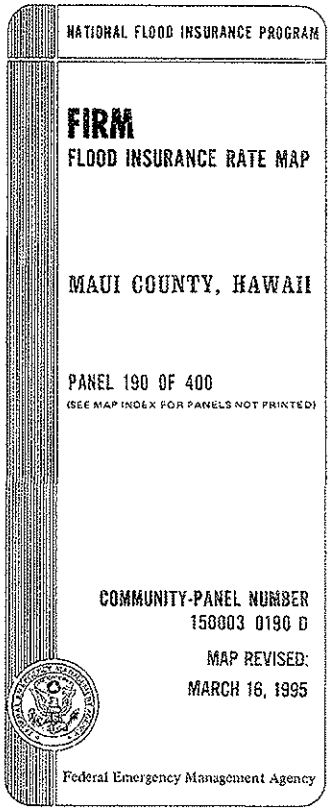
Your proposed project, however, may impact the existing Iao Stream Flood Control Project and proposed basin improvements. I ask that you schedule a meeting with Mr. Daniel Meyers of my staff (438-8875) and Ms. Nani Shimabuku (Project Manager: 438-2940) to discuss your proposed improvements.

Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

Steven H. Yamamoto, P.E.
Chief, Civil Works Technical Branch

Enclosures


NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

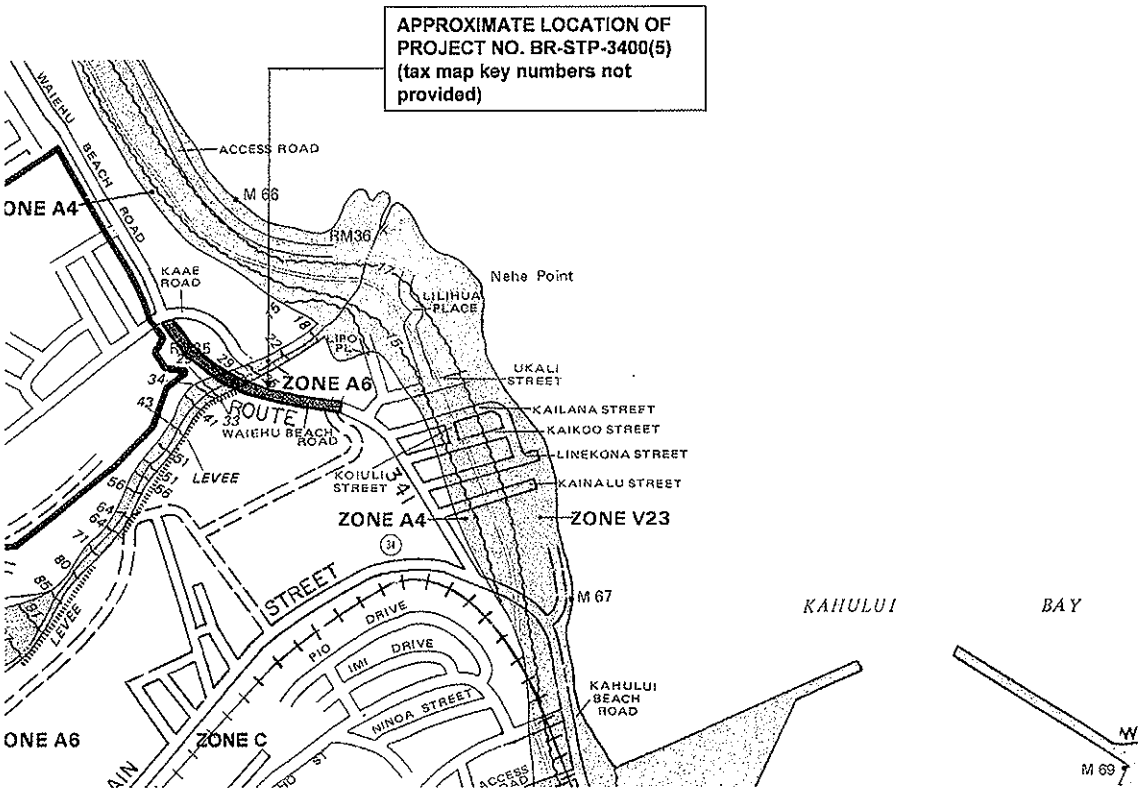
MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 D

MAP REVISED:
MARCH 16, 1995

Federal Emergency Management Agency



NOTES TO USER

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all potential flood hazards outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in the Special Flood Hazard Areas (zones A and V) may be protected by flood control structures.

Coastal base flood elevations apply only landward of the shoreline shown on this map.

For adjoining map panels, see separately printed Index to Map Panels.

INITIAL IDENTIFICATION:
DECEMBER 6, 1977

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
JUNE 1, 1981

FLOOD INSURANCE RATE MAP REVISIONS:
SEPTEMBER 6, 1989

Map revised MARCH 16, 1995 to add base flood elevations, to change special flood hazard areas, and to include previously issued letters of map revision.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

KEY TO MAP

500-Year Flood Boundary ZONE B

100-Year Flood Boundary

Zone Designations ZONE A4 ZONE A6

100-Year Flood Boundary ZONE B

500-Year Flood Boundary

Base Flood Elevation Line With Elevation In Feet** 513

Base Flood Elevation In Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7 x

Zone D Boundary

River Mile M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Steven H. Yamamoto, P.E.
U.S. Army Corps of Engineers, Honolulu District
Department of the Army
Fort Shafter, Hawaii 96858

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Yamamoto:

Thank you for your letter dated October 23, 2009 (CEPOH-EC-T) regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in the respective order of your comments:

a. We understand that the Flood Insurance Rate Maps (FIRM) panels 15000300383E and 15000300384E, were updated on September 25, 2009. According to the updated maps, the project site is located in Flood Zones X, AE, and AE Floodway. The Draft EA will include a description of these flood zones.

b. We will contact your office to schedule a meeting to discuss the proposed improvements and the impacts it may have to the Iao Stream Flood Control Project.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, HI 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

October 30, 2009

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment, Waiehu Beach Road, Rehabilitation of Iao Stream Bridge, District of Wailuku, Island of Maui, Hawaii, Project No. BR-STP-3400(5)

Thank you for forwarding the subject Pre-Assessment Consultation for Draft Environmental Assessment for review and comment by the staff of the U.S. Geological Survey Pacific Islands Water Science Center. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document.

We appreciate the opportunity to participate in the review process.

Sincerely,

Stephen S. Anthony
Acting Center Director

WILSON OKAMOTO CORPORATION
ENGINEERS PLANNERS CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Stephen S. Anthony, Acting Center Director
United States Department of Interior
U.S. Geological Survey
Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Anthony:

Thank you for your letter dated October 30, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

We note your department was unable to review this document due to prior commitments and lack of available staff.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

United States Department of the Interior

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

DEC 1 8 2009

In Reply Refer To:
2010-TA-0010

Mr. Earl Matsukawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street
Suite 400
Honolulu, Hawaii 96826

Subject: Technical Assistance for Iao Stream Bridge Improvements, Waichu Beach Road, Wailuku, Maui, Hawaii

Dear Mr. Matsukawa:

The U.S. Fish and Wildlife Service has reviewed your October 16, 2009, request for technical assistance regarding the proposed improvements to Iao Stream Bridge on Waichu Beach Road in Wailuku, Maui. The project entails improvements benefitting pedestrians, persons with disabilities, bicyclists, as well as motorists. We understand that additional details will be provided in a forthcoming draft Environmental Assessment and Biological Assessment. Based on the photographs enclosed in your letter, vegetation in the vicinity of the bridge appears to be composed entirely of intensively mowed grass.

Based on the information you provided and pertinent information in our files, threatened Newell's shearwater (*Puffinus auricularis newelli*) and the endangered Hawaiian petrel (*Pterodroma sandwichensis*) (collectively referred to as seabirds) have been observed in the vicinity of the proposed project. Seabirds may traverse the project area at night during the breeding season (February 1 through December 15). Any outdoor lighting, particularly when used during each year's peak fledging period (September 15 through December 15), could result in seabird disorientation, fallout, injury and/or mortality. We recommend you avoid night time construction, particularly between September 15 and December 15. To minimize potential project impacts to seabirds, we recommend all outdoor lights associated with the project be shielded so the bulb can be seen only from below.

To minimize erosion, sedimentation, and other adverse impacts to aquatic resources and nearby coral reef ecosystems, we recommend that applicable measures identified in the enclosed list of Standard Best Management Practices for aquatic resources be incorporated, as appropriate, into the draft Environmental Assessment and Biological Assessment.

TAKE PRIDE IN AMERICA

We look forward to reviewing your draft Environmental assessment and Biological Assessment for the proposed project. If you have questions or would like additional information, please contact Dawn Greenlee, Fish and Wildlife Biologist (phone: 808/792-9469; fax: 808-792-9581).

Sincerely,

for Loyal Mehrhoff
Field Supervisor

Enclosure

U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices

The Fish and Wildlife Service recommends that the following measures be incorporated into projects to minimize the degradation of water quality and adverse impacts to fish and wildlife resources.

1. Turbidity and siltation from project-related work shall be minimized and contained to within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

3. Dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss of special aquatic site habitat (coral reefs, wetlands etc.) and any ecological functions unavoidably lost as a result of the project shall be replaced.

4. All project-related materials and equipment (dredges, barges, backhoes etc) to be placed in the water shall be cleaned of pollutants prior to use.

5. No project-related materials (fill, revetment rock, pipe etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands etc.);

6. All debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site.

7. No contamination (trash or debris disposal, non-native species introductions attraction of non-native pests etc.) of adjacent marine/aquatic environments (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests etc.) shall result from project-related activities. This shall be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) to prevent attraction and introduction of non-native species.

8. Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

9. Any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable.

10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding etc.).

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Dr. Loyal Mehrhoff, Field Supervisor
United States Department of Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Room 3-122, Box 50088
Honolulu, Hawaii 96850

Attention: Ms. Dawn Greenlee

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Dr. Mehrhoff:

Thank you for your letter dated December 18, 2009 (Reference 2010-TA-0010) regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Night time construction will be minimized, particularly during the peak fledging period from September 15 to December 15. No new or replacement street lights are proposed for the project. If any night work is required, however, outdoor lights will be down shielded to mitigate potential impacts to seabirds.

Thank you for providing the list of Standard Best Management Practices for aquatic sites. As appropriate, the BMPs will be incorporated into the forthcoming Draft Environmental Assessment. For your information, an Erosion Control Plan and site-specific BMP plan will be prepared for the project and will include measures to mitigate potential water quality impacts.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

MEMORANDUM

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

2009 OCT 20 A 8:50

FROM: Morris M. Atta
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed:
Date: 10/19/09

OCT19'09AM10:30BOR DTU

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Ed Underwood, Administrator
State of Hawaii
Department of Land and Natural Resources
Division of Boating and Ocean Recreation
333 Queen Street, Suite 300
Honolulu, Hawaii 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Underwood:

Thank you for your letter dated October 19, 2009 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION

2009 OCT 20 P 1:5

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

MEMORANDUM

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

FROM: Morris M. Atta
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed: Paul J. Conry
Date: OCT 19 2009

PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Paul Conry, Administrator
State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waichu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Conry:

Thank you for your letter dated October 19, 2009 indicating that you have no objections to the proposed project discussed in the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION
2009 OCT 29 A 10:51
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

2009 OCT 19 PM 1:36

MEMORANDUM

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

FROM: Morris M. Atta
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed: Edwin T. Sakata
Date: 10.26.09

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
SUMNER ERDMAN
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIKE, M.D., J.D.

KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

October 20, 2009

Ref.: RFD.2503.6

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

Request for Determination
Waichu Beach Road/Iao Stream Bridge Rehabilitation
Wailuku, Maui, TMKs: (2) 3-4-029:999 and 3-4-030:999

Reference is made to your October 14, 2009, letter to the Commission on Water Resource Management (Commission) requesting a determination for the proposed Iao Stream Bridge Rehabilitation Project in Wailuku, Maui at TMKs: (2) 3-4-029:999 and 3-4-030:999.

The Commission's Stream Protection and Management Branch has the responsibility to protect stream channels from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses in the State of Hawaii under the authorization of the State Water Code (Code), Chapter 174C, Hawaii Revised Statutes, and Chapter 13-169, Hawaii Administrative Rules (Protection of Instream Uses of Water).

Pursuant to the Code, §174C-71(3)(A), the Commission "shall require persons to obtain a permit from the Commission prior to undertaking a stream channel alteration." The term "stream channel" is defined in the Code, §174C-3, as a "watercourse with a definite bed and banks which periodically or continuously contains flowing water." Furthermore, the Code defines "stream" as any "natural watercourse in which water usually flows in a defined bed or channel."

Based on the information that you provided, the Commission will not require a Stream Channel Alteration Permit (SCAP) for the proposed project because maintenance of existing facilities are exempt from a stream channel alteration permit per HRS §174C-71(3)(A).

Please be advised that your proposal may require other agency approvals regarding wetlands, water quality, grading, stockpiling, and floodways. This letter should not be used for other regulatory jurisdictions or used to imply compliance with other federal, state, or county rules.

Should you have any questions, please contact Robert Chong in the Stream Protection and Management Branch at 587-0266, or robert.k.chong@hawaii.gov.

Sincerely,

KEN C. KAWAHARA, P.E.
Deputy Director

c: Duane Taniguchi, State Department of Transportation, Highways Division

WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS • CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Bill Tam, Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
1151 Punchbowl Street, Room 227
Honolulu, Hawaii 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Tam:

Thank you for your letter dated October 20, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We acknowledge that that the Commission will not require a Stream Channel Alteration Permit (SCAP) for the proposed project, but that the project may require other agency approvals regarding wetlands, water quality, grading, stockpiling, and floodways.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

53559

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
2009 OCT 22 P 1:5

RECEIVED
STATE PARKS

09 OCT 19 P 58

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

MEMORANDUM

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

FROM: Morris M. Atta
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed:
Date: 10/21/09

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Daniel Quinn, Administrator
State of Hawaii
Department of Land and Natural Resources
Division of State Parks
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Quinn:

Thank you for your letter dated October 21, 2009 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 15, 2009

Wilson Okamoto Corporation
1907 South Beretania Street Suite 400
Honolulu, Hawaii 96826

Attention: Mr. Earl Matsukawa, Project Manager

Ladies and Gentlemen:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge

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

Other than the comments from Commission on Water Resource Management, Division of Boating & Ocean Recreation, Land Division-Maui District, Division of Forestry & Wildlife, Division of State Parks, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unsolin
for Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

RECEIVED
MAUI DISTRICT
LAND DIVISION
2009 OCT 20 PM 3:30

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

MEMORANDUM

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

RECEIVED
LAND DIVISION
2009 NOV -5 A 10:22
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: for Morris M. Atta Charlene
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed: _____
Date: 11/3/09

WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS • CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Russell Tsuji, Administrator
State of Hawaii
Department of Land and Natural Resources
Land Division-Maui
1151 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Tsuji:

Thank you for your letter dated November 3, 2009 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

KAULANA H. R. PARK
CHAIRMAN
HAWAIIAN HOMES COMMISSION

ANITA S. WONG
DEPUTY TO THE CHAIRMAN

ROBERT J. HALL
DEPUTY TO THE CHAIRMAN

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

November 4, 2009

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Subject: Pre-Assessment Consultation for Draft Environmental Assessment
Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Project No. BR-STP-3400(5)

Aloha Mr. Matsukawa,

Thank you for the opportunity to provide pre-assessment comments prior to the Draft Environmental Assessment (DEA) for the Waiehu Beach Road, Rehabilitation of Iao Stream Bridge. The Department of Hawaiian Home Lands (DHHL) owns approximately 180 acres in Paukūkalo (63 acres) and Wai'ehu Kou (117 acres), Maui and will be developing a Regional Plan for the area in 2010. The DHHL's property is adjacent to the proposed project.

As adjacent landowners, engaging in our own planning process, it is our responsibility to participate and plan appropriately for the larger region. In addition, it is our priority to ensure that DHHL's plans are as consistent as possible with other plans in the area.

Please consider the following comments on your proposed project:

1. A significant heiau and historic district is located adjacent to the project. The Environmental Assessment should acknowledge the likely presence of ancient structures and iwi in the sand dunes area and the possible impacts from construction and vibration.

2. The Paukūkalo homestead is situated near the project area. Please consider the potential impacts of construction, noise, odors, vibrations, and traffic congestion that will result from the proposed project. We recommend that the contractor take photos to document existing conditions.
3. All proposed alternatives for the project should include a "complete street" that accommodates all modes of travel (vehicular, bus, bicycle, and pedestrian).
4. Please consult with the following organizations who may have programs that will be directly affected by the proposed project:
   a. Paukūkalo Hawaiian Homestead Community Association
   b. Wai'ehu Kou Community Homestead Association
   c. Wai'ehu Kou Residence Lots, Phase 2 Association
   d. Wai'ehu Kou Phase 3 Association, Inc.
   e. Wai'ehu Kou Phase 4
   f. Trust for Public Lands
   g. Wailuku Neighborhood Place
5. If use of Hawaiian home lands is required for the project, please contact our Land Management Division at 620-9450 to request use and access.

We thank you for the opportunity to comment on the project. We will continue, as an adjacent landowner, to do what we can to assist in your planning efforts. If you have any questions, please contact Kaleo Manuel at our Planning Office at 620-9485.

Aloha and mahalo,

Kaulana H.R. Park, Chairman
Hawaiian Homes Commission

Enclosures

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Alapaki P. Nahale-a, Director
State of Hawaii
Department of Hawaiian Home Lands
P.O. Box 1870
Honolulu, Hawaii 96805

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Nahale-a:

Thank you for your letter dated November 4, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in the respective order of your comments:

1. The Draft EA will include an Archaeological Literature Review and Field Inspection which will consider potential construction-related impacts to cultural resources.

2. Potential construction related impacts such as noise, air quality, and traffic congestion will be addressed in the forthcoming Draft EA. The project will not generate significant vibrations, such as those associated with pile driving or blasting. Therefore, vibration impacts to surrounding areas are not anticipated.

3. To the extent possible, the proposed project was developed to provide a complete street build-out using the available right-of-way. The proposed project will include multi-modal travel for pedestrians, bicycles, and vehicles.

4. Thank you for your suggestions. We will distribute a copy of the Draft EA to the organizations you have listed and will contact you to obtain mailing addresses and contract information

5. The use of DHHL lands for construction staging activities is not anticipated.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 19, 2009

Wilson Okamoto Corporation
1907 South Beretania Street Suite 400
Honolulu, Hawaii 96826

Attention: Mr. Earl Matsukawa, Project Manager

Ladies and Gentlemen:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge

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

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 16, 2009

RECEIVED
LAND DIVISION
2009 NOV 18 A 10 15
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

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

FROM: Morris M. Atta
SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment for Waichu Beach Road, Rehabilitation of Iao Stream Bridge
LOCATION: Island of Maui
APPLICANT: Department of Transportation, Highways Division

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 14, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed:
Date: 11/19/09

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD:MorrisAtta
Ref.: PreAsessConsultDEARehablaoStreamBridge
Maui.487

COMMENTS

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

(X) **Please take note that based on the maps provided it appears that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zones X , AE and AE Floodway (AEF). The Flood Insurance Program does not have any regulations for developments within Flood Zone X, however, it does regulate developments within Zones AE and AEF as indicated in bold letters below.**

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

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

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

( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

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

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

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

(X) **Additional Comments: Because portion of this project is being conducted in a flood zone designated as AEF, strict adherence to the NFIP regulations, specifically 44CFR §60.3(d)(3), must be followed.**

(X) Other: **" PLEASE SEE ATTACHED"**

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

Signed: _____
CARTY S. CHANG, ACTING CHIEF ENGINEER

Date: 11/17/09

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

Project: Pre-Assessment Consultation for Draft Environmental Assessment
Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
Wailuku, Maui, Hawaii

ADDITIONAL COMMENTS

For the proposed rehabilitation of Iao Stream bridge and related improvements, we offer the following suggestions:

1. If utilities (sewer, gas, water, etc.) are to be suspended along the bridge structure, they should be located and constructed to minimize flood damage, leakage and prevent snagging of debris.

2. The proposed bridge should not impede the storm water carrying capacity of the body of water it crosses.

3. A scour analysis should be conducted to ensure that the design of the structure will minimize erosion of the foundation. If the channel opening at the structure is widened, evaluate downstream reaches to provide for adequate capacity and erosion.

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. Carty S. Chang, Chief Engineer
State of Hawaii
Department of Land and Natural Resources
P.O. Box 1870
Honolulu, Hawaii 96805

Attention: Ms. Suzie S. Agraan

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Chang:

Thank you for your letter of November 17, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in the order of your comments:

General

a. We confirm that, based on the Flood Insurance Rate Maps (FIRM), the project is located in Flood Zones X, AE, and AE Floodway (AEF).

b. We acknowledge that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR) since the project is being developed within a Special Flood Hazard Area.

c. We further acknowledge that since a portion of the project falls within an AEF flood zone, strict adherence to the NFIP regulations, especially 44CFR 60.3(d)(3), is required. Our civil engineer has initiated consultation on this matter with Mr. Francis Cerizo of the County of Maui, Department of Planning

Additional

1. There are no utilities suspended along the bridge structure.

2. The proposed project shall not impede the storm water carrying capacity of the body of water it crosses.
3. The existing Iao Stream bed in this segment of the stream is a concrete lined channel, therefore the proposed project will not require additional scour protection.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

LINDA LINGLE
GOVERNOR OF HAWAII

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

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

DATE: June 16, 2010

LOG: 2009.3512
DOC: 1006RS39

TO: Wilson, Okamoto Corporation
1907 South Beretania Street, Unit 400
Honolulu, HI 96826

SUBJECT: **Section 106 (NEPA) Review / Pre-Assessment Consultation for Draft EA / Road and Bridge Rehabilitation and Improvements**
Permit # (None)
Building Owner: Hawaii State Department of Transportation
Location: Waiehu Beach Road between Kaae Road/Kuhio Place to Eha Street/Nukuwai Place
Tax Map Key: (2) 3-3 and (2) 3-4

This letter is in response to letters dated October 14, 2009 and October 16, 2009 by Wilson, Okamoto Corporation and the Land Division of the Department of Land and Natural Resources re a *Pre-Assessment Consultation for Draft Environmental Assessment Waiehu Beach Road, Rehabilitation of Iao Stream Bridge, Project No. BR-STP-3400(5).* The project extends along approximately .24 mile. Proposed improvements are designed to benefit pedestrians, persons with disabilities, bicyclists, and motorists. Specific project elements include strengthening of the Iao Stream Bridge to seismic standards; upgrading bridge railings; replacing and adding new guardrails with end connections; ADA approved curb ramps and separated sidewalk; replacement of existing light poles with salt corrosion resistant units; utility relocation of utilities; and new signage and road striping. (The project will employ federal funds, hence the Section 106 designation.)

Re potential impacts:

- We acknowledge that the State Department of Transportation (DOT) is conducting an archaeological assessment.
- The DOT as lead agency has identified nearby two sites listed on the National and State Registers of Historic Places, namely Halekii-Pihana Heiau (No. 50-04-0592) and the Maui Jinsha Mission (No 50-04-1606). We concur with the DOT that the project is far enough away to have no effect on these two sites.
- The Waiehu Beach Road Bridge may be eligible for the Hawaii Register of Historic Places. A check in our office files of historic bridge inventories for Maui County dated 1989 and 1990 do not list this bridge so we do not have its date of construction. We would appreciate you providing us with this information.
- One other concern is maintenance of the historic open character of the roadway. It appears from the letters that the DOT does not intend to expand the right of way. The existing roadside consists of both paved and unpaved surfaces. We hope that the design for bikeways and sidewalks will not lead to complete coverage of the right of way with impervious surfaces.

If you have any questions, please contact Ross W. Stephenson, SHPD Historian, at (808) 692-8028 or ross.w.stephenson@hawaii.gov.

Sincerely,

Mahalo for the opportunity to comment.

Pua Aiu, Administrator, Hawaii Historic Preservation Division (SHPD)

6/30/10
Date

In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.

cc: Department of Planning
County of Maui
250 South High Street
Wailuku, HI 96793

WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS • CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Dr. Pua Aiu, Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawaii 96707

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Dr. Aiu:

Thank you for your letter dated June 16, 2010 (Reference Log: 2009.3512, DOC: 1006RS39) regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We provide the following responses in the respective order of your comments:

- The archaeological report will be included for your review and comment with the forthcoming Draft EA;
- Your concurrence with DOT's determination of "no effect" regarding Halekii-Pihana Heiau (Site #50-04-0592) and Maui Jinsha Mission (Site #50-04-1606) is duly noted;
- Waiehu Beach Road Bridge was constructed in 1954. Reference to this date will be included in the Draft EA;
- Paved areas will be limited to the travel lanes, shoulders, bicycle and pedestrian lanes and will not extend to the road right-of-way; and
- In the event that any historic resources are identified during construction activities, all work shall cease in the immediate vicinity of the find and the SHPD shall be contacted immediately.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
MAYOR

OUR REFERENCE
YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

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

GARY A. YABUTA
CHIEF OF POLICE

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

October 19, 2009

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment
Waiehu Beach Road, Rehabilitation of Iao Stream Bridge

Thank you for your letter of October 14, 2009, requesting comments on the above subject.

We have reviewed the report. Please refer to a copy of the communication from Sergeant Stephen Orikasa for our comments and recommendations. Thank you for giving us the opportunity to comment on project.

Very truly yours,

Assistant Chief Wayne Ribao
for: GARY A. YABUTA
Chief of Police

c: Jeffrey Hunt, Maui County Planning Department

COPY

TO : GARY YABUTA, CHIEF OF POLICE, COUNTY OF MAUI

VIA : CHANNELS

FROM : STEPHEN ORIKASA, ADMINISTRATIVE SERGEANT, WAILUKU PATROL DIVISION

SUBJECT : RESPONSE TO A REQUEST FOR PRE-ASSESSMENT FOR DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS REGARDING THE PROPOSED WAIEHU BEACH ROAD, IAO STREAM BRIDGE PROJECT

I AGREE WITH SGT. ORIKASA'S ASSESSMENT.
10/19/09

This communication is submitted as a response to a request for comments by Mr. Earl Matsukawa, AICP (Project Manager), of the Wilson Okamoto Corporation, on behalf of the State of Hawaii, Department of Transportation (DOT), Highway Division in regards to the following;

SUBJECT : Pre-Assessment Consultation for Draft Environmental Assessment
Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Project No. BR-STP-3400(5)

RESPONSE:

In review of the submitted documents, concerns from the police perspective would be upon the safety of pedestrian and vehicular movement.

Improvements to include pedestrian walkways/corridor and bicycles lanes within the proposed project increases pedestrian safety, thus benefits the safety of adjacent vehicular movement.

There are residences, businesses, child care and an elderly care/living complex in close proximity to this project. During the construction phases, extreme efforts should be made to minimize noise, dust & debris so not to inhibit those whose health and well being may be affected. Adequate traffic control devices and personnel should also be utilized to minimize the impact of heavy equipment and vehicles traveling in and out of the area.

Waiehu Beach Road is a main roadway for the Waiehu/Waihee/Kahakuloa area. It is suggested that a traffic mitigation plan be in place prior to the commencement of this project, and at no time should the project area be completely sterile of vehicular and pedestrian movement, unless warranted to preserve the public's safety.

CONCLUSION:

There are no objections to the commencement of this project at this time. Although, it is of utmost importance to be cognizant of any health and safety impacts, directly and indirectly, which may arise from this project.

Respectfully submitted for your review and approval.

Stephen T. Orikasa E#716
Administrative Sergeant/Wailuku Patrol Division
10/19/09 @ 0730 Hours

Concur with Sgt. Orikasa - traffic control will be key issue to address for vehicular movement.
Capt. G. Sinagawa
10/26/09

WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

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

Attention: Sergeant Stephen Orikasa

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Chief Yabuta:

Thank you for your letter dated October 19, 2009 regarding the pre-assessment consultation for the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in order of your comments:

- We appreciate your concurrence with the objectives of the proposed project to improve pedestrian, bicycle, and vehicular safety.
- The forthcoming Draft Environmental Assessment (DEA) will discuss impacts and mitigation measures to minimize noise, dust, and debris during construction.
- A traffic mitigation plan will be prepared for implementation prior to commencing construction of the proposed project.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

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

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

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

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

October 26, 2009

Mr. Earl Matsukawa, Project Manager
WILSON OKAMOTO CORPORATION
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: REHABILITATION OF IAO STREAM BRIDGE PRE-ASSESSMENT CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT, WAIEHU BEACH ROAD, WAILUKU, MAUI, HAWAII

We reviewed the subject application and have the following comments:

1. The shoulders of Waiehu Beach Road on the approaches to Iao Stream Bridge provide access for our Truck/Tractor w/Trailers, Dump Trucks, Water Wagons and Construction Equipment, such as buildozers, wheel loaders, hydraulic excavators, etc. to the Iao Stream Flood Control Facility. It is imperative that we continue to have these accesses in order to properly maintain said Iao Stream Flood Control Facility.

2. Clear space under the bridge needs to continue to be provided for our construction equipment to pass under the bridge to maintain that portion of the Iao Stream Flood Control Facility from the bridge to the ocean. No ocean access is available, nor desirable due to concerns of potential petroleum contamination of equipment in the near shore waters and due to concerns of corrosion of the salt in the ocean, corroding construction equipment.

3. The Market Street Improvements project will be starting construction shortly. Recommend this project start construction

after completion of construction of the Market Street Improvements. Otherwise both bridges over Iao Stream will be under construction at the same time.

Please call Michael Miyamoto at 270-7845 if you have any questions regarding this letter.

Sincerely,

MILTON M. ARAKAWA, A.I.C.P.
Director of Public Works

MMA:MMM:jc
xc: Highways Division
Engineering Division
S:\LUCA\CZM\Draft Comments\iao_stream_bridge_rehab_pre_assessment_jtc.wpd

WILSON OKAMOTO CORPORATION
CONSULTING ENGINEERS | CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. David Goode, Director
County of Maui
Department of Public Works
200 South High Street Room No. 434
Wailuku, Hawaii 96793

Attention: Mr. Michael Miyamoto

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Goode:

Thank you for your letter dated October 26, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in the order of your comments:

1. Access to the shoulders of Waiehu Beach Road on the approaches to Iao Stream Bridge will be maintained for access by trucks/tractors with trailers, dump trucks, water wagons, and construction equipment for the maintenance of the Iao Stream Flood Control facility.

2. The clear space under the bridge will continue to be provided for maintenance of the Iao Stream Flood Control facility.

3. Construction of the proposed project is anticipated to start in 2012. If this overlaps the completion of the Market Street Improvements project, further discussion to coordinate these construction projects can be pursued.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
MAYOR

DON A. MEDEIROS
Director
WAYNE A. BERGADO
Deputy Director
Telephone (808) 270-7511
Facsimile (808) 270-7995

DEPARTMENT OF TRANSPORTATION

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

November 3, 2009

Mr. Earl Matsukawa
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Subject: Rehabilitation of the Iao Stream Bridge

Dear Mr. Matsukawa,

Thank you for the opportunity to comment on this project. We have no comments to make at this time.

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

Sincerely,

Don Medeiros
Director

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Ms. Jo Anne Johnson, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawaii 96793-2155

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Ms. Johnson

Thank you for your letter dated November 3, 2009 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
Mayor

JEFFREY K. ENG
Director

ERIC H. YAMASHIGE, PE, L.S.
Deputy Director

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

November 9, 2009

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Re: Pre-Assessment Consultation for Draft Environmental Assessment
Waichu Beach Road, Rehabilitation of Iao Stream Bridge
Project No. BR-STP-3400(5)

Dear Mr. Matsukawa:

Thank you for consulting with the Department of Water Supply (DWS) in preparation of this Draft Environmental Assessment (DEA).

The Department's 18-inch waterline runs along the entire project section of Waichu Beach Road. There is a 12-inch and a 4-inch waterline at the Eha Street and Nukuwai Place intersection and an 8-inch and a 4-inch waterline at the Kuhio and Kaae Place intersection. The Department will not issue temporary construction meters for Central Maui projects. Construction plans need to be reviewed by our engineering division. Water valve covers must be lifted to match the finished grade of the roadway.

Pollution Prevention
To supplement measures as required by law to protect the stream during construction, we have attached sample best management practices for road and bridge construction. The DEA should identify mitigation measures to be implemented during construction, including the following:

1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water.
2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Retain ground cover until the last possible date.
4. Stabilize denuded areas by sodding or planting as soon as possible. Replanting should include soil amendments and temporary irrigation. Use high seeding rates to ensure rapid stand establishment.

The Department of Water Supply is an Equal Opportunity provider and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410. Or call (202) 720-5964 (voice and TDD)

Printed on recycled paper

5. Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
6. Keep run-off on site.

Should you have any questions regarding system improvements for this project, please contact our engineering division at (808) 270-7835. For questions on water resources, please contact our Water Resources and Planning Division at (808) 244-8550.

Sincerely,

Jeffrey K. Eng, Director
emb

c: engineering division

attachments:
Selected BMPs from "Guidance Specifying Management Measures For Sources of Nonpoint Pollution In Coastal Waters." U.S.EPA

C:\EA EIS STUD\Waichu Beach Road Rehab Iao Stream Bridge pre_DEA.wpd

United States Environmental Protection Agency
Office of Water Washington, DC 20460
840-B-92-002 January 1993

EPA

Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990

VII. ROADS, HIGHWAYS, AND BRIDGES

NOTE: Management Measures II.A and II.B of this chapter also apply to planning, siting, and developing roads and highways.[4]

A. Management Measure for Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:

(1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;

(2) Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and

(3) Limit disturbance of natural drainage features and vegetation.

1. Applicability

This measure is intended to be applied by States to site development and land disturbing activities for new, relocated, and reconstructed (widened) roads (including residential streets) and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff and associated pollutants from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The best time to address control of NPS pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls will be needed to minimize the impacts of NPS runoff on surface waters.

This management measure emphasizes the importance of planning to identify potential NPS problems early in the design process. This process involves a detailed analysis of environmental features most associated with NPS pollution, erosion and sediment problems such as topography, drainage patterns, soils, climate, existing land use, estimated traffic volume, and sensitive land areas. Highway locations selected, planned, and designed with consideration of these features will greatly minimize erosion and sedimentation and prevent NPS pollutants from entering watercourses during and after construction. An important consideration in planning is the distance between

[4] Management measure II.A applies only to runoff that emanates from the road, highway, and bridge right-of-way. This management measure does not apply to runoff and total suspended solid loadings from upland areas outside the road, highway, or bridge project.

a highway and a watercourse that is needed to buffer the runoff flow and prevent potential contaminants from entering surface waters. Other design elements such as project alignment, gradient, cross section, and the number of stream crossings also must be taken into account to achieve successful control of erosion and nonpoint sources of pollution. (Refer to Chapter 3 of this guidance for details on road designs for different terrains.)

The following case study illustrates some of the problems and associated costs that may occur due to poor road construction and design. These issues should be addressed in the planning and design phase.

> ***CASE STUDY - ANNAPOLIS, MARYLAND***
>
> Poor road siting and design resulted in concentrated runoff flows and heavy erosion that threatened several house foundations adjacent to the road. Sediment-laden runoff was also discharged into Herring Bay. To protect the Chesapeake Bay and the nearby houses, the county corrected the problem by installing diversions, a curb-and-drain urban runoff conveyance, and a rock wall filtration system, at a total cost of $100,000 (Munsey, 1992).

3. Management Measure Selection

This management measure was selected because it follows the approach to highway development recommended by the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA) guidance, and highway location and design guidelines used by the States of Virginia, Maryland, Washington, and others.

Additionally, AASHTO has location and design guidelines (AASHTO, 1990, 1991) available for State highway agency use that describe the considerations necessary to control erosion and highway-related pollutants. Federal Highway Administration policy (FHWA, 1991) requires that Federal-aid highway projects and highways constructed under direct supervision of the FHWA be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface water and ground-water resources.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

a. *Consider type and location of permanent erosion and sediment controls (e.g., vegetated filter strips, grassed swales, pond systems, infiltration systems, constructed urban runoff wetlands, and energy dissipators and velocity controls) during the planning phase of roads, highway, and bridges. (AASHTO, 1991; Hartigan et al., 1989)*

b. *All wetlands that are within the highway corridor and that cannot be avoided should be mitigated. These actions will be subject to Federal Clean Water Act section 404 requirements and State regulations.*

c. *Assess and establish adequate setback distances near wetlands, waterbodies, and riparian areas to ensure protection from encroachment in the vicinity of these areas.*

Setback distances should be determined on a site-specific basis since several variables may be involved such as topography, soils, floodplains, cut-and-fill slopes, and design geometry. In level or gently sloping terrain, a general rule of thumb is to establish a setback of 50 to 100 feet from the edge of the wetland or riparian area and the right-of-way. In areas of steeply sloping terrain (20 percent or greater), setbacks of 100 feet or more are recommended. Right-of-way setbacks from major waterbodies (oceans, lakes, estuaries, rivers) should be in excess of 100 to 1000 feet.

d. *Avoid locations requiring excessive cut and fill. (AASHTO, 1991)*

e. *Avoid locations subject to subsidence, sink holes, landslides, rock outcroppings, and highly erodible soils. (AASHTO, 1991; TRB, Campbell, 1988)*

f. *Size rights-of-way to include space for siting runoff pollution control structures as appropriate. (AASHTO, 1991; Hartigan, et al., 1989)*

Erosion and sediment control structures (extended detention dry ponds, permanent sediment traps, catchment basins, etc.) should be planned and located during the design phase and included as part of the design specifications to ensure that such structures, where needed, are provided within the highway right-of-way.

g. *Plan residential roads and streets in accordance with local subdivision regulations, zoning ordinances, and other local site planning requirements (International City Managers Association, Model Zoning/Subdivision Codes). Residential road and street pavements should be designed with minimum widths.*

Local roads and streets should have right-of-way widths of 36 to 50 feet, with lane widths of 10 to 12 feet. Minimum pavement widths for residential streets where street parking is permitted range from 24 to 28 feet between curbs. In large-lot subdivisions (1 acre or more), grassed drainage swales can be used in lieu of curbs and gutters and the width of paved road surface can be between 18 and 20 feet.

h. *Select the most economic and environmentally sound route location. (FHWA, 1991)*

i. *Use appropriate computer models and methods to determine urban runoff impacts with all proposed route corridors. (Driscoll, 1990)*

Computer models to determine urban runoff from streets and highways include TR-55 (Soil Conservation Service model for controlling peak runoff); the P-8 model to determine storage capacity (Palmstrom and Walker); the FHWA highway runoff model (Driscoll et al., 1990); and others (e.g., SWMM, EPA's stormwater management model; HSP continuous simulation model by Hydrocomp, Inc.).

j. *Comply with National Environmental Policy Act requirements including other State and local requirements. (FHWA, T6640.8A)*

k. *Coordinate the design of pollution controls with appropriate State and Federal environmental agencies. (Maryland DOE, 1983)*

l. Develop local official mapping to show location of proposed highway corridors.

Official mapping can be used to reserve land areas needed for public facilities such as roads, highways, bridges, and urban runoff treatment devices. Areas that require protection, such as those which are sensitive to disturbance or development-related nonpoint source pollution, can be reserved by planning and mapping necessary infrastructure for location in suitable areas.

5. Effectiveness Information and Cost Information

The most economical time to consider the type and location of erosion, sediment, and NPS pollution control is early in the planning and design phase of roads and highways. It is much more costly to correct polluted runoff problems after a road or highway has already been built. The most effective and often the most economical control is to design roads and highways as close to existing grade as possible to minimize the area that must be cut or filled and to avoid locations that encroach upon adjacent watercourses and wet areas. However, some portions of roads and highways cannot always be located where NPS pollution does not pose a threat to surface waters. In these cases, the impact from potential pollutant loadings should be mitigated. Interactive computer models designed to run on a PC are available (e.g., FHWA's model, Driscoll et al., 1990) and can be used to examine and project the runoff impacts of a proposed road or highway design on surface waters. Where controls are determined to be needed, several cost-effective management practices, such as vegetated filter strips, grassed swales, and pond systems, can be considered and used to treat the polluted runoff. These mitigating practices are described in detail in the discussion on urban developments (Management Measure IV.A).

B. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

1. Applicability

This management measure is intended to be applied by States to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges should be a coordinated effort among the States, the FHWA, the U.S. Coast Guard, and the Army Corps of Engineers. Locating bridges in coastal areas can cause significant erosion and sedimentation, resulting in the loss of wetlands and riparian areas. Additionally, since bridge pavements are extensions of the connecting highway, runoff waters from bridge decks also deliver loadings of heavy metals, hydrocarbons, toxic substances, and deicing chemicals to surface waters as a result of discharge through scupper drains with no overland buffering. Bridge maintenance can also contribute heavy loads of lead, rust particles, paint, abrasive, solvents, and cleaners into surface waters. Protection against possible pollutant overloads can be afforded by minimizing the use of scuppers on bridges traversing very sensitive waters and conveying deck drainage to land for treatment. Whenever practical, bridge structures should be located to avoid crossing over sensitive fisheries and shellfish-harvesting areas to prevent washing polluted runoff through scuppers into the waters below. Also, bridge design should account for potential scour and erosion, which may affect shellfish beds and bottom sediments.

3. Management Measure Selection

This management measure was selected because of its documented effectiveness and to protect against potential pollution impacts from siting bridges over sensitive waters and tributaries in the coastal zone. There are several examples of siting bridges to protect sensitive areas. The Isle of Palms Bridge near Charleston, South Carolina, was designed without scupper drains to protect a local fishery from polluted runoff by preventing direct discharge into the waters below. In another example, the Louisiana Department of Transportation and Development specified stringent requirements before allowing the construction of a bridge to protect destruction of fragile wetlands near New Orleans. A similar requirement was specified for bridge construction in the Tampa Bay area in Florida (ENR, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section for urban sources of pollution (Management Measure IV.A).

a. Coordinate design with FHWA, USCG, COE, and other State and Federal agencies as appropriate.

b. Review National Environmental Policy Act requirements to ensure that environmental concerns are met (FHWA, T6640.8A and 23 CFR 771).

c. Avoid highway locations requiring numerous river crossings. (AASHTO, 1991)

d. Direct pollutant loadings away from bridge decks by diverting runoff waters to land for treatment.

Bridge decks should be designed to keep runoff velocities low and control pollutant loadings. Runoff waters should be conveyed away from contact with the watercourse and directed to a stable storm drainage, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge.

e. Restrict the use of scupper drains on bridges less than 400 feet in length and on bridges crossing very sensitive ecosystems.

Scupper drains allow direct discharge of runoff into surface waters below the bridge deck. Such discharges can be of concern where the waterbody is highly susceptible to degradation or is an outstanding resource such as a spawning area or shellfish bed. Other sensitive waters include water supply sources, recreational waters, and irrigation systems. Care should be taken to protect these areas from contaminated runoff.

f. Site and design new bridges to avoid sensitive ecosystems.

Pristine waters and sensitive ecosystems should be protected from degradation as much as possible. Bridge structures should be located in alternative areas where only minimal environmental damage would result.

g. On bridges with scupper drains, provide equivalent urban runoff treatment in terms of pollutant load reduction elsewhere on the project to compensate for the loading discharged off the bridge.

5. Effectiveness Information and Cost Information

Effectively controlling NPS pollutants such as road contaminants, fugitive dirt, and debris and preventing accidental spills from entering surface waters via bridge decks are necessary to protect wetlands and other sensitive ecosystems. Therefore, management practices such as minimizing the use of scupper drains and diverting runoff waters to land for treatment in detention ponds and infiltration systems are known to be effective in mitigating pollutant loadings. Tables 4-7 and 4-8 in Section II provide cost and effectiveness data for ponds, constructed wetlands, and filtration devices.

C. Management Measure for Construction Projects

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Erosion and sedimentation from construction of roads, highways, and bridges, and from unstabilized cut-and-fill areas, can significantly impact surface waters and wetlands with silt and other pollutants including heavy metals, hydrocarbons, and toxic substances. Erosion and sediment control plans are effective in describing procedures for mitigating erosion problems at construction sites before any land-disturbing activity begins. Additional relevant practices are described in Management Measures III.A and III.B of this chapter.

Bridge construction projects include grade separations (bridges over roads) and waterbody crossings. Erosion problems at grade separations result from water running off the bridge deck and runoff waters flowing onto the bridge deck during construction. Controlling this runoff can prevent erosion of slope fills and the undermining failure of the concrete slab at the bridge approach. Bridge construction over waterbodies requires careful planning to limit the disturbance of streambanks. Soil materials excavated for footings in or near the water should be removed and relocated to prevent the material from being washed back into the waterbody. Protective berms, diversion ditches, and silt fences parallel to the waterway can be effective in preventing sediment from reaching the waterbody.

Wetland areas will need special consideration if affected by highway construction, particularly in areas where construction involves adding fill, dredging, or installing pilings. Highway development is most disruptive in wetlands since it may cause increased sediment loss, alteration of surface drainage patterns, changes in the subsurface water table, and loss of wetland habitat. Highway structures should not restrict tidal flows into salt marshes and other coastal wetland areas because this might allow the intrusion of freshwater plants and reduce the growth of salt-tolerant species. To safeguard these fragile areas, the best practice is to locate roads and highways with sufficient setback distances between the highway right-of-way and any wetlands or riparian areas. Bridge construction also can impact water circulation and quality in wetland areas, making special techniques necessary to accommodate construction. The following case study provides an example of a construction project where special considerations were given to wetlands.

CASE STUDY - BRIDGING WETLANDS IN LOUISIANA

To provide protection for an environmentally critical wetland outside New Orleans, the Louisiana Department of Transportation and Development (DOTD) required a special construction technique to build almost 2 miles of twin elevated structures for the Interstate 310 link between I-10 and U.S. Route 90. A technique known as "end-on" construction was devised to work from the decks of the structures, building each section of the bridge from the top of the last completed section and using heavy cranes to push each section forward one bay at a time. The cranes were also used to position steel platforms, drive in support pilings, and lay deck slabs, alternating this procedure between each bay. Without this technique, the Louisiana DOTD would not have been permitted to build this structure. The twin 9,200-foot bridges took 485 days to complete at a cost of $25.3 million (*Engineering News Record*, 1991).

3. Management Measure Selection

This management measure was selected because it supports FHWA's erosion and sediment control policy for all highway and bridge construction projects and is the administrative policy of several State highway departments and local governmental agencies involved in land development activity. Examples of erosion and sediment controls and NPS pollutant control practices are described in AASHTO guidelines and in several State erosion control manuals (AASHTO, 1991; North Carolina DOT, 1991; Washington State DOT, 1988). A detailed discussion of cost-effective management practices is available in the urban development section (Section II) of this chapter. These example practices are also effective for highway construction projects.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section (Section III) of this chapter.

a. Write erosion and sediment control requirements into plans, specifications, and estimates for Federal aid construction projects for highways and bridges (FHWA, 1991) and develop erosion control plans for earth-disturbing activities.

Erosion and sediment control decisions made during the planning and location phase should be written into the contract, plans, specifications, and special provisions provided to the construction contractor. This approach can establish contractor responsibility to carry out the explicit contract plan recommendations for the project and the erosion control practices needed.

b. Coordinate erosion and sediment controls with FHWA, AASHTO, and State guidelines.

Coordination and scheduling of the project work with State and local authorities are major considerations in controlling anticipated erosion and sediment problems. In addition, the contractor should submit a general work schedule and plan that indicates planned implementation of temporary and permanent erosion control practices, including shutdown procedures for winter and other work interruptions. The plan also should include proposed methods of control on restoring borrow pits and the disposal of waste and hazardous materials.

c. Install permanent erosion and sediment control structures at the earliest practicable time in the construction phase.

Permanent or temporary soil stabilization practices should be applied to cleared areas within 15 days after final grade is reached on any portion of the site. Soil stabilization should also be applied within 15 days to denuded areas that may not be at final grade but will remain exposed to rain for 30 days or more. Soil stabilization practices protect soil from the erosive forces of raindrop impact and flowing water. Temporary erosion control practices usually include seeding, mulching, establishing general vegetation, and early application of a gravel base on areas to be paved. Permanent soil stabilization practices include vegetation, filter strips, and structural devices.

Sediment basins and traps, perimeter dikes, sediment barriers, and other practices intended to trap sediment on site should be constructed as a first step in grading and should be functional before upslope land disturbance takes place. Structural practices such as earthen dams, dikes, and diversions should be seeded and mulched within 15 days of installation.

d. Coordinate temporary erosion and sediment control structures with permanent practices.

All temporary erosion and sediment controls should be removed and disposed of within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary controls should be permanently stabilized to prevent further erosion and sedimentation (AASHTO, 1991).

e. Wash all vehicles prior to leaving the construction site to remove mud and other deposits. Vehicles entering or leaving the site with trash or other loose materials should be covered to prevent transport of dust, dirt, and debris. Install and maintain mud and silt traps.

f. Mitigate wetland areas destroyed during construction.

Marshes and some types of wetlands can often be developed in areas where fill material was extracted or in ponds designed for sediment control during construction. Vegetated strips of native marsh grasses established along highway embankments near wetlands or riparian areas can be effective to protect these areas from erosion and sedimentation (FHWA, 1991).

g. Minimize the area that is cleared for construction.

h. Construct cut-and-fill slopes in a manner that will minimize erosion.

Cut-and-fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upslope drainage areas, and ground-water conditions. Suggested recommendations are as follows: reduce the length of long steep slopes by adding diversions or terraces; prevent concentrated runoff from flowing down cut-and-fill slopes by containing these flows within flumes or slope drain structures; and create roughened soil surfaces on cut-and-fill slopes to slow runoff flows. Wherever a slope face crosses a water seepage plane, thereby endangering the stability of the slope, adequate subsurface drainage should be provided.

i. Minimize runoff entering and leaving the site through perimeter and onsite sediment controls.

j. Inspect and maintain erosion and sediment control practices (both on-site and perimeter) until disturbed areas are permanently stabilized.

k. *Divert and convey offsite runoff around disturbed soils and steep slopes to stable areas in order to prevent transport of pollutants off site.*

l. *After construction, remove temporary control structures and restore the affected area. Dispose of sediments in accordance with State and Federal regulations.*

m. *All storm drain inlets that are made operable during construction should be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.*

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness information presented under the construction measure for urban development is also applicable to road, highway, and bridge construction. See Tables 4-15 and 4-16 in Section III.

D. Management Measure for Construction Site Chemical Control

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

1. Applicability

This management measure is intended to be applied by States to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The objective of this measure is to guard against toxic spills and hazardous loadings at construction sites from equipment and fuel storage sites. Toxic substances tend to bind to fine soil particles; however, by controlling sediment mobilization, it is possible to limit the loadings of these pollutants. Also, some substances such as fuels and solvents are hazardous and excess applications or spills during construction can pose significant environmental impacts. Proper management and control of toxic substances and hazardous materials should be the adopted procedure for all construction projects and should be established by erosion and sediment control plans. Additional relevant practices are described in Management Measure III.B of this chapter.

3. Management Measure Selection

This management measure was selected because of existing practices that have been shown to be effective in mitigating construction-generated NPS pollution at highway project sites and equipment storage yards. In addition, maintenance areas containing road salt storage, fertilizers and pesticides, snowplows and trucks, and tractor mowers have the potential to contribute NPS pollutants to adjacent watercourses if not properly managed (AASHTO, 1988, 1991a). This measure is intended to safeguard surface waters and ground water from toxic and hazardous pollutants generated at construction sites. Examples of effective implementation of this measure are presented in the section on construction in urban areas. Several State environmental agencies are using this approach to regulate toxic and hazardous pollutants (Florida DER, 1988; Puget Sound Basin, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

The practices that are applicable to this management measure are described in Section III.B.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness data presented in the Section III.A of this chapter describing NPS controls for construction projects in urban development areas are also applicable to highway construction projects.

E. Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

1. Applicability

This management measure is intended to be applied by States to existing, restored, and rehabilitated roads, highways, and bridges. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measures and will have some flexibility in doing so. The application of measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair coastal surface waters. The program to be developed, using the practices described in this management measure, should consist of and identify standard operating procedures for nutrient and pesticide management, road salt use minimization, and maintenance guidelines (e.g., capture and contain paint chips and other particulates from bridge maintenance operations, resurfacing, and pothole repairs).

3. Management Measure Selection

This management measure for operation and maintenance was selected because (1) it is recommended by FHWA as a cost-effective practice (FHWA, 1991); (2) it is protective of the human environment (Puget Sound Water Quality Authority, 1989); (3) it is effective in controlling erosion by revegetating bare slopes (AASHTO, 1991b); (4) it is helpful in minimizing polluted runoff from road pavements (Transportation Research Board, 1991); and (5) both Federal (Richardson, 1974) and State highway agencies (Minnesota Pollution Control Agency, 1989; Pitt, 1973) advocate highway maintenance as an effective practice for minimizing pollutant loadings.

Maintenance of erosion and sediment control practices is of critical importance. Both temporary and permanent controls require frequent and periodic cleanout of accumulated sediment. Any trapping or filtering device, such as silt fences, sediment basins, buffers, inlets, and check dams, should be checked and cleaned out when approximately 50 percent of their capacity is reached, as determined by the erodible nature of the soil, flow velocity, and quantity of runoff. Seasonal and climatic differences may require more frequent cleanout of these structures. The sediments removed from these control devices should be deposited in permanently stabilized areas to prevent further erosion and sediment from reaching drainages and receiving streams. After periods of use, control devices may require replacement of deteriorated materials such as straw bales and silt fence fabrics, or restoration and reconstruction of sediment basins and riprap installations.

Permanent erosion controls such as vegetated filter strips, grassed swales, and velocity dissipators should be inspected periodically to determine their integrity and continued effectiveness. Continual deterioration or damage to these controls may indicate a need for better design or construction.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully apply to achieve the management measure described above.

a. *Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.*

b. *Establish pesticide/herbicide use and nutrient management programs.*

Refer to the Management Measure for Construction Site Chemical Control in this chapter.

c. *Restrict herbicide and pesticide use in highway rights-of-way to applicators certified under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure safe and effective application.*

d. *The use of chemicals such as soil stabilizers, dust palliatives, sterilants, and growth inhibitors should be limited to the best estimate of optimum application rates. All feasible measures should be taken to avoid excess application and consequent intrusion of such chemicals into surface runoff.*

e. *Sweep, vacuum, and wash residential/urban streets and parking lots.*

f. *Collect and remove road debris.*

g. *Cover salt storage piles and other deicing materials to reduce contamination of surface waters. Locate them outside the 100-year floodplain.*

h. *Regulate the application of deicing salts to prevent oversalting of pavement.*

i. *Use specially equipped salt application trucks.*

j. *Use alternative deicing materials, such as sand or salt substitutes, where sensitive ecosystems should be protected.*

k. *Prevent dumping of accumulated snow into surface waters.*

l. *Maintain retaining walls and pavements to minimize cracks and leakage.*

m. *Repair potholes.*

n. *Encourage litter and debris control management.*

o. *Develop an inspection program to ensure that general maintenance is performed on urban runoff and NPS pollution control facilities.*

To be effective, erosion and sediment control devices and practices must receive thorough and periodic inspection checks. The following is a suggested checklist for the inspection of erosion and sediment controls (AASHTO Operating Subcommittee on Design, 1990):

- Clean out sediment basins and traps; ensure that structures are stable.
- Inspect silt fences and replace deteriorated fabrics and wire connections; properly dispose of deteriorated materials.
- Renew riprapped areas and reapply supplemental rock as necessary.
- Repair/replace check dams and brush barriers; replace or stabilize straw bales as needed.
- Regrade and shape berms and drainage ditches to ensure that runoff is properly channeled.
- Apply seed and mulch where bare spots appear, and replace matting material if deteriorated.
- Ensure that culverts and inlets are protected from siltation.
- Inspect all permanent erosion and sediment controls on a scheduled, programmed basis.

p. *Ensure that energy dissipators and velocity controls to minimize runoff velocity and erosion are maintained.*

q. *Dispose of accumulated sediment collected from urban runoff management and pollution control facilities, and any wastes generated during maintenance operations, in accordance with appropriate local, State, and Federal regulations.*

r. *Use techniques such as suspended tarps, vacuums, or booms to reduce, to the extent practicable, the delivery to surface waters of pollutants used or generated during bridge maintenance (e.g., paint, solvents, scrapings).*

s. *Develop education programs to promote the practices listed above.*

5. Effectiveness Information and Cost Information

Preventive maintenance is a time-proven, cost-effective management approach. Operation schedules and maintenance procedures to restore vegetation, proper management of salt and fertilizer application, regular cleaning of urban runoff structures, and frequent sweeping and vacuuming of urban streets have effective results in pollution control. Litter control, clean-up, and fix-up practices are a low-cost means for eliminating causes of pollution, as is the proper handling of fertilizers, pesticides, and other toxic materials including deicing salts and abrasives. Table 4-30 presents summary information on the cost and effectiveness of operation and maintenance practices for roads, highways, and bridges. Many States and communities are already implementing several of these practices within their budget limitations. As shown in Table 4-30, the use of road salt alternatives such as calcium magnesium acetate (CMA) can be very costly. Some researchers have indicated, however, that reductions in corrosion of infrastructure, damage to roadside vegetation, and the quantity of material that needs to be applied may offset the higher cost of CMA. Use of road salt minimization practices such as salt storage protection and special salt spreading equipment reduces the amount of salt that a State or community must purchase. Consequently, implementation of these practices can pay for itself through savings in salt purchasing costs. Similar programs such as nutrient and pesticide management can also lead to decreased expenditures for materials.

Table 4-30. Effectiveness and Cost Summary for Roads, Highways, and Bridges Operation and Maintenance Management Practices

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
MAINTAIN VEGETATION							
For Sediment Control							Natural succession allowed to occur -
Average:	90	NA	NA	NA	NA	NA	Avg: $100/ac/year
Reported Range:	50-100	NA	NA	NA	NA	NA	Reported Range: $50-$200/ac/year
Probable Range:	80-100	-	-	-	-	-	
For Pollutant Removal							Natural succession not allowed to occur -
Average:	60	40	40	50	50	50	Avg: $800/ac/year
Reported Range	0-100	0-100	0-70	20-80	0-100	50-60	Reported Range: $700-$900/ac/year
Probable Range:	0-100	0-100	0-100	0-100	0-100	0-100	
PESTICIDE/HERBICIDE USE MANAGEMENT							Generally accepted as an economical program to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							
STREET SWEEPING							
Smooth Street, Frequent Cleaning (One or More Passes Per Week)							Avg: $20/curb mile Reported Range: $10-$30/curb mile
Average:	20	NA	NA	5	25	NA	
Reported Range:	20	NA	NA	0-10	5-35	NA	
Probable Range:	20-50	-	-	0-10	20-50	10-30	
Infrequent Cleaning (One Pass Per Month or Less)							
Average:	NA	NA	NA	NA	5	NA	
Reported Range:	NA	NA	NA	NA	0-10	NA	
Probable Range:	0-20	-	-	-	0-20	0-10	
LITTER CONTROL							Generally accepted as an economical approach to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							

CMA Eligible for Matching Funds

Calcium magnesium acetate (CMA) is now eligible for Federal matching funds under the Bridge Program of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The Act provides 80 percent funding for use of CMA on salt-sensitive bridges in order to protect against corrosion and to extend their useful life. CMA can also be used to protect vegetation from salt damage in environmentally sensitive areas.

F. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

1. Applicability

This management measure is intended to be applied by States to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries. In areas where such adverse impacts to surface waters can be attributed to adjacent roads or bridges, retrofit management projects to protect these waters may be needed (e.g., installation of structural or nonstructural pollution controls). Retrofit projects can be located in existing rights-of-way, within interchange loops, or on adjacent land areas. Areas with severe erosion and pollution runoff problems may require relocation or reconstruction to mitigate these impacts.

Runoff management systems are a combination of nonstructural and structural practices selected to reduce nonpoint source loadings from roads, highways, and bridges. These systems are expected to include structural improvements to existing runoff control structures for water quality purposes; construction of new runoff control devices, where necessary to protect water quality; and scheduled operation and maintenance activities for these runoff control practices. Typical runoff controls for roads, highways, and bridges include vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

Table 4-30. (Continued)

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
GENERAL MAINTENANCE (e.g., pothole and roadside repairs)							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:							
PROTECTION OF SALT PILES							For salt storage building - Ave: $30/ton salt Reported Range: $10-$70/ton salt
Average:	NA						
Reported Range:	NA						
Probable Range:	90-100[a]						
MINIMIZATION OF APPLICATION OF DEICING SALTS							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
SPECIALLY EQUIPPED SALT APPLICATION TRUCKS							For spread rate control on truck - Ave: $6,000/truck Reported Range: $6,000/truck
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
USE OF ALTERNATIVE DEICING MATERIALS							CMA - Ave: $650/ton Reported Range: $650/ton (note: cost of salt $30/ton)
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff[a]						
CONTAIN POLLUTANTS GENERATED DURING BRIDGE MAINTENANCE							Varies with method of containment use
Average:	NA						
Reported Range:	NA						
Probable Range:	50-100[b]						

NA = Not applicable.
[a]Measured as reduction in salt.
[b]Measured as reduction of all pollutants.

3. Management Measure Selection

This management measure was selected because of the demonstrated effectiveness of retrofit systems for existing roads and highways that were constructed with inadequate nonpoint source pollution controls or without such controls. Structural practices for mitigating polluted runoff from existing highways are described in the literature (Silverman, 1988).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

- *a. Locate runoff treatment facilities within existing rights-of-way or in medians and interchange loops.*
- *b. Develop multiple-use treatment facilities on adjacent lands (e.g., parks and golf courses).*
- *c. Acquire additional land for locating treatment facilities.*
- *d. Use underground storage where no alternative is available.*
- *e. Maximize the length and width of vegetated filter strips to slow the travel time of sheet flow and increase the infiltration rate of urban runoff.*

5. Effectiveness Information and Cost Information

Cost and effectiveness data for structural urban runoff management and pollution control facilities are outlined in Tables 4-15 and 4-16 in Section III and discussed in Section IV of this chapter and are applicable to determine the cost and effectiveness of retrofit projects. Retrofit projects can often be more costly to construct because of the need to locate the required structures within existing space or the need to locate the structures within adjacent property that requires purchase. However, the use of multiple-use facilities on adjacent lands, such as diverting runoff waters to parkland or golf courses, can offset this cost. Nonstructural practices described in the urban section also can be effective in achieving source control. As with other sections of this document, the costs of loss of habitat, fisheries, and recreational areas must be weighed against the cost of retrofitting control structures within existing rights-of-way.

6. Pollutants of Concern

Table 4-31 lists the pollutants commonly found in urban runoff from roads, highways, and bridges and their sources. The disposition and subsequent magnitude of pollutants found in highway runoff are site-specific and are affected by traffic volume, road or highway design, surrounding land use, climate, and accidental spills.

The FHWA conducted an extensive field monitoring and laboratory analysis program to determine the pollutant concentration in highway runoff from 31 sites in 11 States (Driscoll et al., 1990). The event mean concentrations (EMCs) developed in the study for a number of pollutants are presented in Table 4-32. The study also indicated that for highways discharging into lakes, the pollutants of major concern are phosphorus and heavy metals. For highways discharging into streams, the pollutants of major concern are heavy metals—cadmium, copper, lead, and zinc.

Table 4-31. Highway Runoff Constituents and Their Primary Sources

Constituents	Primary Sources
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, break lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anticake compound (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular
Sodium, Calcium, Chloride	Deicing salts
Sulphate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate

In colder regions where deicing agents are used, deicing chemicals and abrasives are the largest source of pollutants during winter months. Deicing salt (primarily sodium chloride, NaCl) is the most commonly used deicing agent. Potential pollutants from deicing salt include sodium chloride, ferric ferrocyanide (used to keep the salt in granular form), and sulfates such as gypsum. Table 4-33 summarizes potential environmental impacts caused by road salt. Other chemicals used as a salt substitute include calcium magnesium acetate (CMA) and, less frequently, urea and glycol compounds. Researchers have differing opinions on the environmental impacts of CMA compared to those of road salt (Chevron Chemical Company, 1991; Salt Institute, undated; Transportation Research Board, 1991).

Table 4-32. Pollutant Concentrations in Highway Runoff (Driscoll et al., 1990)

Pollutant	Event Mean Concentration for Highways With Fewer Than 30,000 Vehicles/Day[A] (mg/L)	Event Mean Concentration for Highways With More Than 30,000 Vehicles/Day[A] (mg/L)
Total Suspended Solids	41	142
Volatile Suspended Solids	12	39
Total Organic Carbon	8	25
Chemical Oxygen Demand	49	114
Nitrite and Nitrate	0.46	0.76
Total Kjeldahl Nitrogen	0.87	1.83
Phosphate Phosphorus	0.16	0.40
Copper	0.022	0.054
Lead	0.080	0.400
Zinc	0.080	0.329

*Event mean concentrations are for the 50% median site.

Table 4-33. Potential Environmental Impacts of Road Salts

Environmental Resource	Potential Environmental Impact of Road Salt (NaCl)
Soils	May accumulate in soil. Breaks down soil structure, increases erosion. Causes soil compaction that results in decreased permeability.
Vegetation	Osmotic stress and soil compaction harm root systems. Spray causes foliage dehydration damage. Many plant species are salt-sensitive.
Ground Water	Mobile Na and Cl ions readily reach ground water. Increases NaCl concentration in well water, as well as alkalinity and hardness.
Surface Water	Causes density stratification in ponds and lakes that can prevent reoxygenation. Increases runoff of heavy metals and nutrients through increased erosion.
Aquatic Life	Monovalent Na and Cl ions stress osmotic balances. Toxic levels: Na - 500 ppm for stickleback; Cl - 400 ppm for trout.
Human/Mammalian	Sodium is linked to heart disease and hypertension. Chlorine causes unpleasant taste in drinking water. Mild skin and eye irritant. Acute oral LD_{50} in rats is approximately 3,000 mg/kg (slightly toxic).

WILSON OKAMOTO CORPORATION
Engineers | Planners | Economists
1507 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

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

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Taylor:

Thank you for your letter dated November 9, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following response to your comments:

Thank you for the information regarding Department of Water Supply facility near the project site. The proposed project will be subject to Section 401 Water Quality Certification pursuant to the processing of a Department of the Army Permit for the proposed bridge improvements. We will incorporate your suggested best management practices (BMPs) into the BMP plan to be submitted to the Department of Health Clean Water Branch for certification.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

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

November 13, 2009

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Pre-Assessment Consultation for Draft Environmental Assessment

We have reviewed the Project Summary for the subject project and have no comments to the proposed action.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Karla Peters, Parks Project Manager, at (808) 270-7981.

Sincerely,

TAMARA HORCAJO
Director

TH:PTM:kp

c: Patrick Matsui, Chief of Parks Planning and Development
Project Files

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · ECONOMISTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96825 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

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

Attention: Ms. Karla Peters

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road,
Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Correa:

Thank you for your letter dated November 13, 2009 indicating that you have no comments to offer regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

KATHLEEN ROSS AOKI
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

November 18, 2009

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: ENVIRONMENTAL ASSESSMENT COMMENTS (EAC) FOR THE PREPARATION OF A DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE WAIEHU BEACH ROAD, REHABILITATION OF IAO STREAM BRIDGE, LOCATED ALONG WAIEHU BEACH ROAD BETWEEN KAAE ROAD/KUHIO PLACE TO EHA STREET/NUKUWAI PLACE, WAILUKU DISTRICT, MAUI, HAWAII; (EAC 2009/0040)

The Department of Planning (Department) is in receipt of the above-referenced letter dated October 14, 2009, requesting pre-assessment comment on preparation of a Draft EA.

The Department has the following comments:

1. Please review the proposed project for consistency with the Draft Maui Island Plan 2030. The Maui Island Plan can be found at the following URL: http://www.mauicounty.gov/index.asp?NID=1120. The Maui Island Plan provides a guide for the future growth of the Island to the year 2030. The Maui Island Plan establishes a vision and a set of long-range guiding principles, goals, objectives, policies, and maps to guide the growth and development of the Island. The purpose of the Maui Island Plan, amongst others, is to, "Establish policies to manage change and to guide decisions about future land use and development" and to protect natural and cultural resources;

2. The Department requests that the Applicant address any inconsistencies with the Maui Island Plan relative to the proposed project;

3. Any proposed actions should take into consideration that the area is culturally significant and may contain burial grounds and other traditional cultural properties;

4. Provide mitigation alternative analysis in order to minimize the expected increased sedimentation that may occur as a result of the proposed project, including the transport of sediment from the existing channel into near-shore coastal waters;

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

5. No Tax Map Key (TMK) numbers for the affected parcels were provided in your letter. Please provide all correct TMK numbers for all parcels affected by the project;

6. Please provide the Land Use Designations (State, Wailuku-Kahului Community Plan, and Zoning) for the project area. These designations shall be verified by the Department's Zoning Administration and Enforcement Division (ZAED). Please submit the attached *Zoning and Flood Confirmation Form* to ZAED identifying the affected TMK parcels; and

7. The project site is located within the County's Special Management Area (SMA), and an SMA Assessment may be required unless the Department of Transportation, Highways Division can exempt themselves under Chapter 266, Hawaii Revised Statutes.

Thank you for the opportunity to comment. Please include the Department on the distribution list for the Draft EA. Should you require further clarification, please contact Staff Planner Joseph Prutch at joseph.prutch@mauicounty.gov or at (808) 270-7512.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for JEFFREY S. HUNT, AICP
Planning Director

Attachment
xc: Aaron H. Shinmoto, PE, Planning Program Administrator (2)
Joseph M. Prutch, Staff Planner
Project File
General File
JSH:CIY:JMP:vb
K:\WP_DOCS\PLANNING\EAC\2009\0040_IaoStreamBridge\PreComments.doc

COUNTY OF MAUI
DEPARTMENT OF PLANNING
Kalana Paku`i Building
250 South High Street
Wailuku, Hawaii 96793

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

ZONING AND FLOOD CONFIRMATION FORM

APPLICANT INFORMATION *(To be completed by Applicant)*			
APPLICANT			
TELEPHONE		E-MAIL	
PROJECT NAME			
ADDRESS/LOCATION			
TAX MAP KEY NO(S)			
ZONING INFORMATION *(To be completed by ZAED)*			
COMMUNITY PLAN DESIGNTION(S)			
COUNTY ZONING(S)			
STATE LAND USE DISTRICT(S)			
SPECIAL DISTRICT(S)			
FLOOD INFORMATION *(To be completed by ZAED)*			
FLOOD HAZARD AREA ZONE(S)			
BASE FLOOD ELEVATION(S)		mean sea level, 1929 National Geodetic Vertical Datum; or	
For Flood Zone AO, FLOOD DEPTH			
FLOODWAY	☐ Yes ☐ No		
FLOOD DEVELOPMENT PERMIT REQUIRED	☐ Yes ☐ No		

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

FOR COUNTY USE ONLY

REMARKS/COMMENTS:

☐ Additional information required
☐ Required for Agricultural Subdivisions Agricultural Assessment RFS No:
☐ Information submitted is correct
☐ Correction has been made and initialed

Reviewed and Confirmed by:

(Signature) (Date)

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

S:\ALL\FORMS\ZAED\ZoneFldConf\ZonFldConf.doc (Rev. 02.09)

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX 808-946-2253
www.wilsonokamoto.com

7213-01
February 2, 2011

Mr. William Spence, Director
County of Maui
Department of Planning
250 South High Street
Kalana Pakui Building, Suite 200
Wailuku, Hawaii 96793

Attention: Mr. Clayton Yoshida

Subject: Pre-Assessment Consultation
Draft Environmental Assessment (EA) for Waiehu Beach Road, Rehabilitation of Iao Stream Bridge
District of Wailuku, Island of Maui, Hawaii
Federal Aid Project No. BR-STP-3400(5)

Dear Mr. Spence:

Thank you for your letter of November 18, 2009 regarding the subject Draft Environmental Assessment (EA) pre-assessment consultation. We offer the following responses in the order of your comments:

1 and 2. Discussion of the Draft Maui Island Plan 2030 will be included in Chapter 4 of the Draft EA.

3. The Draft EA will include a discussion of potential impacts of the proposed project on cultural resources and properties.

4. The proposed project will be subject to Section 401 Water Quality Certification, pursuant to the processing of a Department of the Army Permit for the proposed bridge improvements. A site-specific Best Management Practices (BMP) plan will be prepared in conjunction with that permit application. The Draft EA will discuss potential mitigation measures that may be included in the BMP plan.

5. As a roadway, the project site has not been assigned a Tax Map Key (TMK) number. The proposed improvements will occur within the existing roadway right-of-way and, as such, will not affect other properties.

6. Chapter 4 of the Draft EA will provide all applicable land use designations associated with the proposed project site and immediately adjoining areas.

7. Chapter 6 will include the SMA permit in the list of required permits and approvals required for the project. We have consulted Ann Cua from your department regarding the concurrent review of the Draft EA and the County's SMA assessment.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Ms. Li Nah Okita, State DOT, Highways Division

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 S. Beretania St., Suite 400
Honolulu, Hawaii 96826

PH 808-946-2277
FX 808-946-2253

www.wilsonokamoto.com
woc@wilsonokamoto.com