William P. Kenoi
Mayor

William T. Takaba
Managing Director

Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i

DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
www.co.hawaii.hi.us

OCT 23 2012
FILE COPY
RECEIVED
'12 OCT 10 P4:13
OFC. OF ENVIRONMENTAL QUALITY CONTROL

October 4, 2012

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

Dear Mr. Hooser:

Subject: Final Environmental Assessment and Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, TMKs (3rd) 2-4-001:019, 024, 120, 167,179, 181, 182 and 183; 2-4-023:009-010; 019-023,024-026; 2-4-028:014-015, and 032; 2-4-056: 004-006: 014-015; 021-022; 028-029 and 030. 2-4-057:024-025 and 028, South Hilo District, Island of Hawai'i

With this letter, the Department of Public Works (DPW), County of Hawai'i, transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the subject project. The Draft Environmental Assessment was published in the OEQC Bulletin of August 23, 2012. During the public comment period, written comments were received and responses were prepared for each comment. After review of the public comments and of the Final Environmental Assessment, the DPW has determined that this project will not have significant negative effect on the environment. Thus, we have issued a Finding of No Significant Impact (FONSI). Please publish this notice in the next OEQC Environmental Notice (October 23, 2012). We have enclosed the following:

- One hardcopy of the Final EA.
- A CD containing the .pdf file for the EA and a WORD file with the OEQC transmittal documents, including OEQC Environmental Notice Publication Form, project summary, the distribution list for the Draft EA, and a sample "Dear Participant" letter.
- Hardcopies of the OEQC transmittal material.

Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office. Please contact Allan Simeon of DPW at 961-8925 if you have any questions.

Sincerely,

Warren Lee, P.E.
Director
Attach: As noted above
Cc: (w/o attach) Ron Terry, Ph.D, Project Environmental Consultant

OEQC Publication Form
The Environmental Notice

Name of Project:	Kapiolani Street Extension
Applicable Law:	Chapter 343, HRS
Type of Document:	Final EA and Finding of No Significant Impact (FONSI)
Island:	Hawai`i
District:	South Hilo
TMK:	TMK (3rd.) 2-4-001: 019, 024, 120, 167, 179, 181, 182 and 183. 2-4-023:009-010; 019-023: 024-026. 2-4-028:014-015: and 032. 2-4-056: 004-006: 014-015; 021-022; 028-029 and 030. 2-4-057:024, 025 and 028
Permits Required:	State Historic Preservation Division: Chapter 6e Concurrence; State Department of Health: NPDES; County of Hawai'i, Department of Public Works: Grubbing and Grading Permits, County of Hawai'i, Planning Department Plan Approval
Name of Applicant or Proposing Agency:	Hawai`i County Department of Public Works
Address	101 Pauahi Street, Suite 7
City, State, Zip	Hilo HI 96720
Contact and Phone	Allan Simeon, P.E., 961-8925
Approving Agency:	Hawai`i County Department of Public Works
Address	101 Pauahi Street, Suite 7
City, State, Zip	Hilo HI 96720-4224
Contact and Phone	Allan Simeon, P.E., 961-8925
Consultant	Geometrician Associates
Address	PO Box 396
City, State, Zip	Hilo HI 96721
Contact and Phone	Ron Terry 969-7090

Project Summary. The Hawai'i County Department of Public Works proposes to extend Kapiolani Street in Hilo between Lanikaula and Mohouli Streets. The project includes two-lanes and a central median/turn lane, curbs, gutters, and sidewalks, bike lanes, a concrete bridge across Waiākea Stream, drainage structures, utility relocation, intersection channelization and improvements, traffic signals, crosswalks, ADA curb ramps, street lighting, landscaping, retaining walls, property and driveway tie-ins, a potential bus shelter pullout, and other related improvements. The purpose and need is to: 1) improve traffic flow on Kilauea and Kinoole Streets; 2) provide a bike and pedestrian route from the University of Hawai'i at Hilo to Mohouli Street, as part of a downtown to university connection; 3) provide access to undeveloped State of Hawai'i lands for beneficial public uses; and 4) provide an alternative evacuation route during tsunami. The new road would mostly be located on existing County right-of-way within Kapiolani, Mohouli and Lanikaula Streets and three properties that were set aside in 2010 for the proposed road, with limited right-of-way acquisition from corner and adjacent properties. Beneficial effects include linking the disconnected segments of Kapiolani Street to provide access, connectivity and safer biking. In general, traffic congestion would decrease and air quality would increase due to the more efficient link. No valuable species or habitat are present, and historic sites include only four remnants of 20th century flood control, sugar cane cultivation and dairy uses that lack integrity or significance for preservation. Short-term impacts to water quality, air quality, traffic congestion and noise can be mitigated to minor levels, and growth facilitated by the project has been specified in State and County plans. Cumulative impacts during construction may occur but can be mitigated by scheduling and coordination; permanent cumulative traffic impacts can be alleviated by adjusting existing university traffic/parking restrictions and mass transit schedules.

Distribution List for Kapiolani Street Extension Final EA
(will be sent EA or letter announcing availability)

AGENCIES AND ORGANIZATIONS

Teresa Donham, Acting Archaeology Branch Chief
State Historic Pres. Div.
601 Kamokila Blvd., Rm. 555
Kapolei HI 96707

Russell Tsuji, Administrator
Hawai‘i State DLNR Land Div.
P.O. Box 621
Honolulu HI 96809

William M. Tam, Director
Hawai‘i State Commission on Water Resource Management
P.O. Box 621
Honolulu HI 96809

Deputy Director
Environmental Health Administration
Hawai‘i State Department of Health
P.O. Box 3378
Honolulu HI 96801

Harry Yada, Director of Real Property
University of Hawai‘i at Hilo
200 W. Kawili Street
Hilo, Hawaii 96720-4091

Gerald DeMello, Director of University Relations
University of Hawai‘i at Hilo
200 W. Kawili Street
Hilo, Hawaii 96720-4091

Bobby Jean Leithead-Todd, Director
Hawai‘i County Planning Dept.
101 Aupuni Street, Suite 3
Hilo HI 96720

Dora Beck, Acting Director
Hawai‘i County DEM
25 Aupuni Street, Rm. 210
Hilo HI 96720

Quirino Antonio, Manager
Hawai‘i County DWS
345 Kekuanaoa Street, Suite 20
Hilo HI 96720

Hawai‘i County Council
25 Aupuni Street
Hilo HI 96720

Harry Kubojiri, Chief
Hawai‘i County Police Department
349 Kapiolani Street
Hilo HI 96720

Bob Ward
77-6526 Ho‘olaupa‘i St.
Kailua Kona HI 96740

Jon J. Arizumi, President, and Carol A. VanCamp, Government Affairs Committee Chair
Japanese Chamber of Commerce & Industry of Hawaii
714 Kanoelehua Avenue
Hilo HI 96720

LIBRARY COPY

Librarian, Hilo Public Library
300 Waianuenue Avenue
Hilo HI 96720

NEIGHBORING PROPERTY OWNERS

HAWAII BUKKYO KAI KAN
216 MOHOULI ST
HILO HI 96720

KAMANA INC
688 KINOOLE ST STE 212
HILO HI 96720

WAIAKEA UKA BIBLE CHURCH
187 AINAKO AVE
HILO HI 96720

CHRIST LUTHERAN CHURCH
595 KAPIOLANI ST
HILO HI 96720

ISLAND OF HAWAI‘I YMCA
300 W LANIKAULA ST
HILO HI 96720

HOSPICE OF HILO
1011 WAIANUENUE AVE
HILO HI 96720

TERENCE YAMAMOTO
2527 RAINBOW DR
HONOLULU HI 96822

ISHII, HOWARD R TRST
272 MOHOULI ST
HILO HI 96720

HATADA, BRIAN TOSHIO TRST
254 MOHOULI ST
HILO HI 96720

KOIZUMI, DEBBIE M
263 MOHOULI ST
HILO HI 96720

KANESHIRO, SEIKO/ SADAKO
P O BOX 1118
HILO HI 96721

CHARTRAND,LIONEL K
542 MANONO ST
HILO HI 96720

BOTBYL, SEAN PETER
6256 PINE ST
MAYS LANDING NJ 08330

USAGAWA, JUTARO TR
1228 KIHONUA PL
HILO HI 96720

HARADA, JAMES S
215 MOHOULI ST
HILO HI 96720

HATA, HOWARD YOICHI
2825 S KING ST #2804
HONOLULU HI 96826

HASEGAWA, GERALDINE N
40 MAKAKAI PL
HILO HI 9672

ESAKI, AMY I TRS ETAL
5505 B KAAPUNI RD
KAPAA HI 96746

ROSENDAHL, LOIS
240 MOHOULI ST
HILO HI 96720

OGATA, TETSUO
190 W LANIKAULA ST
HILO HI 96720

KUROYAMA, HACHIRO
210 W LANIKAULA
HILO HI 96720

SUYAMA, LLOYD K
226 W LANIKAULA ST
HILO HI 96720

HAWAII HOUSING AUTHORITY
PO BOX 17907
HONOLULU HI 96817

COMMUNITY MEMBERS MAILING LIST

First Name	Last Name	Organization	Contact
Thomas	(Unknown)		765-5730
Jim and Sandy	Anderson		702 Hueu Place Hilo HI 976720
Greg	Ayau	Bank of Hawaii	Gregory.Ayau@boh.com
Mary	Begier		mary@marybegier.com
Dr. and Mrs. Dan	Belcher		dhbelcher@gmail.com
Larry	Black		104 Kapoa St Hilo HI 96720
Jerry	Chang	State House	repchang@capitol.hawaii.gov
Gayle	Cho	Hawaii CC	gaylec@hawaii.edu
Earl	Fujishige	Waiakea Uka Bible Church	efujishi@yahoo.com
Ken	Goodenow		goodenow@hawaiiantel.net
Helen	Hemmes		hemmesh@hawaiiantel.net
Donald	Ikeda	County of Hawaii	dikeda@co.hawaii.hi.us
Leslie	Isemoto	Isemoto Contracting	iccles@ilhawaii.net
Galen	Kuba		gmkuba@hawaii.rr.com
Dan	Kunert		dkunato@yahoo.com
Gary and Dinnie	Kysar	Destination Hilo	cldymoon@hawaiiantel.net
R.	Manganay		rmanganay@co.hawaii.hi.us
Barry	Mark	Ameriprise Financial	barrymark@hawaiiantel.net
Jeff	Melrose	Island Planning	jeff@isleplan
Amy	Miwa	County of Hawaii	amiwa@co.hawaii.hi.us
Mark	Nakashima	State House	repnakashima@hawaii.gov
Gregory Hall	Nielsen		PO Box 77, Kurtistown, HI 96760
Robert	Nishimoto		nishicast888@gmail.com
Fresh	Onishi	County of Hawaii	25 Aupuni St, Hilo HI 96720
Ian and Song	Sakai	Waiakea Uka Bible Church	songsakai@yahoo.com
Brian	Shiron	Waiakea Uka Bible Church	756-6471
Norman	Sletteland		409 Pohakulani St., Hilo HI 96720
Wayne and Rayelle	Subica	Imata & Assoc.	171 Kapiolani St Hilo HI 96720
Lloyd K.	Suyama		226 W. Lanikaula St, Hilo, HI 96720
Harvey	Taira	Suisan Co	harveyT@suisan.com
Harvey & Helene	Tajiri		helene96720@gmail.com
M&M Robert	Usagawa		robert.usagawa@hawaiiantel.net
Bill	Walter	Shipman	wwalter@whshipman.com
Bob	Williams	Hawaiian Island Veterans, Inc.	964-5764
Hugh	Willocks	Willocks Construction Co.	hughh@willockshawaii.com
Fred	Yamashiro	Island of Hawaii YMCA	fred.yamashiro@gmail.com
Miles	Yoshioka	Hi Island Chamber of Comm.	admin@hicc.biz

Dear Participant:

Attached for your review is the Final Environmental Assessment (DEA) and Finding of No Significant Impact (FONSI) prepared pursuant to the EIS law (Hawaii Revised Statutes, Chapter 343) and the EIS rules (Administrative Rules, Title 11, Chapter 200).

Project Name: **Kapiolani Street Extension**

Location: Island: **Hawai`i** District: **South Hilo**
Tax Map Key Numbers: **(3rd.) 2-4-001: 019, 024, 120, 167, 179, 181, 182 and 183. 2-4-023:009-010; 019-023: 024-026. 2-4-028:014-015: and 032. 2-4-056: 004-006: 014-015; 021-022; 028-029 and 030. 2-4-057:024, 025 and 028**

Proposing/Approving
Agency: **Hawai`i County Department of Public Works**
Address: **101 Pauahi Street, Suite 7**
Hilo HI 96720
Contact: **Allan Simeon, P.E** Phone: **961-8925**

If you no longer need the Draft or Final EA, please recycle it. Thank you for your participation in the Environmental Assessment process.

Dear Participant:

This notice is to inform you that that a Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI) prepared pursuant to the EIS law (Hawai‘i Revised Statutes, Chapter 343) and the EIS rules (Administrative Rules, Title 11, Chapter 200) is available for review. **As of October 23, 2012, the EA is expected to be available for download at: http://hawaii.gov/health/environmental/oegc/index.html**

Hardcopies of the EA have been sent to the Hilo Public Library. Limited numbers of hardcopies are also available for private distribution (call 808-969-7090 to request)

Project Name: **Kapiolani Street Extension**

Location: Island: **Hawai`i** District: **South Hilo**
Tax Map Key Numbers: **(3rd.) 2-4-001: 019, 024, 120, 167, 179, 181, 182 and 183. 2-4-023:009-010; 019-023: 024-026. 2-4-028:014-015: and 032. 2-4-056: 004-006: 014-015; 021-022; 028-029 and 030. 2-4-057:024, 025 and 028**

Proposing/Approving
Agency: **Hawai‘i County Department of Public Works**
Address: **101 Pauahi Street, Suite 7**
Hilo HI 96720
Contact: **Allan Simeon, P.E** Phone: **961-8925**

Thank you for your participation in the Environmental Assessment process.

Dear Librarian:

Please make available to your patrons for review the attached Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI), which was prepared pursuant to the EIS law (Hawaii Revised Statutes, Chapter 343) and the EIS rules (Administrative Rules, Title 11, Chapter 200).

Project Name: **Kapiolani Street Extension**

Location: Island: **Hawai`i** District: **South Hilo**
Tax Map Key Numbers: **(3rd.) 2-4-001: 019, 024, 120, 167, 179, 181, 182 and 183. 2-4-023:009-010; 019-023: 024-026. 2-4-028:014-015: and 032. 2-4-056: 004-006: 014-015; 021-022; 028-029 and 030. 2-4-057:024, 025 and 028**

Proposing/Approving
Agency: **Hawai`i County Department of Public Works**
Address: **101 Pauahi Street, Suite 7**
Hilo HI 96720
Contact: **Allan Simeon, P.E** Phone: **961-8925**

If you no longer need the Draft or Final EA, please recycle it. Thank you for your participation in the Environmental Assessment process.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

FINAL ENVIRONMENTAL ASSESSMENT AND FONSI

County of Hawai‘i, Department of Public Works

October 2012

Submitted Pursuant to Chapter 343, Hawai‘i Revised Statutes (HRS)

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

FINAL ENVIRONMENTAL ASSESSMENT AND FONSI

Tax Map Key Numbers: (3rd):
2-4-001: 019, 024, 120, 167, 179, 181, 182 and 183
2-4-023:009-010; 019-023: 024-026
2-4-028:014-015: and 032;
2-4-056: 004-006: 014-015; 021-022; 028-029 and 030
2-4-057:024, 025 and 028

PROPOSING/APPROVING AGENCY:

County of Hawai‘i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, Hawai‘i 96720

CONSULTANT:

Geometrician Associates
P.O. Box 396
Hilo, Hawai‘i 96721

And

SSFM International Inc.
99 Aupuni Street, Suite 202
Hilo, Hawai‘i 96720

CLASS OF ACTION:

Use of State Land
Use of County Funds

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR)

[This page intentionally left blank]

SUMMARY

The County of Hawai‘i, Department of Public Works, proposes to extend Kapiolani Street to provide a two-lane road connection between Lanikaula and Mohouli Streets in Hilo, Hawai‘i. The project is planned to include the construction of concrete curbs, gutters, and sidewalks, bike lanes, a concrete bridge across Waiākea Stream, drainage improvements, utility relocation and potential utility installation, intersection channelization and improvements, traffic signal systems, crosswalks, ADA curb ramps, street lighting, landscaping, retaining walls, property and driveway tie-ins, a potential bus shelter pullout and other related improvements.

The purpose and need of the project is to: 1) improve traffic flow on Kilauea and Kinoole Streets; 2) provide a bike and pedestrian route from the University of Hawai‘i at Hilo to Mohouli Street, as part of a downtown to university connection; 3) provide access to undeveloped State of Hawai‘i lands for beneficial public uses; and 4) provide an alternative evacuation route during tsunami.

The new road would be almost entirely contained on existing County right-of-way associated with the existing Kapiolani, Mohouli and Lanikaula Streets and three properties that were set aside in 2010 for the Kapiolani Street Extension. The project will also require some right-of-way acquisition from properties on the corners of Lanikaula and Mohouli Streets. Use of other properties adjacent to the Kapiolani Street Extension may be required for drainage features, slope easements and utility structures, as determined during final design.

Beneficial effects include linking the disconnected segments of Kapiolani Street to provide access, connectivity and safer biking conditions. Traffic congestion would decrease and air quality would increase for most existing segments and intersections in the general project area due to the more efficient link. The affected area has degraded alien vegetation, and no threatened or endangered species or valuable habitat is present. Four archaeological sites associated with 20th century flood control, sugar cane cultivation or dairy uses were found; none are significant for preservation in place. The County will provide for archaeological monitoring if required by the State Historic Preservation Division. Short-term impacts to water quality, air quality, traffic congestion and noise can be mitigated to minor levels by proper adherence to construction permits and other mitigation. Growth facilitated by the project has been specified in State and County plans. Cumulative impacts during construction may occur but can be mitigated by scheduling and coordination; permanent cumulative traffic impacts can be alleviated by adjusting existing university traffic/parking restrictions and mass transit schedules.

Table of Contents

SUMMARY **S-1**
TABLE OF CONTENTS ..... **i**
LIST OF ABBREVIATIONS ..... **iii**

1 PROJECT LOCATION, DESCRIPTION, AND ALTERNATIVES **1-1**
1.1 Project Location, Description and Purpose and Need 1-1
1.2 Alternatives Considered 1-11
1.3 Consistency with Government Plans and Policies 1-13
1.3.1 Hawai‘i State Plan 1-13
1.3.2 Hawai‘i County General Plan 1-14
1.3.3 Bike Plan Hawaii and Hawai‘i Complete Streets Act 1-18

2 ENVIRONMENTAL ASSESSMENT PROCESS **2-1**

3 ENVIRONMENTAL SETTING AND IMPACTS **3-1**
3.1 Physical Environment 3-1
3.1.1 Geology, Soils and Hazards 3-1
3.1.2 Floodplains, Drainage and Water Quality 3-2
3.1.3 Hazardous Materials and Toxic Substances 3-7
3.2 Biological Environment 3-8
3.3 Socioeconomic 3-11
3.3.1 Land Use, Social Factors and Community Identity 3-11
3.3.2 Public Services, Facilities and Utilities 3-12
3.3.3 Cultural and Historic Resources 3-14
3.3.4 Scenic Resources 3-19
3.4 Traffic Related Impacts 3-20
3.4.1 Traffic Flow 3-20
3.4.2 Climate and Air Quality 3-25
3.4.3 Noise 3-29
3.5 Growth-Inducing, Cumulative and Secondary Impacts 3-34
3.6 Required Permits and Approvals 3-38
3.7 Summary of Mitigation Measures 3-38

4 COMMENTS AND COORDINATION 4-1
4.1 Agencies and Organizations Contacted 4-1

5 LIST OF DOCUMENT PREPARERS 5-1

6 ENVIRONMENTAL ASSESSMENT FINDINGS 6-1

REFERENCES R-1

LIST OF FIGURES

Figure 1-1 USGS Location Map 1-2
Figure 1-2 Aerial Image with Selected Land Use Features 1-3
Figure 1-3 Project Site Photos 1-4
Figure 1-4a Overall Plan 1-5
Figure 1-4b Typical Cross Section 1-6
Figure 1-4c Lanikaula Street Intersection 1-7
Figure 1-4d Mohouli Street Intersection 1-8
Figure 1-4e Waiakea Flood Control Channel Bridge 1-9
Figure 3-1 Flood Insurance Rate Map of Project Area 3-3
Figure 3-2 Archaeological Sites Near Proposed Kapiolani Street Extension 3-18
Figure 3-3 Project Related Traffic Volume Redistribution 3-24

LIST OF TABLES

Table 3-1 Selected Socioeconomic Characteristics 3-13
Table 3-2 Existing (2012) Roadway Average Daily Traffic 3-21
Table 3-3 Estimated Worst-Case 1-Hour Carbon Monoxide Concentrations 3-27
Table 3-4 Estimated Worst-Case 8-Hour Carbon Monoxide Concentrations 3-28
Table 3-5 Federal Highway Administration Noise Abatement Criteria 3-30
Table 3-6 Projects with Potential for Cumulative Impacts 3-37
Table 3-7 Summary of Mitigation Measures 3-39

LIST OF APPENDICES

Appendix 1 Public Involvement
Appendix 2 Botanical Survey
Appendix 3 Water Quality and Aquatic Biology Report
Appendix 4 Archaeological Inventory Survey
Appendix 5 Traffic Impact Assessment Report
Appendix 6 Air Quality Report
Appendix 7 Acoustic Study
Appendix 8 Phase I Environmental Site Assessment

Appendix 9 List of Properties Affected
Appendix 10 UH Hilo Long Range Development Plan 2020 Preferred Plan

LIST OF ABBREVIATIONS

ADA	Americans with Disabilities Act
ADT	Average daily traffic
BMP	Best Management Practice
DLNR	(Hawai‘i State) Department of Land and Natural Resources
DOH	(Hawai‘i State) Department of Health
DWS	(Hawai‘i County) Department of Water Supply
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gpd	Gallons per day
gpm	Gallons per minute
HAR	Hawai‘i Administrative Rules
HELCO	Hawaii Electric Light Company\
HEPA	Hawai‘i Environmental Policy Act
HCGP	Hawai‘i County General Plan
HRS	Hawai‘i Revised Statutes
Kv	Kilovolt
LOMR	(Flood Zone) Letter of Map Revision
LOS	(Traffic) Level of Service
LRDP	(UH Hilo) Long Range Development Plan
MCL	Maximum Contaminant Level
MG	Million gallons
msl	Mean sea level
MTA	(Hawai‘i County) Mass Transit Agency
OEQC	(Hawai‘i State) Office of Environmental Quality Control
SFHA	Special Flood Hazard Area
SHPD/O	State Historic Preservation Division/Officer
SMA	Special Management Area
TIAR	Traffic Impact Assessment Report
UH	University of Hawai‘i
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1 PROJECT LOCATION, DESCRIPTION AND ALTERNATIVES

1.1 Project Location, Description and Purpose and Need

Project Location and Description

The County of Hawai‘i, Department of Public Works (DPW), proposes to extend Kapiolani Street to provide a two-lane road connection between Lanikaula and Mohouli Streets in Hilo, Hawai‘i (Figures 1-1 to 1-3). The new road would be almost entirely contained on existing County right-of-way associated with Kapiolani, Mohouli and Lanikaula Street and three properties that were set aside in June 2010 (SUB 10-000989) for the Kapiolani Street Extension: TMKs 2-4-001:019, 181 and 182 and 2-4-056:029, which the County intends to have conveyed from the Department of Land and Natural Resources The project will also require some right-of-way acquisition from properties on the corners of Lanikaula and Mohouli Streets: TMKs: 2-4-001:167; 2-4-023:022 and 023; 2-4-028:014 and 032; 2-4-056: 015, 028 and 030; and 2-4-057:024. Use of properties adjacent to the Kapiolani Street Extension including TMKs 2-4-001: 019, 024, and 183; and 2-4-056:014, 021, 022, and 028, will be needed for right-of-way for the roadway as well as additional property that may be required for drainage features, slope easements and utility structures, as determined during final design. Temporary right-of-entry to grade small portions of property to make appropriate transitions to sidewalks on the right-of-way will be required at properties on Mohouli and Lanikaula Streets at TMKs 2-4-001:120 and 179; 2-4-056: 004, 005, and 006; 2-4-023:009, 010, 019, 020, 021, 024, 025, and 026; 2-4-028:015; and 2-4-057:028. Appendix 9 includes a full list of affected properties, estimated square footage of right-of-way needs, and property owners. All encumbered State properties (leases and Executive Orders) identified in Appendix 9 will require the withdrawal of any portions identified within the Kapiolani Street Extension and set aside to the County for roadway purposes.

The project is planned to include the construction of concrete curbs, gutters, and sidewalks, bike lanes within cross sections of 60 ~~and 66~~ feet, a median in sections lacking a left-turn lane, a concrete bridge across Waiakea Stream, drainage improvements, utility installation and relocation, intersection channelization and improvements, traffic signal systems at Mohouli Street and Lanikaula Street, crosswalks, ADA curb ramps, street lighting, landscaping retaining walls, property and existing/future driveway tie-ins, a potential bus shelter pullout and other related improvements. Figures 1-4a-e provide plan views of the overall project and details at various locations. The intersections of Kapiolani Street with Lanikaula Street and Mohouli Street will have full dedicated opposing left-turn lanes in all directions and a right-turn for the eastbound approach of Lanikaula Street.

The project was authorized in February 2011, when the Hawai‘i County Council passed Bill 322, which authorized the County to secure $8.7 million in capital improvement funding for the project. The actual cost of the project will be refined through final design. After the EA is complete, the County will finish design and obtain permits, and then select a contractor for construction, which is scheduled for completion as early as 2014.

Figure 1-1
Location Map

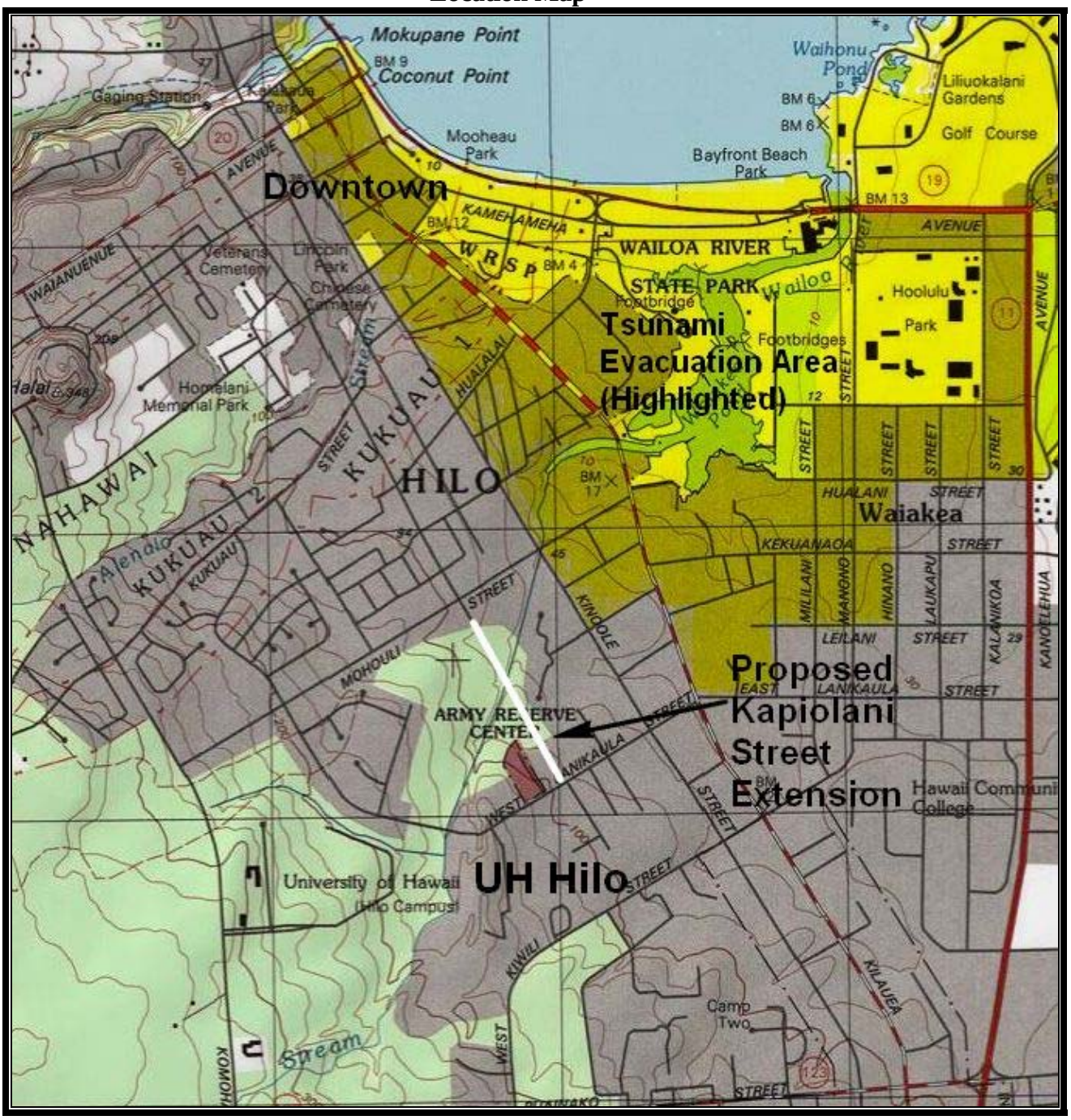
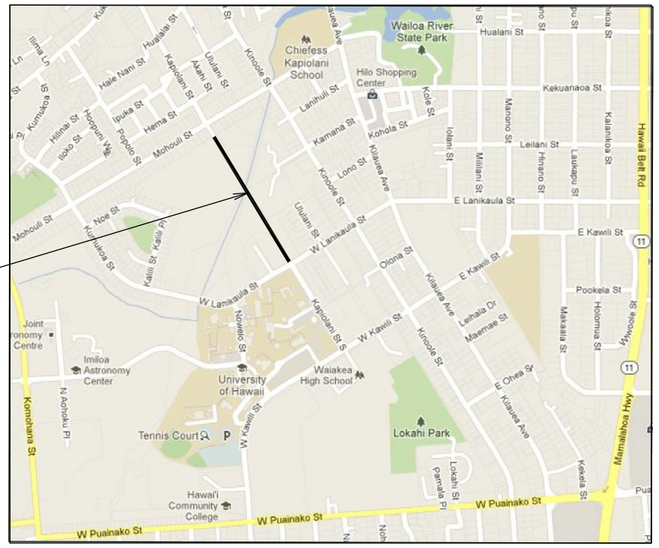


Figure 1-2
Aerial Image with Selected Land Use Features

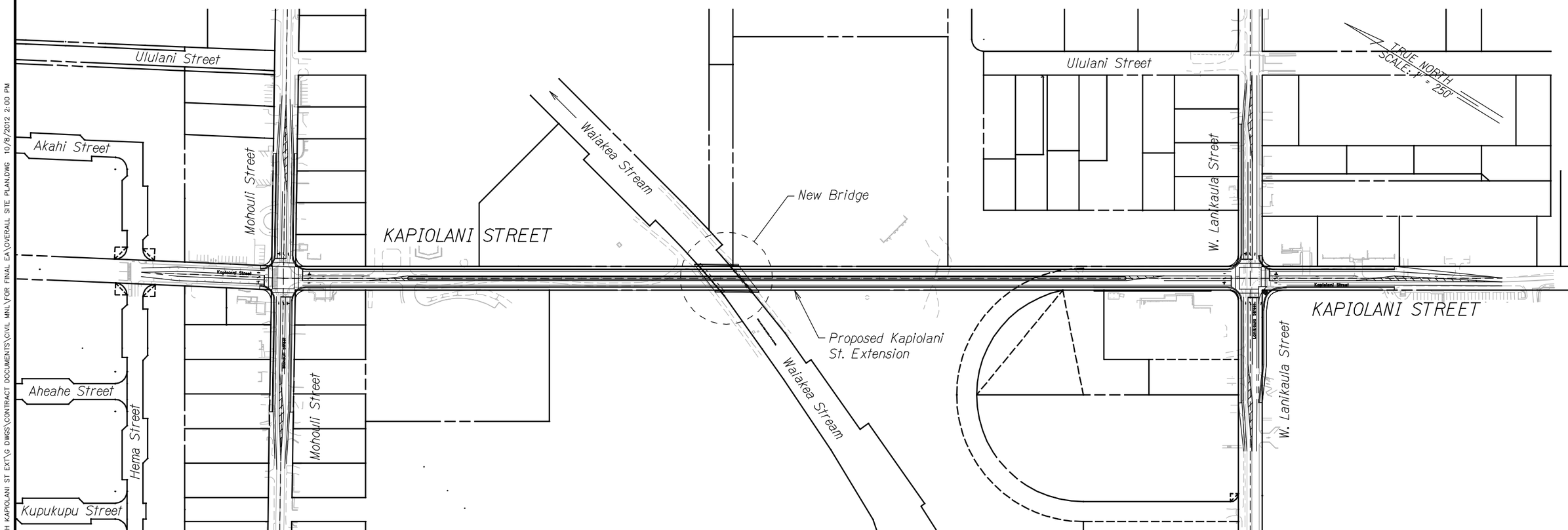
Figure 1-3 Project Site Photos

1-3a, top: Mohouli St. intersection, looking north; 1-3b, center: Waiakea Flood Control Channel; 1-3c, bottom: Vegetation in interior of corridor.



N

VICINITY PLAN
NOT TO SCALE



GRAPHICAL SCALE:

250' 125' 0 250' 500'

Scale: 1" = 250'

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

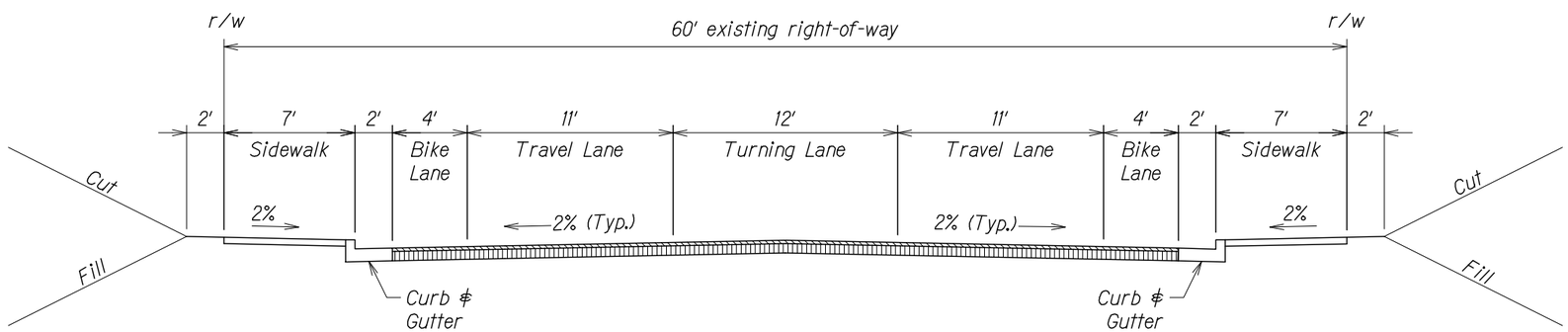
OVERALL SITE PLAN
KAPIOLANI STREET EXTENSION
Project No. E-4039

Scale: 1" = 250'

Date: October 2012

FIGURE
1-4a

M:\2011\2011_120.000 COH KAPIOLANI ST EXT\G DWGS\CONTRACT DOCUMENTS\CIVIL MNL\FOR FINAL EA\OVERALL SITE PLAN.DWG 10/8/2012 2:00 PM



Typical Section

GRAPHICAL SCALE:

8' 0 8' 16'

Scale: 1" = 8'

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

TYPICAL CROSS SECTION

KAPIOLANI STREET EXTENSION
Project No. E-4039

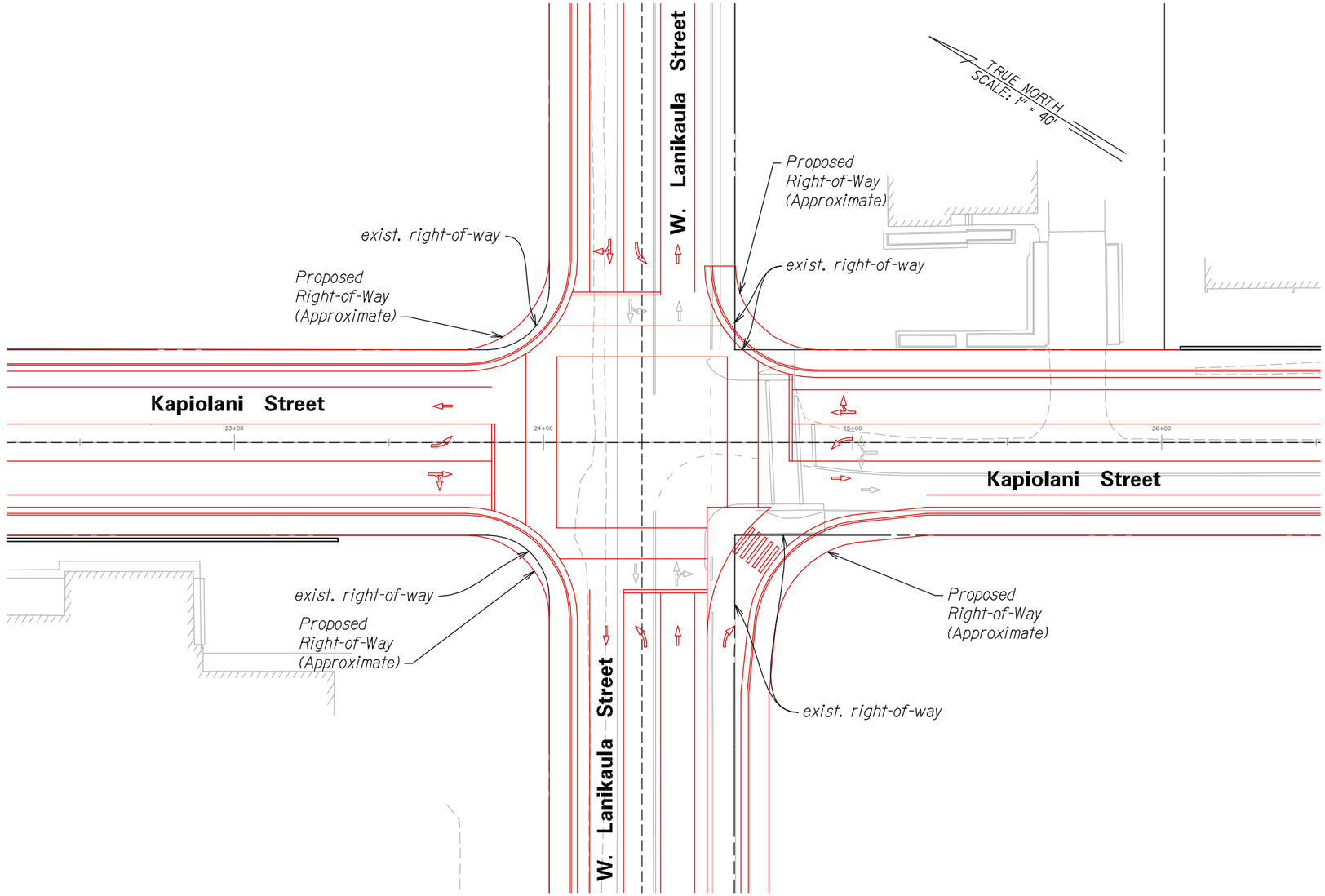
Scale: 1" = 8'

Date: October 2012

FIGURE

1-4b

M:\2011\2011_120.000 COH KAPIOLANI ST EXT\C DWGS\CONTRACT DOCUMENTS\CIVIL MNL\FOR FINAL EA\TYPICAL SECTION.DWG 10/8/2012 8:35 AM



LEGEND:

- Proposed Improvements
- Existing Features
- Proposed Right-of-Way
- existing right-of-way
- Direction of Traffic

GRAPHICAL SCALE:

40' 20' 0 40' 80'

Scale: 1" = 40'

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

LANIKAULA STREET INTERSECTION

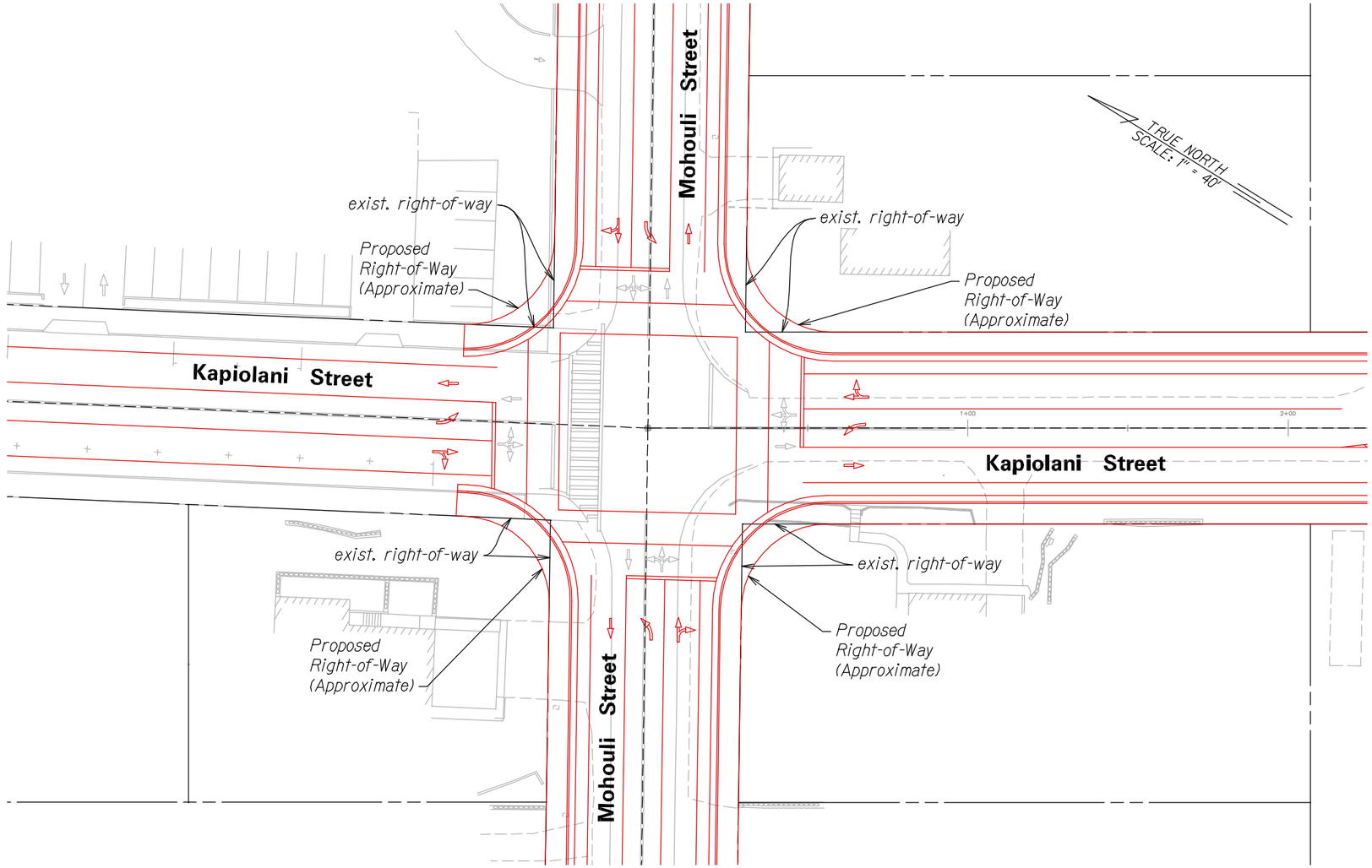
KAPIOLANI STREET EXTENSION
Project No. E-4039

Scale: 1" = 40'

Date: October 2012

FIGURE 1-4c

M:\2011\2011_120.000 COH KAPIOLANI ST EXT\G DWGS\CONTRACT DOCUMENTS\CIVIL MNL\FOR FINAL EA\INTERSECTION PLAN.DWG 10/8/2012 11:02 AM



LEGEND:

- Proposed Improvements
- Existing Features
- Proposed Right-of-Way
- existing right-of-way
- Direction of Traffic

GRAPHICAL SCALE:

40' 20' 0 40' 80'

Scale: 1" = 40'

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

MOHOULI STREET INTERSECTION

KAPIOLANI STREET EXTENSION
Project No. E-4039

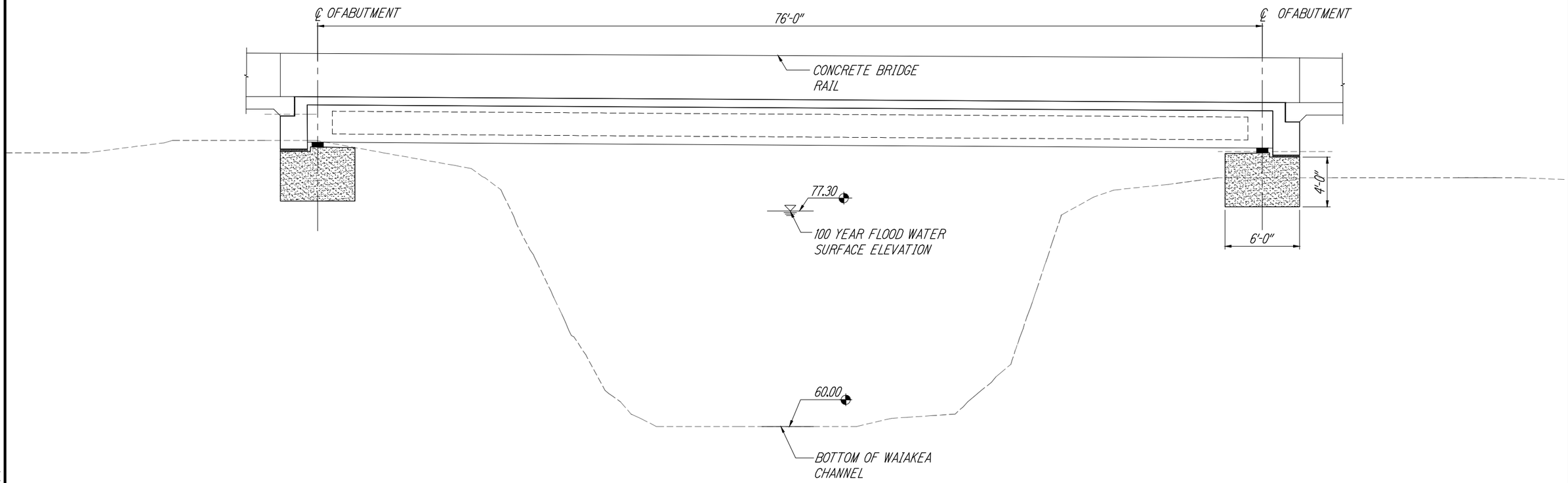
Scale: 1" = 40'

Date: October 2012

FIGURE

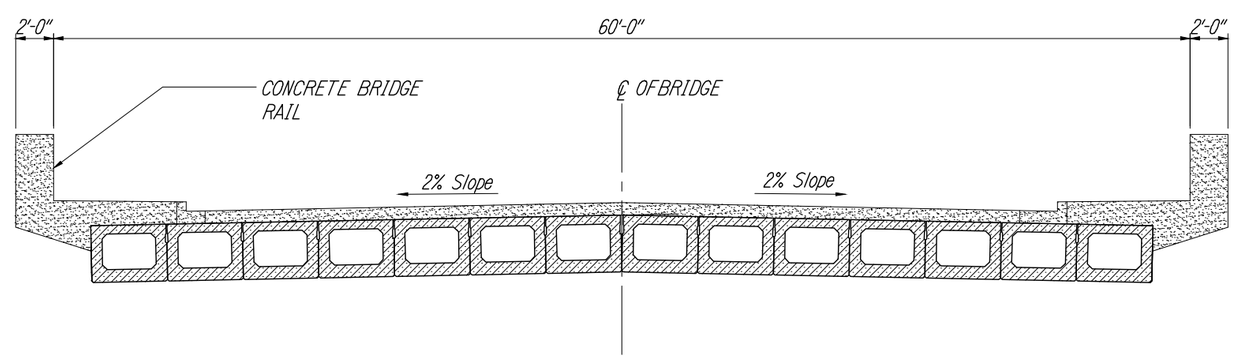
1-4d

\\SSFM.LOCAL\DFSMROOT\DFSMNLPROJ\2011\2011_120.000 COH KAPIOLANI ST EXT\G DWGS\CONTRACT DOCUMENTS\CIVIL MNL\FOR FINAL EA\INTERSECTION PLAN.DWG 10/8/2012 8:44 AM



SIDE VIEW

Scale: 1/8" = 1'-0"



TYPICAL SECTION

Scale: 1/8" = 1'-0"

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 120
Hilo, Hawaii 96720

CONCEPT BRIDGE SIDE VIEW AND TYPICAL SECTION

KAPIOLANI STREET EXTENSION
Project No. E-4039

Scale: 1/8" = 1'-0" | Date: October 2012

FIGURE **1-4e**

M:\2011\2011_120.000 COH KAPIOLANI ST EXT\C DWGS\CONTRACT DOCUMENTS\STRUCTURAL\EXIBIT AND CONCEPT\1-4E EXIBIT - REVISED 121008.DWG 10/8/2012 10:12 AM

This page intentionally left blank

Project Purpose and Need

The purpose and need of the project are to:

- *Improve traffic flow on Kinoole, Lanikaula, Mohouli and Kapiolani Streets*. Currently, traffic has poor levels of service at some intersections at peak hours, part of it related to circuitous travel paths to and from the University of Hawai‘i at Hilo (UH Hilo) and inadequate intersections on Kapiolani Street. As discussed in Section 3.4.1, this congestion will worsen over the next twenty years. The project would improve level of service and reduce traffic congestion and delays relative to no action.
- *Provide a bike and pedestrian route from the University to Mohouli Street, as part of a downtown to UH Hilo connection*. Kilauea Avenue is a main motor vehicle route with four lanes with very little right-of-way available in which to provide bike lanes. Kinoole Street has only two lanes but relatively heavy traffic with many intersections and driveways. Cyclists on both streets often use the sidewalks, if present.
- *Provide access to undeveloped State of Hawai‘i lands*. The project would facilitate plans for orderly development of the University of Hawai‘i at Hilo and other potential non-profit users of this State land. This would promote economic development and the provision of social services, benefiting students, the Big Island community, and the entire State of Hawai‘i.
- *Provide an alternate evacuation route during tsunami*. As shown in Figure 1-1, the mandatory evacuation zone when a tsunami emergency is declared area includes areas *makai* of Kinoole Street extending from downtown southeast to Kamana Street. Kapiolani Street would provide an alternate route that completely avoids areas within or directly adjacent to evacuation zones.

1.2 Alternatives Considered

The County has studied potential alternative actions, and does not envision any with the potential to meet most or all of the project purposes, other than the proposed project.

Although there are other conceivable routes between Mohouli Street and Lanikaula Street, none would be as direct or short (about 0.45 miles) as the proposed route, which has been recognized on official County maps of Hilo since 1967. Recognizing the importance of this particular route, which simply and directly connects the gap in Kapiolani Street, the County of Hawai‘i worked with UH Hilo to ensure that a proposed general lease of State lands by the University of Hawai‘i included a set-aside of the right-of-way for the proposed Kapiolani Street Extension.

One potential alternative route would begin on Lanikaula Street *mauka* of the Hilo Baptist Church (see location of church on Figure 1-2). This route could stay west of the Waiakea Drainage Canal and connect to Kapiolani Street near Christ Lutheran Church and thus avoid the expense of a bridge across this drainage, although it would be about 500 feet longer than the proposed route and would not provide access to lands east of the drainage. This route would

involve a T-intersection with Lanikaula Street, as there is no roadway opposite, at a location that does not provide access for any UH Hilo or other public facilities. The disadvantages of this – and any other conceivable alternative route – has led the County to dismiss such routes from further consideration in the EA, as the County would not undertake to construct them.

A solution that was proposed in 2004 for some of the traffic congestion on Kilauea Avenue and Kinoole Street is a two-mile extension of the existing one-way couplet on these streets between Waianuenue Avenue and Ponahawai Streets as far as Kawili Street (Hawai‘i County DPW 2004). Traffic modeling for this County-initiated study indicated many beneficial reductions of congestion and increases in Level of Service. The proposal was never advanced and there was no public involvement. It is not known whether the businesses and homeowners with frontage on these sections would support it or would have concerns about limitations on their access and detours for residents and customers. Although there is merit in renewing consideration of this idea, it would address only one of the elements of purpose and need (improving traffic flow) and would not assist in providing access to State lands for beneficial public uses, and is beyond the scope of this EA. If pursued separately, it would not conflict with and might complement the proposed project.

To address pedestrian and bicycle safety, it would be feasible to establish a safer bicycle route between Mohouli Street (and the downtown areas beyond) and UH Hilo by constructing bike lanes on Kilauea Avenue and/or Kinoole Street. However, Kilauea Avenue has four lanes, sidewalks and double sets of utility poles within a 60-foot right-of-way, leaving very little if any area in which to provide bike lanes without removing structures on developed property. Kinoole Street has only two lanes, sidewalks and double sets of utility poles within a 60-foot right-of-way. Most importantly, there are dozens of driveways. Construction of bike lanes on either Kinoole Street or Kilauea Avenue between Lanikaula and Mohouli Streets is feasible, but they would require considerable purchase of right-of-way and/or relocation of sidewalks and utilities and disruption of existing businesses and residences, none of which is required for Kapiolani Street. The expense and difficulty of developing bike lanes on these portions of Kilauea Avenue or Kinoole Street is one of the reasons these have never been advanced for construction, despite these streets being designated for future bike lanes in the *Hawai‘i Bike Plan* (HDOT 1994, 2003). The construction of such lanes as an alternative for the proposed Kapiolani Street has been dismissed from further consideration in the EA.

The No Action Alternative provides a baseline for comparison of impacts from the proposed project. It would result in no on-ground impacts, but it has adverse implications for traffic and access considerations. Unless explicitly mentioned, the discussion of impacts and mitigation in Chapter 3 relates to the Proposed Project Alternative only.

1.3 Consistency with Government Plans and Policies

The project is generally highly consistent with government plans and policies. The following sections discuss consistency with key plans.

1.3.1 Hawai‘i State Plan

The Hawai‘i State Plan was adopted in 1978. It was revised in 1986 and again in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended). The Plan establishes a set of goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The proposed project is consistent with State goals and objectives that call for increases in employment, income and job choices, and a growing, diversified economic base extending to the neighbor islands. The sections of the Hawai‘i State Plan most relevant to the proposed project are centered on the themes of economy, environmental protection, and education, as discussed below.

§226-6 Objectives and policies for the economy--in general. (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:

(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.

(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.

226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources. (a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:

(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.

(2) Effective protection of Hawaii's unique and fragile environmental resources.

§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources. (a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.

§226-21 Objective and policies for socio-cultural advancement--education. (a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.

(b) To achieve the education objective, it shall be the policy of this State to:

5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.

Discussion: The proposed Kapiolani Street Extension would improve conditions for motorists, bicyclists and pedestrians, and open up access for State lands that could be used for socially beneficial purposes including higher education. Although not valuable farmland by current standards, the lands have previously been disturbed and farmed and do not have natural or cultural resources or scenic values that require special protection. The proposed project supports all relevant objectives and policies of the Hawai‘i State Plan.

1.3.2 Hawai‘i County General Plan

The *General Plan* for the County of Hawai‘i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The latest plan was adopted by ordinance in 2005. The *General Plan* is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Below are pertinent Goals, Objectives, Policies and Standards sections related to transportation, followed by a discussion of conformance. Next, other relevant sections of aspects of the General Plan are briefly discussed.

1.3.2.1 General Plan and Transportation

TRANSPORTATION – GOALS

- Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.
- Make available a variety of modes of transportation that best meets the needs of the County.

TRANSPORTATION – POLICIES

- A framework of transportation facilities that will promote and influence desired land use shall be established by concerned agencies.
- The agencies concerned with transportation systems shall provide for present traffic and future demands, including the programmed development of mass transit programs for high growth areas by both the private and public sectors.
- The improvement of transportation service shall be encouraged.
- Consider the provision of adequate transportation systems to enhance the economic viability of a given area.

- Develop a comprehensive, islandwide multi-modal transportation plan that identifies the location and operation of automobile, mass transit, bicycle and pedestrian systems, in coordination with appropriate Federal and State agencies.
- Explore means and opportunities to enhance the shared use of the island's roadways by pedestrians and bicyclists, in coordination with appropriate government agencies and organizations.

TRANSPORTATION – STANDARDS

- Transportation systems shall meet the requirements of the U.S. Department of Transportation, State Department of Transportation and the County of Hawai'i.
- Transportation systems shall conform with design guidelines established by the American Association of State Highway and Transportation Officials (AASHTO).

ROADWAYS – GOALS

- Provide a system of roadways for the safe, efficient and comfortable movement of people and goods.
- Provide an integrated State and County transportation system so that new major routes will complement and encourage proposed land policies.

ROADWAYS – POLICIES

- Encourage the programmed improvement of existing roadways by both public and private sectors.
- Investigate various methods of funding road improvements, including private sector participation, to meet the growing transportation needs of the island.
- Develop short and long range capital improvement programs and plans for transportation that are consistent with the General Plan.

ROADWAYS – STANDARD

- Major Collector: Any street supplementary to the arterial street system that is a means of transit between this system and smaller areas; used to some extent for through traffic and to access abutting properties; collect and distribute traffic between neighborhood and arterial system. Major collectors shall have a minimum right-of-way of 60 feet.

Discussion: The proposed project is completely consistent with elements of the General Plan dealing with transportation. The project would promote transportation goals and conform to appropriate standards. The project provides for bicycle and pedestrian facilities in keeping with its location near UH Hilo. Implementation of the proposed project would not conflict with any goals, policies or courses of action, and would, in fact, contribute to their fulfillment.

1.3.2.2 Other Selected Elements of General Plan

ECONOMIC GOALS

(d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural and social environment.

ENVIRONMENTAL QUALITY POLICIES

(a) Take positive action to further maintain the quality of the environment for residents both in the present and in the future.

ENVIRONMENTAL QUALITY STANDARDS

(a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
(b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.

HISTORIC SITES GOALS

(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.

HISTORIC SITES POLICIES

(c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.

FLOOD CONTROL AND DRAINAGE GOALS

(c) Control pollution.
(d) Prevent damage from inundation.
(e) Reduce surface water and sediment runoff

FLOOD CONTROL AND DRAINAGE POLICIES

(g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

(a) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
(b) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
(c) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.

NATURAL RESOURCES AND SHORELINES GOALS

(a) Protect and conserve the natural resources of the County of Hawaii from undue exploitation, encroachment and damage.
(f) Ensure that alterations to existing land forms and vegetation, except crops, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.

COURSES OF ACTION FOR SOUTH HILO: ECONOMIC

(f) Support the development of a master plan for lands within the vicinity of the University of Hawaii at Hilo to incorporate a "college town" concept utilizing an appropriate mixture of residential, commercial and other land uses to complement the university's infrastructure

COURSES OF ACTION FOR SOUTH HILO: HOUSING

(a) Encourage the State to provide student, faculty, and staff housing for the University of Hawaii at Hilo and the Hawaii Community College.

COURSES OF ACTION FOR SOUTH HILO: PUBLIC FACILITIES: EDUCATION

(c) Provide pedestrian walkways to and around all school complexes.
(d) Support the continued expansion of the University system and the University of Hawaii at Hilo and Hawaii Community College campus and encourage the continuing education programs throughout the community. The transfer of State lands to the University should be actively pursued.

(e) Encourage continual improvements to existing educational facilities.

Discussion: The project is consistent with these aspects of the General Plan. It will encourage economic opportunities related to education and non-profit enterprises that are compatible with the County's cultural, natural and social environment, the quality of which will be maintained. Historic sites or agricultural lands will not be adversely impacted. The improvements do not encroach into the flood zone except to bridge a channelized artificial drainage. The natural beauty and natural resources of the Hilo area will not be adversely affected directly or indirectly by the proposed project, given standard expected conditions of land use approvals and permitting. The improvements will assist UH Hilo in the orderly development of its facilities and programs on State land, including potential student and faculty housing, which will benefit the Hilo area, the Island of Hawai'i, and the State of Hawai'i. The road will be designed with pedestrian and bicycle facilities appropriate to the important function as a corridor for students to walk or bike to campus.

1.3.3 Bike Plan Hawaii and Hawai'i Complete Streets Act

There are several State and County plans that discuss bicycling and pedestrian facilities. DOT's bicycle masterplan, *Bike Plan Hawaii* (HDOT 1994) (updated in 2003 on a web publication at http://hawaii.gov/dot/highways/Bike/bikeplan/index.htm) does not call for facilities on the Kapiolani Street Extension, as this roadway had not been planned in 2003. However, Kapiolani Street to the northwest of Mohouli Street is identified as a future "Shared, Signed Roadway." A signed shared roadway is a street or highway that is specifically designated by signs as a preferred route for bicycle use. Signed facilities generally should meet or exceed widths of 14 feet for curb lanes or 4 feet for paved shoulders. This route is identified as a Priority II, which is expected to be implemented within a ten year planning horizon. It is identified as a Class A facility, meaning use of an existing road with only minor work would be necessary to upgrade the existing facility to appropriate standards. The cost was estimated at $4,000 in 2003. In addition to Bike Plan Hawaii, the *Hawai'i Long Range Transportation Plan* (Hawai'i DOT 1998: Figure 6-87)) indicated that a non-motorized path could eventually be constructed along the edges of the Waiākea Flood Control Channel. The Kapiolani Street Extension would facilitate access to this future path, if constructed.

The Complete Streets Act, Act 54, was passed by the 2009 Hawai'i State Legislature. In the language of the law:

> §286- Complete streets. (a) The department of transportation and the county transportation departments shall adopt a complete streets policy that seeks to reasonably accommodate convenient access and mobility for all users of the public highways within their respective jurisdictions as described under section 264-1, including pedestrians, bicyclists, transit users, motorists, and persons of all ages and abilities.
> (b) This section shall apply to new construction, reconstruction, and maintenance of highways, roads, streets, ways, and lanes located within urban, suburban, and rural areas,

if appropriate for the application of complete streets.

Discussion: The Kapiolani Street Extension would provide a signed, shared roadway that would match expected future bike lanes on Kapiolani Street and assist in providing safe bicycle route from UH Hilo to Mohouli Street and beyond to downtown, in conformance with *Bike Plan Hawaii* and the Complete Streets Act.

2 ENVIRONMENTAL ASSESSMENT PROCESS

The project involves the use of County of Hawai‘i and State of Hawai‘i land, and County of Hawai‘i funds, and therefore requires compliance with Chapter 343, Hawai‘i Revised Statutes (HRS), the Hawai‘i Environmental Policy Act (HEPA). The County of Hawai‘i, Department of Public Works is the proposing and approving agency for this Environmental Assessment (EA).

This EA process is being conducted in accordance with Chapter 343 HRS. This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

Part 4 of this document states the finding (anticipated in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings by the County of Hawai‘i, Department of Public Works. In the EA process, if the approving agency determines after considering comments to the Draft EA that no significant impacts would likely occur, then the agency issues a Finding of No Significant Impact (FONSI), and the action is permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) is prepared.

3 ENVIRONMENTAL SETTING AND IMPACTS

This section describes the existing social, economic, cultural, and environmental conditions associated with the proposed project, along with the probable impacts of the proposed action and mitigation measures designed to avoid, reduce or eliminate adverse environmental impacts. As discussed above in Section 1.2, the No Action Alternative would have certain traffic and access disadvantages, but it would not result in any on-ground impacts to land or land uses on or near the designated corridor. Therefore, unless explicitly mentioned, discussion of impacts and mitigation relates to the Proposed Project Alternative only.

The area upon which the Kapiolani Street Extension and associated intersection and other improvements would be built is referred to throughout this EA as the *project corridor* or *project site*. The term *project area* is more flexibly used to describe the general Hilo area.

3.1 Physical Environment

3.1.1 Geology, Soils and Hazards

Existing Environment

Geologically, the project corridor is located on the flanks of Mauna Loa volcano on surface lava flows that occurred from 5,000 to 10,000 years before the present (Wolfe and Morris 1996). The project corridor soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Keaukaha extremely rocky muck on 6-20% slopes, an organic and strongly acid soil that is approximately 0 to 8 inches thick, with about 25% of the area occupied by lava outcrops. Its capability subclass is VIIs, which means that this soil has very severe limitations that make it very unsuited for cultivation, and restrict its use to mainly pasture and woodland or wildlife (U.S. Soil Conservation Service 1973).

The project corridor is rated Lava Flow Hazard Zone 3 on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The relatively high hazard risk is based on the fact Mauna Loa is an active volcano. Volcanic Hazard Zone 3 areas have had up to 5 percent of their land area covered by lava or ash flows since the year 1800, and between 15 and 75 percent of the areas have been covered in the past 750 years. The 1881 lava flow penetrated the area now occupied by much of the upper part of the Hilo, including an area on Mohouli Street about 1,250 feet *mauka* (uphill) of the project corridor.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built.

Impacts and Mitigation Measures

In general, geologic conditions impose no overriding constraints on the project, and it is not imprudent to construct in terms of geological hazard. The County of Hawai‘i recognizes that most of the surface of Hawai‘i Island is subject to eventual lava inundation, and that roadway infrastructure in places such as Hilo face risk. Given the considerable investment in the existing infrastructure in this part of Hilo, including the UH Hilo campus, senior housing facilities, the Hospice of Hilo, and residential areas, the County has determined that it is economically and environmentally sensible to invest in roadway infrastructure that effectively serves the community, despite the eventual risk of lava flows. Project design will take the substrate and seismic setting into account, and no mitigation measures are expected to be required.

3.1.2 Floodplains, Drainage and Water Quality

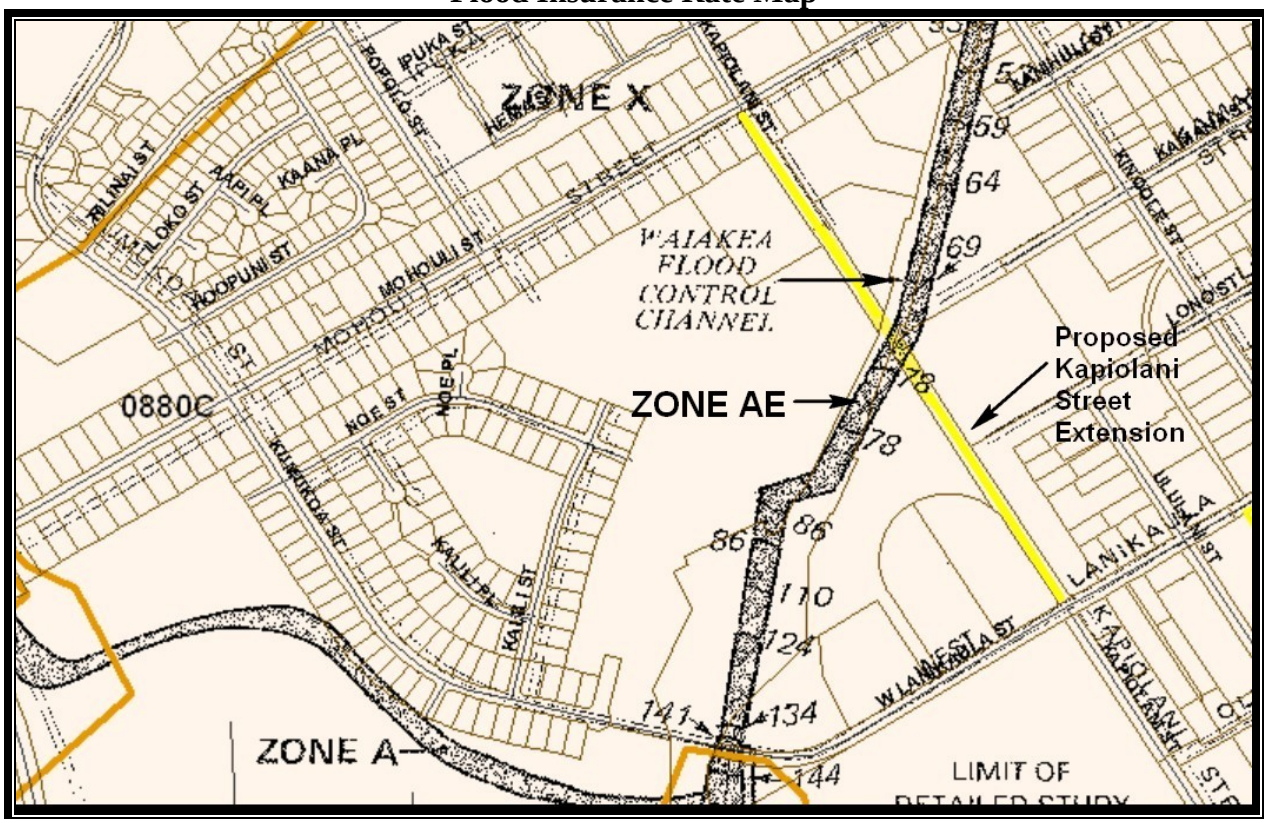
Existing Environment: Floodplains

An average annual rainfall in the Hilo area of between 120 and 200 inches (UH Hilo Department of Geography 1998) generates substantial runoff in some locations. The Flood Insurance Rate Maps (FIRM) FM1551660880C (9/16/88) show that the majority of the project corridor is on fairly recent lava that drains rapidly and is in Flood Zone X, outside the 100-year floodplain (see Figure 3-1). The portion of the project where the Waiākea Flood Control Channel (see photo in Figure 1-3b) would be traversed by a bridge is within Flood Zone AE, which are special flood hazard areas subject to inundation by the 100-year flood determined in a Flood Insurance Study by detailed methods. Base flood elevations are shown within these zones. Hydraulic studies conducted for the project have determined that the 100-year floodplain is entirely contained with the deep channel of the Waiākea Flood Control Channel.

Existing Environment: Water Bodies and Water of the U.S.

Waiākea Stream is tributary to Wailoa River (see Figure 1-1). The Wailoa River system is listed in the Hawai‘i Watershed Atlas as a third order perennial stream that extends approximately 25.2 miles from the Waiākea Forest Reserve down to the Hilo Harbor at Waiākea Pond. The total area of the Wailoa River system watershed is estimated at 98.6 square miles. The Wailoa River is a perennial system and one of the few stream systems draining Mauna Loa despite the high rainfall in the drainage basin, because the recent lava flows are highly permeable and have not as yet developed organized drainage patterns. Waiākea Stream has several branches, some fed by springs at higher elevations above Hilo and some perennial. Though Waiākea Stream may be perennial in the upper reach, it is clearly an interrupted stream (flow discontinuous in middle and lower reach). The 1881 lava flow has buried some segments of the stream and forced flow underground. Several branches and man-made ditches carry flow intermittently to Waiākea Stream (AECOS 2009).

Figure 3-1
Flood Insurance Rate Map



Source: Hawai‘i National Flood Insurance Program Flood Hazard Assessment Tool
http://gis.hawaiinfip.org/fhat/

The Kapiolani Street Extension is located in a low elevation segment of Waiākea Stream at about 50 feet above sea level. Lower Waiākea Stream, including the segment within the main survey area (from Kinoole Street to West Lanikaula Street), is a modified channel in an artificial course designed to move storm flows quickly through Hilo to Waiākea Pond, in the lowlands at Wailoa River State Park, and from there directly into Hilo Bay (see Figure 1-1). The flood control channel was part of the Wailoa River Flood Control Project. The project was authorized by the Flood Control Act of 3 September 1954, and completed in August 1965 at a cost of $1,044,888 in federal funds. The original stream channel, located *mauka* of Lono Street, was less organized and dissected. Although the topography of the old channel is still visible, it was completely cut off from its headwaters and no longer flows.

On and near the project corridor, the current Waiākea Stream channel is lined with a levee and has reveted margins (see photo in Figure 1-3b). Large concrete box culverts are associated with road crossings. No substantial part of the lower segment of Waiākea Stream is perennial flowing, although Waiākea Pond backs up into the channel under Kilauea Avenue.

According to the latest Environmental Protection Agency (EPA) guidance, based on the EPA's interpretation of the Clean Water Act (CWA), implementing regulations and relevant case law, the following waters are considered waters of the U.S. protected by the CWA:

- Traditional navigable waters;
- Interstate waters;
- Wetlands adjacent to either traditional navigable waters or interstate waters
- Non-navigable tributaries to traditional navigable waters that are relatively permanent, meaning they contain water at least seasonally; and
- Wetlands that directly abut relatively permanent waters.

In addition, the following waters are protected by the Clean Water Act if a fact-specific analysis determines they have a "significant nexus" to a traditional navigable water or interstate water:

- Tributaries to traditional navigable waters or interstate waters;
- Wetlands adjacent to jurisdictional tributaries to traditional navigable waters or interstate waters; and
- Waters that fall under the "other waters" category of the regulations.

Relevant potential water bodies in the project corridor appear to include only the Waiākea Flood Control Channel/Stream itself (see Figures 1-1 and 1-4b). Fieldwork and consultation of U.S. Geological Survey maps and U.S. Fish and Wildlife Service National Wetland Inventory maps indicate that there are no other water bodies, including flanking wetlands.

Existing Environment: Water Quality

With regard to state water quality standards, Waiākea Stream is a Class 2 inland water body except for the headwaters in the Waiākea Natural Area Reserve, which are Class 1. According to Hawai'i Administrative Rules (HAR) §11-54-3(b)(2), Class 1 waters should remain in their natural state as nearly as possible with an absolute minimum of pollution from any human caused source. The Class 2 objective is to protect their use for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. Waiākea Stream discharges into Hilo Bay, which is considered a Class A embayment (HDOH 2009). According to HAR §11-54-3(c)(2):

> "It is the objective of class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class."

Waiākea Stream is listed on the Hawai‘i Department of Health (HDOH) 2006 list of impaired waters in Hawai‘i, prepared under Clean Water Act §303(d) (HDOH 2008). The “impaired” listing is based upon visual observations made from 2001 to 2004. The listing indicates that Waiākea Stream may not meet Hawai‘i water quality standards for certain parameters.

A biological and water quality study of the Waiākea Stream portion of the project site performed by AECOS Inc. The report is attached as Appendix 3 and summarized in this section and Section 3.2 on biology, below, from which most scholarly references have been removed for readability. In order to investigate baseline water quality of Waiākea Stream, on April 11, 2012, AECOS conducted field measurements for temperature, dissolved oxygen, and pH and collected and water samples for analysis of conductivity, total suspended solids, turbidity, nitrate-nitrite nitrogen, total nitrogen, and total phosphorus from three stations. Because the stream was not flowing through the project corridor at the time of the survey, the water quality stations were established in isolated spring-fed pools just downstream from West Lanikaula Street and upstream from the concrete-lined bottom near Kinoole Street. The survey also included observations made at several additional points on the stream extending from Waiākea Pond, through Waiākea Homesteads, to near the headwaters in the Waiākea Forest Reserve. Also considered were historical water quality data collected from Waiākea Stream in 1996, 2001, and 2009 by AECOS.

Overall, samples collected from the project area demonstrate very good water quality. Despite the differences in the sampled pools, water quality was found to be fairly consistent. Temperature and conductivity were low and water was supersaturated with oxygen. Water clarity was good and turbidity and total suspended solids were very low, consistent with most measurements from previous years. Nutrient concentrations were found to be low. Total phosphorus values were fairly typical for Hawaiian streams in rural or undeveloped watersheds. Recent rainfall and ephemeral flow in the stream channel is likely the source of water in these stations, as indicated by low conductivity. All three stations harbored dense mats of filamentous green algae, which resulted in elevated dissolved oxygen readings and elevated pH at one station. Low ammonia concentrations at all stations sampled in 2009 may have indicated that water flow is fairly frequent, since biotic waste was not accumulating in sampled pools that contained both fish and invertebrates.

Impacts and Mitigation Measures: Floodplains and Waters of the U.S.

As discussed above, hydraulic studies for the project have preliminarily determined that the floodplain of Waiākea Stream is entirely contained within the artificial flood control channel. The bridge would be built as a clear span across the existing drainage; t it would not intrude into the artificially constructed bed or banks of this drainage feature. The floodplain authority for the County of Hawai‘i is reviewing the hydraulic study to confirm its findings and coordinating with FEMA to determine if a Letter of Map Revision (LOMR) will be required.

As there will be no work within the Waiākea Flood Control Channel, no Stream Channel Alteration Permit would appear to be necessary, which will be confirmed by review of the EA and the project

plans by the Department of Land and Natural Resources, Commission on Water Resources Management.

One of the goals of project design has been to avoid the discharge of dredged or fill materials into waters of the U.S., which are present in the channel of Waiākea Stream below the Ordinary High Water Mark (OHWM), which is defined in federal regulations [33 CFR 328.3(e)] as:

> "… the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

No formal survey of the OHWM was conducted, but the project would not involve any construction whatsoever in the stream bed or stream banks; the new abutments would be placed behind the existing ones, on County right of way elevated above the 100-year flood elevation and well above the OHWM. No dredge or fill in waters of the U.S. would occur (see Figure 1-4e).

Impacts and Mitigation Measures: Water Quality, Erosion and Sedimentation

Construction of the Kapiolani Street Extension project will involve about four acres of grading, excavation and addition of impermeable surface in the area between Mohouli and Lanikaula Streets. In any project, uncontrolled excess sediment from soil erosion during and after excavation and construction has the potential to impact natural watercourses, water quality and flooding potential. Contaminants associated with heavy equipment and other sources during construction have the potential to impact ground water if not mitigated effectively.

In order to minimize the potential for sedimentation and erosion, especially near the Waiakea Flood Control Channel that empties into Waiākea Pond, the contractor shall perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai‘i County Code. Because the project will disturb more than one acre of surface, a National Pollutant Discharge Elimination System (NPDES) permit must be obtained before the project commences. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but will not be limited to, the following:

- Limiting the amount of surface area graded at any given time to reduce the area subject to potential erosion;
- Utilizing soil erosion protective materials such as mulch or geotextiles on areas where soils have a high potential for erosion until permanent vegetation is in place;
- Planting vegetation as soon as grading operations permit to minimize the amount of time soils are exposed to possible erosion;
- Building sedimentation basins to collect sediment that might enter runoff waters; and

- Installing silt fences along the downstream perimeter of any disturbed areas to collect sediment from stormwater runoff; and

The project plans will be regulated through review and approval by DPW and the Hawai‘i State Department of Health (DOH) to ensure compliance with standards related to storm runoff containment. It is not expected that the Kapiolani Street Extension Project will have a long term negative impact on water quality in Waiākea Stream.

3.1.3 Hazardous Materials and Toxic Substances

Environmental Setting, Impacts and Mitigation Measures

A Phase I Environmental Site Assessment (ESA) was conducted for the project corridor by Myounghee Noh and Associates. A portion of the Phase I ESA is reproduced as Appendix 8, and the entire document is available for inspection upon request from the Hawai‘i County Department of Public Works. A Phase I ESA aims to identify *recognized environmental conditions* that exist on the project corridor and existing *recognized environmental conditions* in the project area that have the potential to impact the project corridor. The term *recognized environmental conditions* means the presence or likely presence of any hazardous substances or petroleum products on the site that indicates an existing release, a past release, or a material threat of a release into structures on the site or into the ground, groundwater, or surface water of the site.

There is no evidence that the project corridor has been previously used or developed other than for farming prior to 1940 and light grazing prior to 1986 within some areas. These uses indicate little potential for historical use or storage of regulated or hazardous chemicals onsite. A number of standard federal and State databases for hazardous substance or petroleum product releases were consulted, including those that report leaking underground storage tanks, brownfield sites, hazardous waste generators, and landfill/solid waste disposal sites. Based on the records review and the site reconnaissance observations, there were no indications that the project corridor has had developed uses. No indications of illegal dumping were observed during the site reconnaissance to the project corridor or adjoining properties. As a result, the Phase I ESA determined that there do not appear to be any *recognized environmental conditions* in connection with the project corridor and no source of concern to the public regarding such conditions should the project corridor be developed for a road. Construction of a new road does not appear to pose any unreasonable risk in terms of worker or public exposure to such materials.

3.2 Biological Environment

Biological reports were prepared specially for the project by Geometrician Associates and AECOS Inc. and are attached as Appendices 2 and 3, respectively. The information below was taken partly from these sources, and most scholarly references have been removed for readability.

Existing Environment: Vegetation and Flora

The natural vegetation of this part of Hilo was most likely lowland rain forest dominated by *ʻohiʻa* (*Metrosideros polymorpha*) and *hala* (*Pandanus tectorius*) (Gagne and Cuddihy 1990). These original communities, however, have been destroyed or heavily degraded by cattle grazing, agriculture and clearing for farms and residences, and the vegetation of the project area is now either managed (i.e., farms, pasture or landscaped grounds) or adventive "communities" of various alien weeds. A walk-through biological survey of the project corridor was performed by botanist Layne Yoshida and Ron Terry on May 17, 2012, which is documented in Appendix 2.

Dominant canopy species are Chinese banyan (*Ficus microcarpa*), Java plum (*Syzygium cumini*), alistonia (*Alistonia macrophylla*), king palm (*Archontophoenix alexandrae*), bingabing (*Macaranga mappa*), avocado (*Persea americana*), charcoal tree (*Trema orientalis*) and melochia (*Melochia umbellata*). The northern portion is dominated by bamboo (possibly *Gigantochloa* sp.).

A full list of the 114 +/- plant species found on the site is contained in the table in Table 1 of Appendix 2 (it should be noted that Table 4 of Appendix 3 also includes a list of plants found within and adjacent to Waiakea Stream, and not necessarily within the affected project corridor). The flora is overwhelmingly dominated by non-native, weedy species. Many of the plants found are cultivated and ornamental species used in landscaping and have apparently escaped from adjacent properties. No notable or valuable specimens of non-native trees are present. Only six of the plant species present in the project corridor are natives. No endemic natives (found in Hawaiʻi and nowhere else) were found. The six natives were all indigenous (found in Hawaiʻi as well as elsewhere). There were three ferns: sword fern (*Nephrolepis exaltata*), an adiantum (*Adiantum capillus-veneris*) and *ekaha* (*Lepisorus thunbergianus*); one herb: *popolo* (*Solanum americanum*); one sedge (*Pycreus polystachyos*; and one vine: morning glory (*Ipomoea indica*). All are very common throughout windward Hawaiʻi.

No listed, candidate or proposed endangered plant species were found during the survey. In terms of conservation value, no botanical resources requiring special protection are present (USFWS 2012).

Existing Environment: Terrestrial Fauna

The urban habitat of the Kapiolani Street Extension, which is almost totally lacking in native plants, is not suitable for most native birds, but a wide variety of non-native birds are often observed. As with all of the island of Hawaiʻi, several endangered native terrestrial vertebrates may overfly, roost, nest, or utilize resources in the general project area of urban Hilo. These include the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). The petrel is listed as endangered, and the shearwater as threatened, under both federal and State of Hawaiʻi endangered species statutes. The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies. Collision with man-made structures is regarded as a second most significant cause of mortality of these seabird species in Hawaiʻi.

Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals. No suitable nesting habitat for either of these seabird species exists within the project corridor.

Although waterbirds may occasionally be present in the Waiākea Stream when water is present, none were observed during several reconnaissances of the drainage channel. About 0.7 miles downstream, various species of ducks, geese and other migratory birds utilize Waiākea Pond. The Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife, has protected several fingers of land adjacent to the outlet of Waiākea Stream on the pond with gates that keep out dogs to allow resting areas for these species. The endangered Hawaiian goose or Nēnē (*Branta sandvichensis)* is often observed near Waiākea Pond.

Other than the Hawaiian Hawk, few species of native forest birds would be expected in the project corridor due to its low elevation (70-80 feet above sea level) and lack of native plants, although the Hawai‘i ‘Amakihi (*Hemignathus virens virens*) might very occasionally descend from its usual modern range in the uplands and be present.

The endangered Hawaiian hoary bat was not detected during the course of surveys, but it highly probable that this species uses resources within the general project area, as it is frequently observed in Hilo. The impact that any construction project potentially poses to bats is during the clearing and grubbing phases of construction, as tall, woody vegetation is removed. The removal of this vegetation within the project corridor may temporarily displace bats using the vegetation for roosting. As bats use multiple roosts within their home territories, this disturbance from the removal of vegetation is likely to be minimal. However, during the pupping season, female bats carrying pups may be less able to rapidly vacate a roost site when the vegetation is cleared. Additionally, adult female bats sometimes leave their pups in the roost tree while they forage, and very small pups may be unable to flee a tree that is being felled.

Aside from the bat, other mammals in the project area are introduced species, including feral cats (*Felis catus*), feral pigs (*Sus scrofa*), small Indian mongooses (*Herpestes a. auropunctatus*) and various species of rats (*Rattus* spp.). None are of conservation concern and all are deleterious to native flora and fauna.

Existing Environment: Aquatic Biota

AECOS surveyed aquatic species in various segments of Waiākea Stream and found results similar to previous surveys that it conducted in 1993. Introduced poeciliids are by far the most abundant organisms, including green swordtail (*Xiphophorus helleri*) and guppy (*Poecilia reticulata*). The native goby *‘o‘opu nākea* (*Awaous guamensis*) is often observed resting on the bottom of the deeper pools, particularly those that harbor benthic algae and are partially shaded. Dragonflies (Odonata) are often observed near Waiākea Stream, as the adults cruise the channel and surrounding area. The spring-fed and ephemeral pools provide habitats for odonate nymphs and other aquatic insects such

as the water boatman (*Trichocorixa reticulata*). Additionally, introduced amphibians (bullfrog, *Lithobates catesbeianus* and cane toad, *Rhinella marina*) lay eggs and the tadpoles mature in the ponds.

The *Hawai'i Watershed Atlas* (DLNR-DAR 2008) lists all five native amphidromous *'o'opu* or gobies (*Stenogobius hawaiiensis*, *Eleotris sandwicensis*, *Awaous guamensis*, *Sicyopterus stimpsoni*, and *Lentipes concolor*) and *ōpae 'ōeha'a* or prawn (*Macrobrachium grandimanus*) as present in the estuary and/or lower reach of Wailoa River. The native stream macrofauna are diadromous: eggs are laid in the stream and the larvae that hatch from these eggs move downstream and out into the ocean, where they develop for a time before migrating back into fresh water to grow to maturity.

The atlas lists four native damselflies as present in the middle reach (*Megalagrion blackurni* and *M. xanthomelas*) or headwaters (*M. calliphya* and *M. hawaiiense*) of Wailoa River. An adult *M. hawaiiense* was observed in a previous survey of Waiākea Stream near Komohana Street (AECOS 2002). *M. xanthomelas* is a candidate species for listing on the endangered species list (USFWS 2012). This species tends to breed in coastal wetlands fed by basal springs or in the lower reaches of perennial streams, although it will opportunistically exploit temporary pools bordering flashy streams. The species lays its eggs on aquatic vegetation. Maintenance of aquatic vegetation and streambed roughness that allow for the formation of temporary pools after freshets is important for these damselflies.

No aquatic species protected by State of Hawai'i, Administrative Rules (DLNR, 1998, 2007), nor federally endangered or threatened species (USFWS 2012) was observed in Waiākea Stream at or near the project corridor.

Impacts and Mitigation Measures

The No Action Alternative would avoid any disturbance of existing conditions.

The project corridor is dominated by non-native plant species, and no rare, threatened or endangered plants are present.

Construction or operation of the Kapiolani Street Extension will not block the stream channel and affect upstream migration of the native amphidromous fauna, which can occur on those occasions when there is stream flow. Construction BMPs developed to prevent erosion, sedimentation and degradation of water quality detailed in Section 3.1.2 will also serve to protect the aquatic biota.

As discussed above, several terrestrial vertebrates listed by the federal and State governments as threatened or endangered are present in this part of the island of Hawai'i and may overfly, roost, nest, or utilize resources in the project area, including the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). Avoidance measures will be instituted in order to avoid impacts to these protected species:

- There will be no clearing of woody vegetation taller than 15 feet during the bat pupping season, which runs from June 1 through September 15 each year.
- There will be no earthmoving or tree cutting during the breeding season for Hawaiian Hawks (March through September). If this time period cannot be avoided, the County will arrange for a hawk nest search to be conducted by a qualified biologist, and if hawk nests are present in or near the project corridor, all land clearing activity will cease until the expiration of the breeding season.
- All lighting installed for either construction or use of the road will be required to be shielded in conformance with the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code, Article 9) to reduce the risk that seabirds may be attracted to and then disoriented by the lighting. Additionally, no nighttime construction work will be allowed during the seabird-fledging season, which runs from September 15 through December 15 each year.

3.3 Socioeconomic

3.3.1 Land Use, Social Factors and Community Identity

Existing Environment

Land use surrounding the project corridor is a mixture of single-family and multi-family residential and institutional uses, including UH Hilo, the Kamana Elderly Housing facility and the Hale Olaloa senior housing facility, the Hospice of Hilo inpatient facility, the YMCA, and several churches (see Figures 1-1 and 1-2).

Although most of the roadway and associated facilities would be located within existing County rights-of-way, small areas required for intersection improvements, drainage, slope easements, etc., will be acquired through purchase or easements from the State and private landowners. All such properties are in the State Land Use Urban District, and zoning for such properties is generally RS-10 (Residential, minimum lot size 10,000 square feet). The site is not within the Special Management Area.

Table 3-1 details Hilo’s population and socioeconomic characteristic. Hilo has a diverse population with over 80 percent minorities, mainly Asian and Pacific Islander, within one of the 100 fastest-growing counties in the U.S. It has a median age of over 40 years and more than 37 percent of the population is 65 or older, one of the oldest populations in the State of Hawai‘i. At the same time, more than 4,000 students at UH Hilo, many of whom are not counted in census statistics because their permanent residences are elsewhere, are also present. Several segments of the population that typically exhibit disadvantaged measures of social welfare are disproportionately represented in the population of Hilo as compared to the County or State of Hawai‘i. Median family income is 10 percent less than that of the County as a whole. More than 15 percent of individuals in the County have income below the poverty level, double the statewide rate. Similar patterns pertain to households receiving welfare, food stamps, and disability payments.

Impacts and Mitigation Measures

The road will be a public facility that is a permitted use in any State Land Use district or County zoning district. The project would not cause relocation of residences, businesses, community facilities, farms or other activities. Impacts to the social environment will be largely beneficial, because the project will facilitate use of land for socially beneficial activities such as education and social services, as well as better access to these activities for motorists, pedestrians and bicyclists.

3.3.2 Public Services, Facilities and Utilities

Public Services and Facilities

The principal public facility with the potential to be affected by the Kapiolani Street Extension is UH Hilo, which, as discussed elsewhere, will benefit from better access. Fire, police and emergency services are readily available. Hawai‘i County Police Department headquarters are located on Kapiolani Street approximately 0.4 miles away, and the Hilo Central Fire Station is located within one mile. EMT services are provided by the Hawai‘i County Fire Department. Acute care services are available at Hilo Medical Center, approximately 2.5 miles from the project corridor.

Utilities

Hawaii Electric Light Company (HELCO) has one major 69 kV overhead transmission line with 12 kV distribution and communication lines (Hawaiian Telcom and Oceanic Time Warner Cable) along the north side of Lanikaula Street at the proposed Kapiolani Street intersection. There are also street lights attached to the wood poles. At the Mohouli Street intersection with Kapiolani Street, HELCO has 12 kV distribution lines along the north side of Mohouli Street and east side of Kapiolani Street along with communication lines and street lights. A number of utility poles will have to be relocated based on the proposed intersection improvement plans. New electric service will be required for the new traffic signal lights at the two intersections as well as for new street lights along the Kapiolani Street Extension. At the present time, no new utility poles are anticipated. The new street lighting system will consist of approximately 36 LED street lights mounted on 30-foot aluminum poles with 12-foot arms and approximately 2,500 linear feet of 2-inch conduits and cables. LED street lights are preferable over low pressure sodium street lights for their lower energy usage, color rendering and longer life.

Table 3-1 Selected Socioeconomic Characteristics of Hilo

SUBJECT	NUMBER	PERCENT
SEX AND AGE		
Total population	43,263	100.0
Median age (years)	40.5	(X)
16 years and over	35,193	81.3
65 years and over	7,807	18.0
RACE		
Total population	43,263	100.0
One Race	29,199	67.5
White	7,617	17.6
Black or African American	227	0.5
American Indian and Alaska Native	132	0.3
Asian	14,833	34.3
Asian Indian	49	0.1
Chinese	645	1.5
Filipino	2,637	6.1
Japanese	9,550	22.1
Korean	419	1.0
Native Hawaiian	4,467	10.3
Two or More Races	14,064	32.5
HOUSEHOLDS BY TYPE		
Total households	15,483	100.0
Family households (families)	10,287	66.4
With own children under 18 years	3,766	24.3
Female householder, no husband present	2,278	14.7
With own children under 18 years	1,027	6.6
Nonfamily households	5,196	33.6
Householder living alone	3,992	25.8
Households with individuals under 18 years	4,770	30.8
Households with individuals 65 years and over	5,386	34.8
Average household size	2.69	(X)
Average family size	3.20	(X)
HOUSING OCCUPANCY		
Total housing units	16,905	100.0
Occupied housing units	15,483	91.6
Vacant housing units	1,422	8.4
Rental vacancy rate (percent)	6.9	(X)

Source: 2010 U.S. Census of Population (http://2010.census.gov/2010census/data/)

The County DPW has been in discussions with County Department of Water Supply (DWS), the Department of Environmental Management (DEM), and UH Hilo, which is the largest expected user of the lands adjacent to the corridor, concerning locating potential water and wastewater facilities on the proposed Kapiolani Street Extension. If there were potential facility users with plans in the near future that were willing to provide funding, DPW would include the facilities in its plans to avoid the need for later excavation and patching of the road. DWS has confirmed that there are other water main connection points that could service future development in the corridor, and thus there is no requirement for water mains under the proposed roadway.

The issue of whether and how to install wastewater facilities is not yet resolved. UH Hilo has indicated that plans for these lands are not likely to be fulfilled within the next decade, and there are thus no immediate wastewater needs for university facilities that would justify UH Hilo investment in this infrastructure as part of the project construction at this stage. The challenges related to topography and a crossing of the Waiakea Flood Control Channel make gravity flow of wastewater an issue that will require additional investigation during the final engineering phase of the project. Other considerations include potential requirements for existing adjacent users to connect to the wastewater system, an issue that will also be investigated during final design.

3.3.4 Cultural and Archaeological Resources

Cultural Background and Resources

The traditional cultural value of the project corridor was assessed by determining whether it supports any traditional gathering uses, is vital for access to traditional cultural sites, or has other important symbolic associations for native Hawaiians or other cultural groups.

The project corridor is located in the *ahupuaʻa* of Waiākea in the district of South Hilo. The earliest historical knowledge of Hilo comes from legends written by Samuel Kamakau (1961) of the 16th century chief ʻUmi-a-Liloa (son of Liloa), who at that time ruled the entire island of Hawaiʻi. Descendants of Umi and his sister-wife were referred to as "Kona" chiefs, controlling Kaʻū, Kona, and Kohala, while descendants of Umi and his Maui wife were "Hilo" chiefs, controlling Hāmākua, Hilo, and Puna (Kelly 1981:1). According to Kamakau (1961), both sides fought over control of the island, desiring access to resources such as feathers, *māmaki* tapa, and canoes on the Hilo side, and *wauke* tapa and warm lands and waters on the Kona side (Kelly 1981:3).

Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into *ahupuaʻa,* which today retain their original names (Kelly 1981:3). These include the *ahupuaʻa* of Puʻuʻeo, Piʻihonua, Punahoa, Pōnohawai, Kūkūau, and Waiākea. The design of these land divisions was such that residents could have access to all that they needed to live, with ocean resources at the coast, and agricultural and forest resources in the interior. However, only Piʻihonua and Waiākea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly 1981:5).

Historical accounts place the project corridor in the "upland agricultural zone" (McEldowney 1979), which consisted of scattered huts amidst garden plots created through what McEldowney described "shifting agriculture." As Isabella Bird recorded upon arriving in Hilo in 1873:

> "Above Hilo, broad lands sweeping up cloudwards, with their sugar cane, kalo, melons, pine-apples, and banana groves suggest the boundless liberality of Nature" (Bird 1964:38).

Handy and Handy (1972) also described the general region as an agricultural area:

> "On the lava strewn plain of Waiākea and on the slopes between Waiākea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in all the lower fern-forest zone above Hilo town along the course of the Wailuku River" (Handy and Handy 1972:539).

Maly (1996) referred to a 1922 article from the Hawaiian Language newspaper, *Ka Nupepa Kū'oku'a*, where planting on pāhoehoe lava flats was described:

> "There are pāhoehoe lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (mau ka'au) of them. The house sites are still there, not one or two but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors" (Maly 1996:A-2).

The *ahupua'a* of Waiākea is a very large land division that includes all land in and near UH-Hilo as well as the land *mauka* and *makai*. As part of an archaeological assessment study, Maly (1996) conducted historical research for the lands of Wainaku, Pōnohawai, Waiākea, and Pi'ihonua. He discussed the significance of the use of the Hawaiian word *wai* in the place names: Waiākea, Pōnohawai, Wainaku, and Wailuku (River). According to Maly, the word *wai* (water) has strong metaphorical associations with the Hawaiian concept of wealth (*waiwai*), stressing its cultural importance (Maly 1996:A-2). In this context, the importance of Hilo can be better understood, with its copious streams that fed taro pondfields and its numerous fishponds.

Waiākea, along with Punahoa and Pi'ihonua, was held by Kamehameha I until the time of his death in 1819, at which time his holdings, including Waiākea, were passed down to his son, Liholiho. Following the *Māhele,* the population of Hilo grew and the scattered upland habitations gave way to sugar cultivation (McEldowney 1979:37).

The *ahupua'a* of Waiākea became Crown Lands during the Mahele of 1848. In the following years, 25 land claims were awarded. The awards were all small in size, and 24 went to native claimants. No Land Commission awards were made within or near the project corridor (Maly 1996).

Following the *Māhele*, Kamehameha IV leased large portions of Waiākea to outside interests for

pasture and sugarcane cultivation (Moniz 1992). In 1861 S. Kipi leased the Crown Lands of Waiākea for the rate of $600 dollars a year to be used as pasture land for five years (Kelly et al. 1981; Maly 1996). In 1874 the first lease for sugarcane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996). This lease was eventually transferred to the Waiakea Mill Company, founded by Alexander Young and Theo H. Davis, and the Waiakea sugar plantation was established in 1879. The Waiakea Mill Company started with about 350 acres of cultivated lands they had acquired from Lyman. In 1888 the company acquired a 30-year lease that increased their land holdings in Waiākea Ahupuaʻa. When the lease ran out in 1918, the acreage under cultivation had increased to nearly 7,000; but without a lease the *ahupuaʻa* fell under the homesteading laws, which required the government to lease the land to individual growers. Waiakea Mill Company was expected to grind the crop for the independent growers under a contract that gave the company 40 percent of the proceeds from the sale of the refined sugar. Contractual and legal problems, combined with a declining sugar market and the devastating *tsunami* of 1946, led the Waiakea Mill Company to cease operation in 1947, and offer its property under General Lease 2741 to private cultivators for the purpose of growing cane (Maly 1996). During its 68 years of operation, the Waiakea Mill Company was a major force in shaping the economic and social growth of Hilo, and certainly left its mark on both the cultural and physical landscapes of the area. The productive areas were interconnected with a plantation railroad system connecting fields with the mill at Wailoa Stream.

An August 1923 map (H.T.S. Plat 769; see Figure 13 of Appendix 4) of the Waiakea Cane Lots cane lots shows that the project corridor crosses Lot 2 and Lot 3 between Lanikaula and Mohouli Streets. Lot 2 was described as containing 59.5 acres with 16.39 acres of cane, 41.98 acres of waste, and 1.13 acres retained by the Waiakea Mill Company for a 30-foot railroad right-of-way. Lot 3 is described as containing 24.6 acres with 20.75 acres of cane, 3.8 acres of waste, and 0.05 acres retained by the Waiakea Mill Company for a 30-foot railroad right-of-way.

Various lessees utilized these cane lots to grow sugarcane from the 1920s through the 1930s. After this, Kazuo Miyasaki, Manager of the Hilo Dairy, was utilizing part of Lot 2 for dairy purposes until the 1950s. In 1946, a roughly 200-foot wide section of Lot 2 along Mohouli Street was withdrawn from the Miyasaki lease to develop a part of the Mohouli Heights Subdivision. By 1956, with no active dairy and most of the land overgrown, the Miyasaki lease was given up, and the land was used for pasture as well as the construction of the Waiakea Flood Control Channel that was part of the Wailoa River Flood Control Project discussed in Section 3.1.2, above. The construction of the flood channel across Lot 2 made access across the lot difficult for the pasture lessee, and in 1966 the lease was finally given up and the land reverted to the State. There is less information concerning Lot 3, but it was likely used to grow sugar cane and later grazed.

Cultural Resources

No caves, springs, *puʻu*, native forest groves, gathering resources or other natural features are present in or near the project corridor. The vegetation is almost entirely non-native and contains

only a few common native species, lacking the quality and quantity or resources that would be important for native gathering. As discussed below, no archaeological remains reflecting cultural history or supporting cultural values appear to be present. Based on historical research, botanical reconnaissance and inquiries with potentially knowledgeable informants (including the Office of Hawaiian Affairs and *kama'aina* neighbors), it would appear that no known valuable natural, cultural or historical resources are present on the project corridor. The project corridor does not support any traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with the property.

Cultural Resources: Impacts and Mitigation Measures

As it currently appears that no resources or practices of a potential traditional cultural nature (i.e., landform, vegetation, etc.) appear to be present on or near the project corridor, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed construction and use of the Kapiolani Street Extension would not likely impact any culturally valued resources or cultural practices. Although there are no indications so far from literature review or consultation with the State Historic Preservation Division, the Office of Hawaiian Affairs, or local residents knowledgeable about Hawaiian cultural practices that there are any traditional cultural properties or practices on the project corridor, various parties including the Office of Hawaiian Affairs and State Historic Preservation Division were supplied a copy of the Draft EA in order to help finalize this finding.

Archaeological Resources: Existing Environment

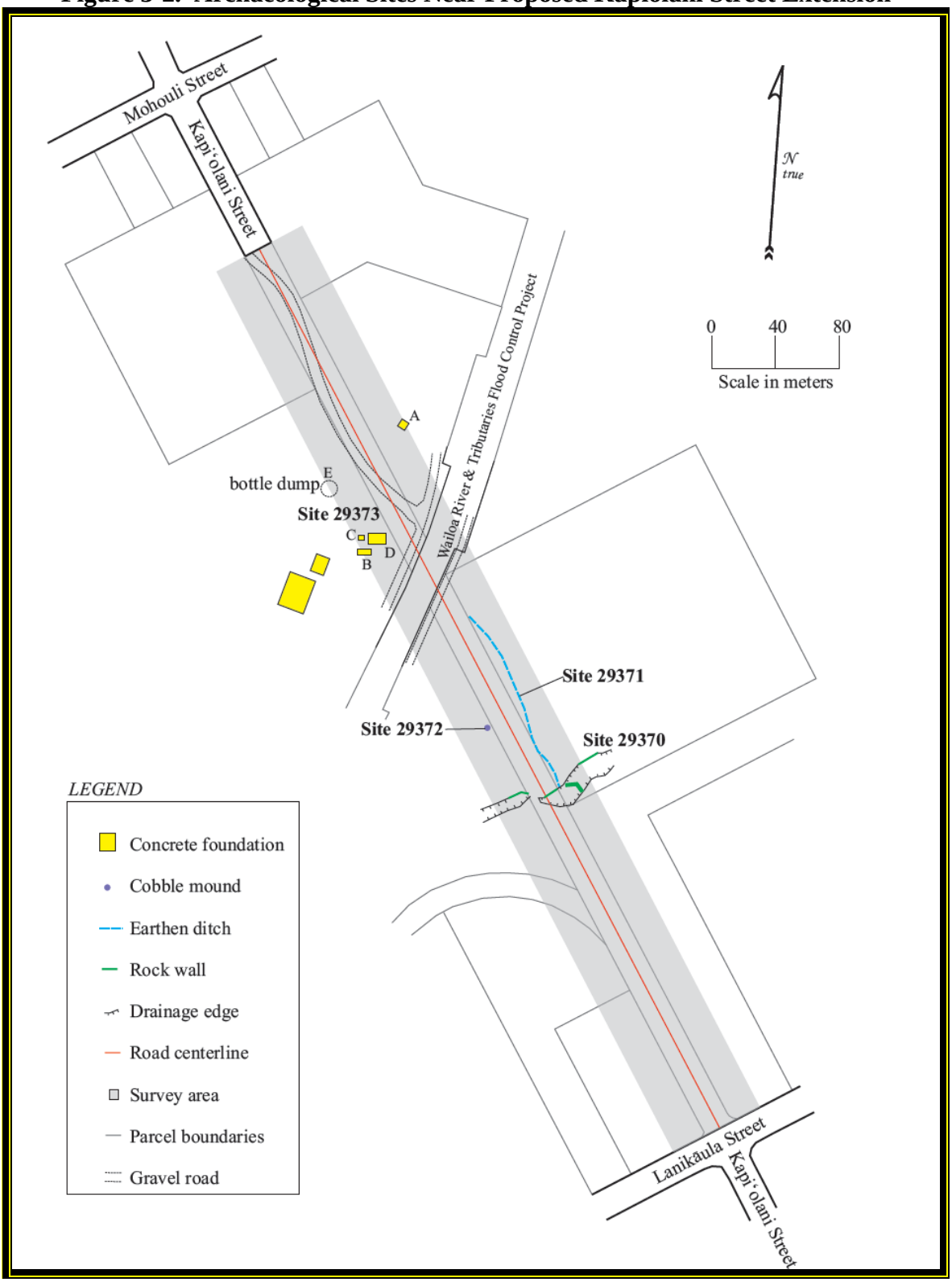
As noted previously, an archaeological inventory survey of the project corridor was conducted by Rechtman Consulting. The survey is included as Appendix 4 and is summarized below.

The archaeological inventory study involved a pedestrian survey of a 200-foot corridor within any undeveloped land centered on the Kapiolani Street Extension right-of-way, along with those portions of the corner intersection properties at Lanikaula and Mohouli Streets, where right-of-way acquisition is expected. All sites and features were located, mapped, described, drawn at appropriate scales, and photographed.

Archaeological Resources: Impacts and Mitigation Measures

The survey found and recorded four archaeological sites dating to the Historic Period within the 200-foot wide survey corridor surrounding the project corridor (Figure 3-2). The sites include a modified drainage (Site 29370) and earthen ditch (Site 29371) seemingly designed to control water flow from the Waiākea Stream basin during times of heavy rain, a piled cobble mound (Site 29372), and the remnants of the old Hilo Dairy buildings (Site 29373) including several concrete foundations, metal roofing material, and a bottle dump. No archaeological resources were identified at the intersections of Kapiolani and Mohouli/Lanikaula Streets.

Figure 3-2. Archaeological Sites Near Proposed Kapiolani Street Extension



All of the recorded sites date to the Historic Period (likely the early to mid-twentieth century) and are associated with either flood control associated with Waiākea Stream, the cultivation of sugarcane for the Waiakea Sugar Company, or the former Hilo Dairy. All four sites are considered significant for information yielded relative to 20th century land use within the study area. The data collection at and about these sites in the form of archival research, and field recordation and photography is substantial enough to have mitigated any potential impacts to the sites from the proposed construction of the Kapiolani Street extension; therefore no further historic preservation work is the recommended treatment.

By letter of July 6, 2012, Rechtman Consulting requested the State Historic Preservation Division (SHPD) for concurrence with the findings of the survey, including the finding of that there will be no adverse effect from the undertaking and that no additional data recovery work will be required. As a response had not yet been received by the time the Draft EA was published, the Final EA was to have reported on the response of the SHPD. As of October 7, 2012, the report was in the final stages of review. Discussions with SHPD indicate that it will be approved with minor technical revisions, and may include an additional condition requiring archaeological monitoring during initial grading.

As an additional precaution, in the unlikely event that archaeological resources or human remains are encountered during future development activities within the project corridor, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

3.3.4 Scenic Resources

Existing Environment

The *Hawai‘i County General Plan* provides a discussion of the natural beauty of the South Hilo District, which is dominated by Mauna Kea and Mauna Loa from various vantages. Hilo Bay and other shoreline areas also offer scenic resources. Tables in the General Plan list areas of natural beauty in the district; none are present on or within a mile of the site.

Currently, the project corridor is surrounded and covered by dense non-native vegetation and is not readily visible from any vantage point except at the intersections, and has no inherent scenic value. The intersections of Kapiolani Street with Mohouli Street and Lanikaula Street lack scenic characteristics (see Figure 1-3).

Impacts and Mitigation Measures

Construction will produce short-term visual impacts but as there are no existing scenic resources, no mitigation should be necessary. In the long-term, the area is expected to be urbanized as part of the expansion of UH Hilo and other non-profit uses of State land. No long-term scenic impacts would occur.

3.4 Traffic Related Impacts

3.4.1 Traffic Flow

A Traffic Impact Assessment (TIAR) for the project was prepared for the project by SSFM International, Inc. It is attached as Appendix 5 and summarized below. The purpose of the TIAR is to document the traffic impact on the surrounding area intersections in order to determine beneficial and adverse traffic impacts, contribute to the design of the intersections in order to minimize these impacts and achieve acceptable traffic flow, and provide data for the air quality and noise analyses.

The proposed year of construction completion for the Kapiolani Street Extension project is 2014. The roadway is being designed as a collector with sidewalks and bike lanes along both sides of the road and traffic signals and turn lanes at the intersections where needed.

Existing Conditions and Level of Service

Kapiolani Street is an undivided, two-lane, County collector road, oriented in the north-south direction (see Figure 1-2). The road extends from Waianuenue Avenue in the north to Kawili Street in the south with a break between Mohouli Street and Lanikaula Street. North of Mohouli Street, Kapiolani Street serves a low volume of residential traffic. On school days from 7:15 AM to 8:00 AM, Kapiolani Street functions as a one-way in the northbound direction between Haili Street and Waianuenue Avenue. South of Lanikaula Street, Kapiolani Street provides access to UH Hilo and Waiakea High School, which creates traffic congestion in the peak periods.

Lanikaula Street is an undivided, two-lane, County collector road, generally oriented in the east-west direction (see Figure 1-2). Adjacent to the project area, Lanikaula Street extends from Kalili Street to Kilauea Avenue and beyond. Northwest of Kalili Street, Lanikaula Street transitions to Kumukoa Street, maintaining similar design criteria, to its intersection with Kukuau Street. In the project area, Lanikaula Street serves residential traffic and UH Hilo. Intersections with Kinoole Street and Mohouli Street are signalized, and there is congestion along Lanikaula Street at the intersection with Kinoole Street in the afternoon peak period.

Mohouli Street is an undivided, two-lane, County collector road, oriented in the east-west direction (see Figure 1-2). Mohouli Street extends from residential communities west of the project area to Kilauea Avenue in the east. Intersections with Kinoole Street and Kilauea Avenue are signalized with left turn lanes provided on all approaches at the intersection with Kinoole Street.

In the project area, *Kinoole Street* is an undivided, two-lane, County collector road, oriented in the north-south direction (see Figure 1-2). Kinoole Street is one of the primary north-south corridors between downtown Hilo and the Waiakea residential neighborhood. The corridor also serves heavy commuter traffic resulting in bottlenecks and delay in the northbound direction in the morning and southbound direction in the afternoon. Additionally, intersecting side streets experience congestion and delay at their intersection with Kinoole Street.

South of the project area, *Kawili Street* is a two-lane, undivided collector. Kawili Street provides a connection between Puainako Street and Kinoole Street, and areas beyond (see Figure 1-2). Kawili Street is utilized as access for industrial parks, residential subdivisions, and Waiakea High School and UH Hilo in the project area. Delay exists at the signalized intersection with Kinoole Street partially due to the absence of dedicated left turn lanes for either Kinoole Street approach which delays through-traveling vehicles. In the AM, westbound traffic along Kawili Street also queues back beyond the intersection with Kilauea Avenue. Due to this queue spillback, vehicles making the northbound left-turn and westbound through movements at Kilauea Avenue and Kawili Street are unable to proceed during this period. As a result, the signalized intersection of Kawili Street and Kilauea Avenue experiences significant delay as well. In the PM, the eastbound approach traffic queues along Kawili Street to the intersection with Kinoole Street, opposite of what is seen in the AM.

In order to determine the relative overall use of the various subject roadways, 24-hour traffic counts were taken (Table 3-2).

Table 3-2. Existing (2012) Roadway Average Daily Traffic

Roadway	Location	ADT	HV%
Kinoole Street	Between Mohouli Street and Lanihuli Street	13,640	16.4
Lanikaula Street	Between Kalili Street and Nowelo Street	5,500	2.2
Lanikaula Street	Between Kapiolani Street and Ululani Street	8,540	3.7
Mohouli Street	Between Kumukoa Street and Popolo Street	9,680	1.9

ADT = Average daily traffic; HV = Heavy vehicle

Intersection turning movement and 24-hour classification traffic counts were taken by SSFM on April 10, 2012 at the intersections of Mohouli Street with Kapiolani, Kinoole and Kumukoa Streets, and at the intersections of Lanikaula Street with Kinoole and Kapiolani Streets. Turning movement classification counts were taken at the study intersections during the AM and PM peak periods from 6:30–8:30 AM and 3:30–5:30 PM. Average weekday AM and PM peak hours at the study intersections were found to be 7:15-8:15 AM and 4:15-5:15 PM. Diagrams with turn volumes for all the subject intersections at peak hours are provided in Appendix 5.

The Hawai‘i County Mass Transit Agency (MTA) provides public transportation around the island on the Hele-On bus. The Intra-Hilo Waiakea-Uka and Intra-Hilo Kaumana buses run in and around the project area. As noted on the UH Hilo website, there are 46 buses stopping at UH Hilo each weekday, and 34 on Saturday. The campus bus stops are located in front of the Old Gym on Kapiolani Street, between Lanikaula Street and Kawili Street.

Some roads in the study area have sidewalks, while others have paved shoulders for pedestrian access. South of the project area, bike route signage exists along Kapiolani Street with bike lanes

along Kawili Street. Around the project area and UH Hilo, significant pedestrian and bike activity exists. This is especially true when the university is in session.

Level of service (LOS) is an operational analysis rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS values ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Tables 4 and 5 of Appendix 5 detail Level of Service for existing conditions for each turning movement for all subject intersections. Most movements are LOS C or better. The northbound movement from Kapiolani Street onto Lanikaula Street is LOS F in the PM and D in the AM, reflecting the congestion associated with accessing the entrances to UH Hilo and Waiakea High School at this busy, unsignalized intersection during peak hours.

Impacts and Mitigation Measures

Construction of the Kapiolani Street Extension is planned to be complete in 2014. Following State standards, the future "build year" for the TIAR is 2034, 20 years from the anticipated date of completed construction. The TIAR factored in both roadway changes and additional traffic as a result of all surrounding area development anticipated to occur by 2034. This includes the planned widening of Mohouli Street and all planned UH Hilo development anticipated to be completed by 2034. Those developments bordered by Mohouli Street, Kinoole Street, and Lanikaula Street that are not yet constructed were considered only accessible following the construction of the Kapiolani Street extension and therefore were only included for Future (2034) Proposed Project conditions.

Considering annual traffic growth over the past 10 years as well as projected surrounding area development and growth by UH Hilo (not including the Kapiolani Street-accessible development), it was anticipated that future volumes would continue to increase through 2034. Therefore, to estimate future traffic conditions, through-volumes along Mohouli Street, Lanikaula Street, and Kinoole Street were all specified to increase at a rate of 0.5% per year from current levels. Additionally, other traffic movements directly related to accessing UH Hilo were increased 0.5% per year to separately account for continuing UH Hilo development and growth.

As discussed in Chapter 1, the Kapiolani Street Extension is being planned as a business, industrial with a 60~~6~~-foot right-of-way (ROW) including eight-foot shoulders, five-foot bike lanes, and 12-foot travel lanes in either direction, with a 12-foot turning lane where needed. Proposed posted speed limits along the corridor will vary from 25 MPH near the intersections with Mohouli Street and Lanikaula Street to 35 MPH in the center.

Vehicular traffic anticipated to use the Kapiolani Street Extension includes:

- Vehicles traveling to/from Kapiolani Street-accessible UH-Hilo developments;
- Vehicles that can shorten the distance or time of their existing trip through use of Kapiolani Street;

The volume of vehicles along the proposed Kapiolani Street Extension was calculated using a four step trip generation methodology: trip generation, trip distribution, modal choice, route assignment, as detailed in Appendix 5. It should be noted that most future development in this area is associated with UH Hilo, and thus it is envisioned that many student and other trips will actually be conducted on foot, by bike, or through mass transit. This would lead to a reduction of total trips generated associated with the additional developments in the area. However, to be conservative, the TIAR did not apply reductions to the generated trips or future anticipated growth.

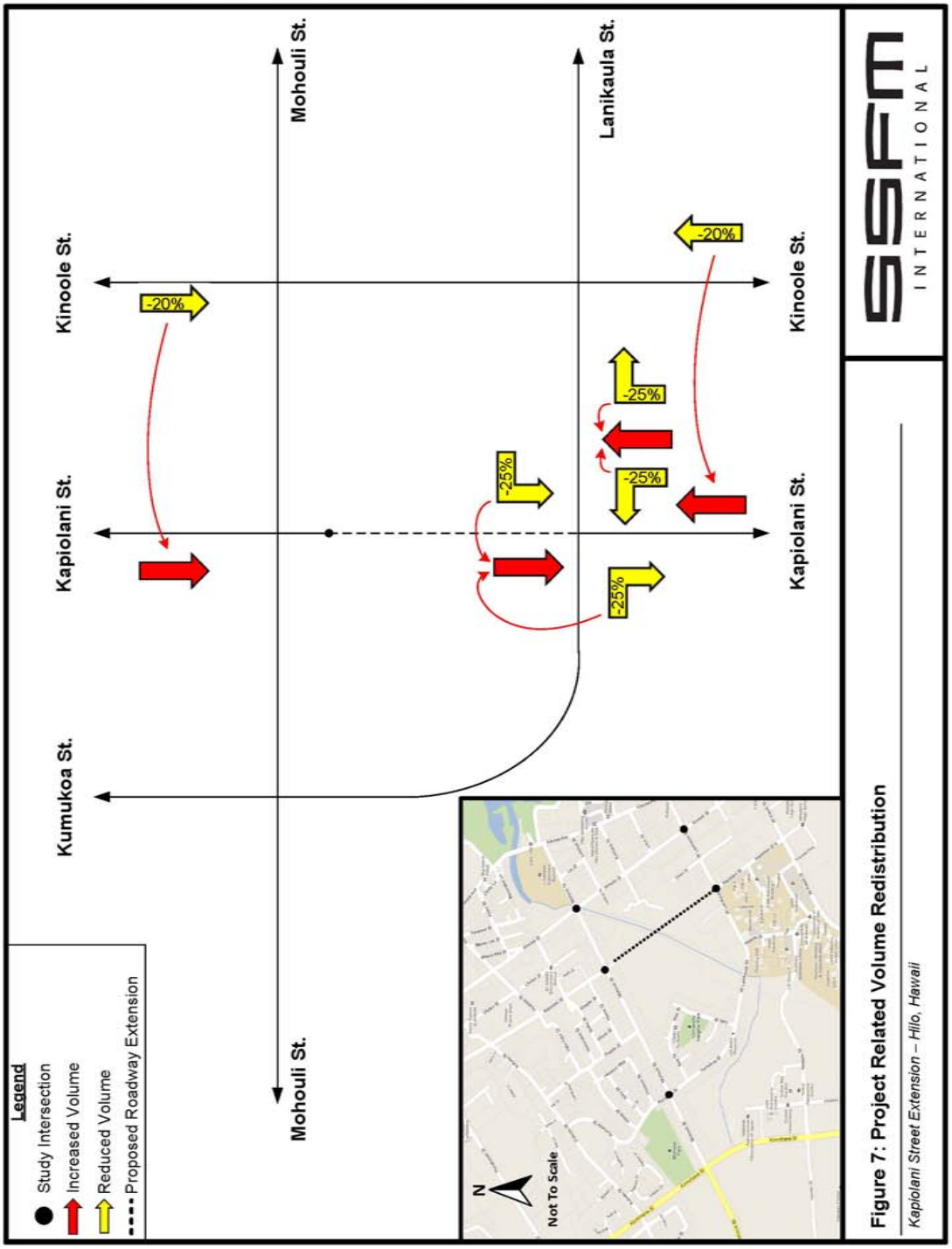
The TIAR redistributed vehicle traffic to Kapiolani Street, and Kapiolani Street-accessible UH Hilo project related volumes were added to the Future (2034) No Action Alternative scenario traffic volumes. Considering the anticipated growth and developments in the area, Future (2034) Proposed Project Alternative scenario ADT along the Kapiolani Street extension is projected to be 5,200. Peak hour volumes for all intersections are shown in Figures 8-9 of Appendix 5.

Without mitigation in the form of improved intersection design, traffic LOS would be very poor. Therefore, both the Lanikaula and Mohouli Street intersections with Kapiolani Street are proposed to be designed with dedicated left-turn lanes for all eight approaches. There will also be a right-turn lane for the eastbound approach of Lanikaula Street to alleviate delay to through-traveling vehicles. Signals are planned for both intersections, as LOS would have been F for many movements without signalization, and the intersections met appropriate warrants for signalization. Right-of-way constraints at the Kapiolani Street intersections with Mohouli Street and with Lanikaula Street precluded consideration of roundabouts, as these would require large footprints to provide sufficient turning area for large design vehicles, including buses, associated with collector roads. Acquiring the necessary right-of-way would have likely involved removal of at least four homes.

Finally, LOS was calculated for the Proposed Project and No Action Alternative scenarios. Tables 8-10 of Appendix 5 provide detailed lists of LOS for each movement of each intersection under both scenarios. To summarize, all study intersections would operate with appropriate LOS, with only one poorly operating turn movement under the Proposed Project Alternative scenario. Appropriate LOS would occur for all movements at the Kapiolani Street intersections with Mohouli Street and Lanikaula Street under the proposed design. Without the project, several movements at both the AM and PM peak hours would decline to LOS F at the Kapiolani Street intersections with Mohouli and Lanikaula Streets. There is little difference in LOS between the Proposed Project and No Action Alternatives scenarios at the other studied intersections at Kinoole Street and Kumukoa Street. Overall, with the intersections as designed, LOS should be adequate for Future (2034) Proposed Project conditions.

As discussed above, the Kapiolani Street Extension would provide an alternate way to UH Hilo, and traffic would tend to be redistributed on adjacent streets. Figure 3-3 is a map that depicts estimated values for the level of redistribution. Approximately 20 percent of traffic currently utilizing Kinoole

Figure 3-3 Project Related Traffic Volume Redistribution



Street, Mohouli Street or Lanikaula Street to access the corner of Kapiolani and Lanikaula Streets will take advantage of the Kapiolani Street Extension. This is forecast to decrease volumes on the former streets, but increase traffic on Kapiolani Street north of Mohouli Street, where LOS is currently acceptable. For safety, this existing section of Kapiolani Street should be maintained at 25 MPH.

3.4.2 Climate and Air Quality

An air quality study for the project was performed by B.D. Neal and Associates Inc. The report is attached as Appendix 6 and summarized in this section, from which most scholarly references have been removed for readability.

The climate of Hilo can be described as humid and tropical. Average high temperatures in Hilo vary from approximately 78º Fahrenheit (F) in the winter to 82º F in the summer. Temperature lows average approximately 65º F in the winter and 70º F in the summer. Freezing temperatures or frost do not occur in the project area. Mean annual rainfall in Hilo is estimated at 130 inches.

Wind is important for its effect on dispersion or concentration of pollutants. Trade winds with an east to northeast direction are present up to 90 percent of summer days and 50 percent of winter days. These winds are generally light, and seldom exceed an average daily speed of 10 miles per hour. At night, a shallow mountain drainage wind from the southwest is usually present except during episodes of strong regional wind. Trade winds are occasionally replaced by light and variable "*kona*" winds, most often in winter (UH-Hilo Dept. of Geography 1998).

Regional and local climate along with the type and amount of human activity generally dictate air quality of a given location. Federal and state air quality standards limit ambient concentrations of pollutants produced by motor vehicles. These include particulate matter, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead. These ambient air quality standards (AAQS) are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR) and Chapter 11-59 of the Hawai‘i Administrative Rules. Each regulated air pollutant has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time.

The State and federal governments periodically monitor air quality to determine whether it meets AAQ standards. Areas that do not meet standards are termed non-attainment areas and are subject to Conformity Rules. These rules were issued by the Environmental Protection Agency (EPA) in response to Section 176 of the 1977 Clean Air Act. Conformity Rules prohibit any federal agency from engaging in any actions that do not conform to a state's plan to correct nonattainment situations. The entire State of Hawai‘i is considered to have acceptable air quality and is thus an attainment area not subject to application of Conformity Rules.

Air quality in the project area is currently mostly affected by emissions from motor vehicles, industry, agriculture and natural sources. Volcanic emissions of sulfur dioxide convert into

particulate sulfate which causes a volcanic haze (vog) to blanket the area during occasional episodes when trade winds are not present. The major industrial source is oil-fired power plants which emit SO_2, nitrogen oxides, and particulate matter. Motor vehicles emit CO, nitrogen oxides and hydrocarbons (an ozone precursor), as well as smaller amounts of other pollutants. The State of Hawai‘i operates a network of air quality monitoring stations around the state. Very little data are available for the Hilo area. In general, these data indicate that concentrations are well within State and federal air quality standards, although data from 2006-2010 showed that the 3-hour and/or 24-hour standards for sulfur dioxide and particulates smaller than 2.5 microns were exceeded several times, due to vog. The State standards pertaining to CO are probably exceeded on occasion near high-volume intersections during periods when traffic congestion and poor dispersion conditions coincide. The usually excellent air quality in Hilo is mainly influenced by the dispersive effects of the trade winds and the isolation of the island from any outside sources of pollution.

Long-Term (Operational) Impacts and Mitigation Measures

Operationally, the new roadway provides a shorter alternate route for use by existing traffic but would also indirectly generate additional traffic through new development at UH Hilo. Even with minor additional traffic, impacts to regional air quality (which is currently excellent) would probably be somewhat beneficial because of the predicted decrease in congestion and queuing.

However, vehicles traversing the Kapiolani Street Extension would contribute to a long-term increase in air pollution emissions along the actual project corridor – what are called microscale impacts. To evaluate the potential impact, an air quality specialist employed computerized emission and atmospheric dispersion models that estimated ambient carbon monoxide (CO) concentrations along roadways leading to and from the project. CO was selected for modeling because it is the most stable and abundant of the pollutants generated by vehicles (see Appendix 5).

Roadway intersections are the primary locations of concern because of vehicular emissions associated with traffic queuing in congested conditions. The air quality study focused on Mohouli Street intersection with Kapiolani, Kumukoa and Kinoole Streets, and the Lanikaula Street intersection Kapiolani and Kinoole Streets, because these intersections will be most affected.

The main objective of the modeling study was to estimate maximum 1-hour and 8-hour CO concentrations for five intersections at the present (2012) and the future (2034) for both the Proposed Project and No Action Alternatives. Maximum concentrations were calculated for both morning and afternoon peak hours, using the MOBIL6.2 computer model. The model incorporates terms for traffic volume, average speed, vehicle mix (i.e., different types of motor vehicles and engines), cold/hot start modes (i.e., whether most vehicles will be “warmed up” and burning fuel efficiently), and other factors. After emissions were calculated, a dispersion model (CAL3QHC) was used to determine how CO would disperse away from the intersection. “Worst case” meteorological conditions (wind speeds of less than 1 meter/second, blowing towards the most sensitive areas) were used in order to arrive at a conservative estimate. Tables 3-3 and 3-4 provide the results of the analysis.

Table 3-3
Estimated Worst-Case 1-Hour Carbon Monoxide Concentrations

Roadway Intersections	Year/Alternative					
	2012/Present		2034 No Action		2034 Proposed Project	
	AM	PM	AM	PM	AM	PM
Mohouli Street at Kumukoa Street	3.3	2.0	3.0	1.6	2.9	1.6
Mohouli Street at Kapiolani Street	2.0	1.4	2.1	1.3	2.6	1.7
Mohouli Street at Kinoole Street	3.0	2.0	3.0	2.1	2.8	2.0
Lanikaula Street at Kapiolani Street	4.4	1.9	3.5	1.9	2.6	1.6
Lanikaula Street at Kinoole Street	3.2	2.1	3.0	1.9	2.8	1.8

Source: Appendix 6
Notes: Concentrations are milligrams per cubic meter and are estimated for areas 3 meters away from traveled portion of roadway at 1.8 m height.
Hawai‘i State Ambient Air Quality Standard for CO: 9
National Ambient Air Quality Standard for CO: 35

As shown in Table 3-3, compared to the existing case, predicted concentrations in the project area for the year 2034 without the project generally decreased (improved) slightly or remained about the same, and worst-case concentrations remained well within the State and national standards. Predicted 1-hour worst-case concentrations for the 2034 with the proposed project scenario decreased (improved) somewhat at most locations studied in the project area compared to the No Action Alternative. Concentrations for other locations and times ranged between 1.6 and 2.9 ppm. Although the morning and afternoon worst-case concentrations at the intersection of Mohouli Street and Kapiolani Street were predicted to increase by about 20 to 30 percent compared to the No Action Alternative, worst-case concentrations at all locations studied remained well within the State and federal standards. This is due to the improved traffic flow afforded by the project.

Table 3-4 supplies the worst-case 8-hour concentrations for these intersections. Patterns similar to those for the 1-hour case are apparent. The predicted concentrations for this scenario for the five locations studied ranged from 1.3 to 1.4 ppm. All predicted 8-hour concentrations for this scenario were well within both the national and the state AAQS.

Table 3-4
Estimated Worst-Case 8-Hour Carbon Monoxide Concentrations

Roadway/Intersection	Year/Alternative		
	2012/Present	2034 No Action	2034 Proposed Project
Mohouli Street at Kumukoa Street	1.6	1.5	1.4
Mohouli Street at Kapiolani Street	1.0	1.0	1.3
Mohouli Street at Kinoole Street	1.5	1.5	1.4
Lanikaula Street at Kapiolani Street	2.2	1.8	1.3
Lanikaula Street at Kinoole Street	1.6	1.5	1.4

Notes: Concentrations are Concentrations are milligrams per cubic meter estimated for areas 3 meters away from traveled portion of roadway at 1.8 m height.
Hawai‘i State Ambient Air Quality Standard for CO: 4.4
National Ambient Air Quality Standard for CO: 9

Short-Term (Construction) Impacts and Mitigation Measures

On-site mobile and stationary construction equipment will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the annual standard for nitrogen dioxide is not likely to be violated by short-term construction equipment emissions. Also, the short-term (1-hour) standard for nitrogen dioxide is based on a three-year average; thus it is unlikely that relatively short-term construction emissions would exceed the standard. Carbon monoxide emissions from diesel engines are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Project construction activities could also obstruct the normal flow of traffic for short periods of times such that overall vehicular emissions in the project area could temporarily increase. The means to alleviate this problem is to keep roadways open during peak traffic hours and to move heavy construction equipment and workers to and from construction areas during periods of low traffic volume. Thus, most potential short-term air quality impacts from project construction related to vehicle emissions can be mitigated.

Construction also has the potential to produce very localized and temporary fugitive dust emissions, although the moist, highly vegetated landscape is not prone to production of dust. Dust-sensitive land uses are present nearby, including single-family residences, two senior housing complexes, churches, and a YMCA. State of Hawai‘i Air Pollution Control Regulations at Hawai‘i Administrative Rules, Chapter 11-60 “Air Pollution Control.” prohibit visible emissions of fugitive dust from construction activities at the property line. A dust control plan will be implemented for

construction activities with potential to generate substantial dust. The elements of the plan may include some or all of the following:

- Watering of active work areas;
- Cleaning adjacent paved roads affected by construction;
- Covering of open-bodied trucks carrying soil or rock;
- Limiting area to be disturbed at any given time;
- Mulching or stabilizing disturbed inactive areas with geotextile; and
- Paving and landscaping as soon as practical in the construction schedule.

3.4.3 Noise

Existing Environment

A study of the acoustic environment within and near the project corridor that included estimation of the effects of both the Proposed Project and No Action Alternatives was conducted for this EA by Y. Ebisu and Associates. The study is attached as Appendix 7 and summarized below.

Noise may be defined as unwanted sound. Evaluation of noise requires a consideration of loudness at various pitches. Loudness is measured in units called decibels (dB). Since the human ear does not perceive all pitches or frequencies equally, noise levels are adjusted (or weighted) to correspond to human hearing. This adjustment is known as the A-weighted scale, abbreviated dBA. The specific sound level descriptor used in this study is the hourly energy equivalent sound level (L_{eq}) in decibels (dB), which considers the combined effects of all noises near and far and includes background noise and noise fluctuation. Noise levels over 70 decibels are considered unpleasant by most individuals; levels under 50 decibels are generally perceived as acceptably quiet.

The State and federal governments have cooperated on determining acceptable standards of noise (measured in decibels) for various categories of land use. Standards help to assess the existing noise environment and to determine whether the increase in noise associated with a highway project substantially impacts the acoustic environment. They also represent a benchmark goal for mitigation measures when the noise impact of a project unavoidably raises noise levels. Noise abatement criteria are presented in Table 3-5.

Existing traffic and background ambient A-weighted noise levels were measured at various locations on and near the corridor, as shown in Figure 1 of Appendix 7. The acoustical study used existing traffic noise measurements to develop and calibrate a model that projected future traffic noise levels under the Proposed Project and No Action Alternatives. The FHWA Traffic Noise Prediction Model, Version 2.5, was the primary method. The model incorporates parameters for

Table 3-5
Federal Highway Administration Noise Abatement Criteria

Activity Category	Design Noise Level L_{eq}	Description of Activity Category
A	57 (Exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67[1] (Exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	72 (Exterior)	Developed lands, properties or activities not included in categories A and B.
D	__	Undeveloped Lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

Source: U.S. Department of Transportation Policy and Procedure Memorandum 90-2, developed per requirements of 23 CFR 771, which regulates Environmental Impact procedures of the Federal Highways Administration (FHWA).

Notes:

L_{eq} is the one-hour energy equivalent sound level measured in decibels on the A-weighted scale (see main text for definitions).

[1] Noise impacts occur when noise "approaches or exceeds" the Noise Abatement Criteria. The Hawaii State Department of Transportation defines "approach" as within 1.0 decibel of the applicable criteria.

terrain, ground cover, and local shielding conditions. The agreement between measured and predicted traffic noise levels, after adjusting for actual vehicle speeds and empirical observations, confirmed that the traffic model could consistently and accurately predict future traffic noise levels.

Sensitive noise receptors are present along and near the project corridor. No park lands border the corridor within the limits of project construction, but single and multifamily residences, a student center, a church, a new Hospice facility, and a YMCA facility are located on both sides of the new roadway alignment within or near the limits of project construction. Along Kapiolani Street between Mohouli Street and Lanikaula Street, existing developments consist of noise sensitive

residences and public use facilities. Current traffic noise levels at a 50-foot setback distance from the centerline of the existing sections of Kapiolani Street are modeled to be approximately 41 to 65 L_{eq}. The existing traffic noise levels do not exceed the 66 L_{eq} criteria at existing noise sensitive buildings along the existing Kapiolani Street sections at Mohouli Street and Lanikaula Street.

At the Olaloa Homes and Kamana Elderly Homes, which are removed from the Mohouli and Lanikaula Street ends of the proposed Kapiolani Street Extension, existing traffic noise levels are lower, on the order of 50 to 53 L_{eq}.

Long-Term (Operational) Impacts

Future year (2034) traffic noise levels were developed for the Proposed Project and No Action Alternatives using the future traffic assignments from the TIAR (see Section 3.4.1, above). Forecast mixes of vehicle types were assumed to be identical for both existing and future traffic, and vehicle speeds for Year 2034 along existing roadways were assumed to be identical to current values. Future posted traffic speeds along the new sections of the Kapiolani Street Extension were assumed to be 25 MPH near the intersections with Mohouli and Lanikaula Streets and 35 MPH in the center portion of the extension. Modeled traffic speeds along the existing and new sections of Kapiolani Street were assumed to be 10 miles per hour greater than their posted speed limits. Future traffic conditions on existing roadways under the No Action Alternative may worsen, with average vehicle speeds declining as a result of increased congestion. Nevertheless, under the No Action Alternative, average vehicle speeds were assumed to remain the same as current values.

Two standards of increase in noise levels are used to determine whether noise impacts have occurred and noise mitigation measures should be considered. One is whether the FHWA noise abatement criterion of 67 L_{eq} for residences, schools, churches, and similar land uses (U.S. Department of Transportation Policy and Procedure Memorandum 90-2) is exceeded or "approached," which is defined in Hawai‘i as 66 L_{eq} or greater. The second standard is the State DOT policy that defines any difference of 15 dB or greater between existing and predicted noise levels at the project year of 2034 as a "substantial" increase. If either standard is exceeded, "reasonable and feasible" mitigation measures must be considered.

Along most of the Kapiolani Street Extension corridor, where no development currently exists, the project would clearly contribute to elevated noise levels. However, even under the No Action Alternative, noise is forecasted to rise near the intersections and along existing sections of Kapiolani Street north of Mohouli Street and south of Lanikaula Street. In some cases, non-project related noise growth exceeds that of the project, and on Lanikaula Street, the project would actually decrease noise levels by subtracting traffic (although not modeled, this would probably occur on Kinoole Street as well).

Future traffic noise levels at Olaloa Homes and Kamana Elderly Homes *makai* of the Kapiolani Street Extension are expected to increase by 3.0 to 9.3 dB as a result of the project. Noise levels at the Christ Lutheran Church at the Mohouli Street end of the Kapiolani Street Extension are

expected to increase by 7.3 dB as a result of the project. However, predicted traffic noise levels at all of these buildings should not exceed the HDOT 66 L_{eq} or 15 dB increase noise abatement criteria. Smaller increases in future traffic noise levels of about 4.9 dB are predicted at the new Hospice of Hilo facility across the Christ Lutheran Church due to the larger setback distance of the hospice facility.

The HDOT 66 L_{eq} noise abatement criteria will be exceeded at four locations:

- The YMCA building on Lanikaula Street.
- The single-family residence on the southeast corner of Mohouli Street and Kapiolani Street.
- The single-family residence on the southeast corner of Lanikaula Street and Kapiolani Street.
- The 3-story, University Palms apartment building, located outside the project corridor on Kapiolani Street, south of the Lanikaula Street intersection.

Along the existing sections of Mohouli and Lanikaula Streets near where they intersect with Kapiolani Street, existing and future traffic noise levels are modeled to exceed the HDOT 66 L_{eq} at noise sensitive buildings located along these two streets. However, increases in future traffic noise levels from these two roadways will range from 0.7 to 0.9 dB at these buildings even without the Kapiolani Street Extension project. The project itself would contribute relatively small increases of 0.1 to 0.2 dB due to increased traffic and the addition of turning lanes at the two intersections. These project-related increases will be difficult to measure or perceive, and are considered to be insignificant.

Long-Term (Operational) Mitigation Measures

Because a sound attenuating wall may be effective in providing 5 to 7 dB of attenuation at the first floor units, it was investigated as a noise mitigation measure for the noise impacted receptors. The required heights of the sound attenuating wall to provide noise mitigation at the second and third floor units at the University Palms apartments was not investigated, because the wall height would be on the order of 15 feet, which is considered excessive in zoning regulations.

By existing HDOT policy and guidelines (HDOT & FHWA 2011), a minimum sound attenuation of 5 dBA at two thirds of the impacted front row receptors is required. The total count of impacted front row receptors include two single family residence receptors, three receptors at the YMCA (which has an equivalent frontage equal to three residences along the right-of-way); and six ground floor multifamily residence receptors at the University Palms apartments; for a total of 11 receptors which could benefit at least to some degree from potential sound attenuating walls.

By existing HDOT policy, at least 5 dB of attenuation would be required at a minimum of seven of these receptors before the sound attenuation walls can be considered to be acoustically feasible. Walls of varying heights would be necessary to achieve at least 5 dB of attenuation at each of the receptors, as shown in Figure 4 of Appendix 7. If it is considered feasible to actually construct these

walls, the sound attenuation walls must also meet all of the following "reasonableness" criteria under the HDOT noise policy (HDOT & FHWA 2011):

1. At least two thirds of the land owners and impacts residents must approve of the sound attenuating walls;
2. A noise reduction of 7 dB is required at a minimum of 75 percent (eight, in this case) of the benefiting front row receptors along the entire project; and
3. The total cost of the sound attenuating walls cannot exceed $60,000 per benefited receptor.

At the University Palms apartments, the presence of the driveways will nullify the effectiveness of the sound attenuating walls, and will not allow for 7 dB of attenuation to be achieved at the six ground floor receptors. Because of this, it will not be possible to achieve 7 dB of attenuation at a minimum of eight impacted receptors along the project corridor. Therefore, the use of sound attenuating walls for this project would not meet the "reasonableness" criteria of the existing HDOT noise abatement policy.

Although sound attenuation walls would not be reasonable, an effective noise mitigation measure for increases at the YMCA facility along the new section of the Kapiolani Street Extension would be to reduce the speed limit of the entire new street section to 25 MPH, which would reduce noise to below the HDOT 66 L_{eq} noise abatement criteria.

Future noise sensitive facilities or housing units that may be planned alongside the new Kapiolani Street Extension represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the Kapiolani Street Extension will be complete prior to any development of the presently open areas adjacent to the roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway, as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for future noise abatement measures under existing HDOT procedures.

Short-Term (Construction) Impacts and Mitigation Measures

Short-term noise impacts associated with construction activities along the existing and future roadway sections may occur. These impacts can occur as a result of the short distances (less than 30 feet) between existing noise sensitive structures and the anticipated construction corridor. The total duration of the construction period for the proposed project would likely be less than a year, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period. If necessary, a construction noise permit will be obtained.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 feet distance. Adverse impacts from construction noise are not expected to adversely affect public health

and welfare due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project work areas.

The State Department of Health (DOH) currently regulates noise from construction activities under a permit system. In cases where construction noise is expected to exceed the DOH "maximum permissible" property-line noise levels, contractors are required to obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. Under current permit procedures, noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors (such as residences) along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, DPW will specify the use of quieted portable engine generators and diesel equipment for use within 500 feet of noise sensitive properties. Heavy truck and equipment staging areas will also be located at areas which are at least 500 feet from noise sensitive properties whenever possible.

3.5 Growth-Inducing, Cumulative and Secondary Impacts

Because growth-inducing impacts and cumulative impacts are closely related in the case of the Kapiolani Street Extension, their discussion is integrated in this section.

Infrastructure expansion projects – whether roads, sewage treatment plants, school construction, or water supply – can induce secondary physical and social impacts that are only indirectly related to the project, particularly related to growth-induction. Some infrastructure projects induce unplanned development, substantially accelerate planned development, encourage shifts in growth from other areas in the region, or intensify growth beyond the levels anticipated and planned for without the project. This can lead to adverse effects associated with land development such as additional traffic, erosion and sedimentation and loss of open space and habitat. At the same time, infrastructure projects can have beneficial secondary impacts, as projects with the capability to provide low-income housing, education or social services have critical building blocks put in place.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. Most of the adverse effects of the project are related to construction and are temporary – disturbance to air quality, traffic, noise and visual quality – and thus very limited in severity, nature and scale. However, there are a number of construction projects occurring nearby within a three-year timeframe that could generate similar construction impacts, with which these temporary construction effects could accumulate. This interaction thus requires attention.

The proposed project would provide access to unused State lands on both sides of the new road that would facilitate new uses. Parties who have expressed an active interest in portions of these State lands (TMKs 2-4:01:24 and 2-4-:56 14 and 17) include UH Hilo, the Waiakea Uka Bible Church, the Big Island Housing Foundation, and the proposed Hilo Veterans Office and Housing Facility. Preparation of this EA included coordinating with each of these parties regarding potential uses.

Appendix 10 is a graphic depicting the preliminary Long Range Development Plan (LRDP) 2020 developed by UH Hilo as part of a visioning process. Although by no means finalized, this exploration of what the campus may look like in 2020 (by which time the goal is to increase enrollment from 4,100 to 7,000 students) and beyond has allowed UH Hilo to organize its planning and expansion efforts. This plan is a good first-order approximation of the areas and nature of expected growth. On May 15, 2006, UH Hilo received permission from the Hawai‘i Board of Land and Natural Resources to begin the process of subdivision of these lands for a 65-year general lease for Education, Housing, and Related Purposes. The “UH Hilo Kapiolani Street Extension” subdivision, finalized on June 18, 2010 (SUB 10-00989), is what formally set aside the Kapiolani Street Extension right-of-way. The LRDP identifies these lands in very general terms for up to 80+/- units of Faculty Housing, 504+/- beds of Student Housing, and about 200,000 square feet of mixed use. Access to all these properties would be greatly facilitated by the Kapiolani Street Extension. It is important to note that the orderly growth of the UH Hilo campus does not represent induced growth, but rather planned growth that has been envisioned in County and State plans.

The Waiakea Uka Bible Church has worked with the YMCA to acquire a lease for TMK 2-1-056:030, a 1.84-acre property currently under lease to the YMCA to relocate its church facilities (see Figure 1-2). This property currently lacks the convenient access that could be provided by the Kapiolani Street Extension. The Big Island Housing Foundation operates the Kamana Elderly housing facility that could be better utilized (and perhaps expanded into adjacent State land) with the access that the Kapiolani Street Extension could provide.

According to an article in the *Hawai‘i Tribune-Herald* (August 1, 2012, p. 1, Tom Callis), a nonprofit organization of Big Island veterans is planning to start construction on a complex of veterans services and housing on 7.5 acres near UH Hilo at the corner of Kawili and Kapiolani Streets (see Figure 1-2). The complex will consist of an office building for government and private veterans organizations, about 100 condominium apartments for veterans and spouses 62 years old and up, and a multipurpose facility providing dining for up to 335 people. The U.S. Department of Veterans Affairs, the state Office of Veterans Services and the private Veterans of Foreign Wars and Disabled American Veterans could all be housed in a central location. The 96 to 110 apartments would serve a gap group, an aging population which might need some assisted living care but not the full-time medical attention provided in the Hilo Veterans long-term care home near Hilo Medical Center. At one time, the nonprofit organization also considered using State land near the proposed Kapiolani Street Extension instead.

Additional non-profit entities may also express interest in the State lands once access (and, potentially, a wastewater main) is provided. Altogether, any such projects have the potential to have impacts to traffic, water quality, archaeological sites, and perhaps other resources. The extent and nature of the impacts cannot be known until actual uses are proposed. The lands are currently County-zoned for residential use (RS-10, minimum lot size 10,000 square feet) and are designated in the Hawai‘i County General Plan for Low Density Urban. All proposed uses will require compliance with Chapter 343, Hawai‘i Revised Statutes, which would likely require preparation of an Environmental Assessment or Environmental Impact Statement. In addition, each use would have to undergo examination for compliance with zoning requirements, and, as necessary, a Change of Zone or Use Permit, processes which trigger environmental reports. Other environmental permits or approvals including grading permits, National Pollutant Discharge Elimination System Permits, and Underground Injection Control Permits would likely be required. This set of permits and approvals will assure assessment of impacts and requirements for mitigation measures, neither of which can be specified at this time. Because of the characteristics of this urban area, as long as standard mitigation measures are required, the development of such uses would not have impacts to resources that would tend to accumulate with those of the Kapiolani Street Extension.

In addition to the growth potentially facilitated by the Kapiolani Street Extension, a number of other projects that could have impacts are independently planned for the area. Most prominent are impacts associated with the gradual, planned growth of UH Hilo. Aside from infilling and minor expansion into the neighborhoods in the *makai* areas of the 115-acre main campus, the major emphasis is use of the nearly 500 acres of land *mauka* or just *makai* of Komohana Street for faculty housing, the relocation of Hawai‘i Community College, parking, and unspecified future growth. Such growth has been anticipated or even specifically planned for through: 1) dedication of the land by the State of Hawai‘i for University uses, mostly related to UH Hilo, and 2) the designation of University Use in the Hawai‘i County General Plan. However, as individual projects develop, EAs for site specific concerns such as archaeology, biology and hazardous materials, cumulative impacts, as well as more neighborhood-wide impacts such as traffic, will be developed to identify develop specific mitigation measures to protect environmental and community resources.

Most nearby projects appear to be related to new buildings on or near the UH Hilo campus. Planned for the near future are new buildings for Student Services (in construction), a 35,000 square-foot, three-story $15.9 million structure that will concentrate all student services in one location on campus; the Ka Haka ‘Ula O Ke‘elikōlani College of Hawaiian Language (whose $23.8 million Phase I includes a complex of three buildings for offices, classrooms, and pre-school facilities); and the College of Pharmacy, an as-yet unfunded project slated to cost $66 million. UH Hilo has also just broken ground on a 300-bed student-housing building located on 33 acres across from UH-Hilo’s main entrance above Waiakea High School, the first housing facility on campus since 1989. Non-UH Hilo projects are the Puainako Street Widening and the Thirty Meter Telescope base facilities. It is also possible that the Hawai‘i Public Housing Authority will move forward with replacing or repairing and remodeling 62 low-income housing units on Kapiolani Street that are currently unoccupied. Table 3-6 summarizes these projects and their potential interaction with the Kapiolani Street Extension.

Table 3-6
Projects with Potential for Cumulative Impacts

Project	Construction Timing	Location Relative to Road	Interaction Potential
UH Student Services Building	2012-2013	0.3 mi. S	Low, due to non-overlapping construction period.
College of Hawaiian Language	2012-2013	0.8 mi. SW	Low, due to distance and likely non-overlapping construction period.
Hilo Baptist Church Expansion	2012-2013	0.2 mi. SW	Low, due to non-overlapping construction period and small scale.
UH Hilo Student Housing	2012-2016	0.4 mi. S	Medium high, due to proximity and overlapping construction period.
College of Pharmacy	2012-2015	0.9 mi. SW	Medium, due to potential overlapping construction period.
TMT Base Facilities	2013-2015	0.9 mi. SW	Low, due to distance and scale.
Puainako Street Widening	Not funded or scheduled	0.7 mi. S	Medium, if timing overlaps, due to potential for both projects to temporarily disrupt traffic. Operationally, both projects would combine to reduce traffic congestion.
Hilo Veterans Housing/Center	Not yet funded, permitted or scheduled	Adjacent *OR* 0.2 mi. S	Medium, due to proximity and potential overlapping construction period.
Lanakila Housing	Not yet funded or scheduled	0.1 mi. N	Medium, due to proximity and potential overlapping construction period.
Waiakea Uka Bible Church	Not yet permitted or scheduled	Adjacent	Medium, due to proximity and potential overlapping construction period.

Note: see narrative above for project details

Several of the projects listed above are fairly uncertain or are unlikely to overlap in terms of timing with the proposed project. If the construction schedule for the Kapiolani Street Extension overlaps with some of the projects, there is potential for cumulative impacts from construction. If unmitigated, there could be cumulative impacts to dust, noise, sedimentation and erosion, visual quality and particularly traffic congestion. These impacts can be mitigated through close communication between responsible agencies and construction managers on scheduling of construction activity and the delivery of equipment and materials and supplies. Joint traffic control plans may be required. The Hawai‘i County Department of Public Works will work closely with the University of Hawai‘i, the Hawai‘i Public Housing Authority and other entities to resolve potential issues, as they have in the past for similar situation. With proper coordination, adverse interactions or cumulative effects during construction can be reduced to negligible levels.

Long term cumulative impacts to most resources are unlikely, as the area lacks significant natural or cultural resources requiring protection, and water quality and floodplain effects for all projects can be mitigated to negligible levels that will not accumulate, given adherence to standard best

management practices. However, if all planned projects are eventually constructed, traffic congestion in the general area is likely to rise, especially when UH Hilo is in session. The TIAR for this EA considered most of the projects that were reasonably certain to be constructed within the next 20 years. Impacts from projects that actually come to pass will need to be managed by UH Hilo through gradual adjustments in policies related to parking, the timing of courses and other measures. The Hawai‘i County Mass Transit Agency has proven capable of responding to increased special needs of the University and could also adjust service. Several of the projects, however, will actually contribute to reduced traffic, particularly the UH Student Housing project, which could substantially reduce trips to and from the university by making residents out of commuters. Likewise, the Puainako Street Widening project would open up a corridor of increased capacity that would divert some traffic now choosing to utilize streets in the university area.

3.6 Required Permits and Approvals

Several permits and approvals would be required to implement this project. They are listed here under their granting agencies.

Hawai‘i State Department of Health
- National Pollutant Discharge Elimination System Permit
- Title 11, Chapter 46, HAR (Community Noise Control)
- Underground Injection Control (UIC) Permit

Hawai‘i State Department of Land and Natural Resources
- State Historic Preservation Division Chapter 6e Concurrence

Hawai‘i County Department of Public Works
- Grubbing and Grading
- Permit to Work Within County Right-of-way

At the current time, DPW does not anticipate the need for any other permits or approvals, a finding that will be revisited after review of agency comments on the Draft EA.

3.7 Summary of Mitigation Measures

Table 3-6 below summarizes mitigation measures. The County of Hawai‘i, Department of Public Works will maintain a checklist of mitigation measures and ensure that each is implemented at the appropriate stage of the project.

Table 3-6. Summary of Mitigation Measures

Subject (Reference)	Mitigation	Enforcement Responsibility
Floodplains (3.1.2)	Review of hydraulic studies; determination of impact to floodplains, if any; Letter of Map Revision if required.	COH-DPW, FEMA
Water Quality, Erosion and Sedimentation (3.1.2)	NPDES permit and development of Storm Water Pollution Prevention Plan to properly manage storm water runoff, with emplacement and monitoring of best management practices	COH-DPW, DOH-CWB
Biology (3.2)	Prohibition on clearing of woody vegetation taller than 15 feet during the Hawaiian hoary bat pupping season, June 1-Sept. 15. Prohibition on earthmoving or tree cutting during the breeding season for Hawaiian Hawks (March through September) unless preceded by professional hawk nest search that determines no hawks on or near activity area. All lighting required to be shielded, and no nighttime construction work during the seabird-fledging season from Sept. 15 to Dec. 15 to reduce risk of harm to seabirds. Construction BMPs will also serve to protect the aquatic biota downstream.	COH-DPW
Utilities (3.3.2)	County will continue to work with adjacent users to determine if there is need and funding for wastewater facilities to be constructed as part of project.	COH-DPW
Archaeological and Cultural Resources (3.3.3)	If archaeological resources or human remains are encountered during future development activities within the project corridor, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted. <u>In addition, SHPD may require archaeological monitoring during initial grading.</u>	COH-DPW SHPD
Air Quality	Prepare dust control plan; traffic control plan; ensure that construction equipment meets all emissions specifications.	COH-DPW
Noise	Maintain 25 MPH speed limit near intersections with Lanikaula Street and Mohouli Street. Obtain Community Noise Control permit with mitigating conditions to be determined.	COH-DPW DOH-IRH
Cumulative (3.5)	Managed by UH Hilo through parking policies, course offering scheduling; adjustments by County Mass Transit Agency of bus schedules.	COH-DPW, MTA; UH Hilo

Notes: COH-DPW: County of Hawai‘i, Department of Public Works. COH-MTA: Mass Transit Agency; DOH-CWB: Department of Health, Clean Water Branch; DOH-IRH: Indoor and Radiological Health Branch; FEMA, Federal Emergency Management Agency; SHPD: State Historic Preservation Division.

4 COMMENTS AND COORDINATION

4.1 Agencies and Organizations Contacted

The following agencies received a letter inviting their participation in the preparation of the Environmental Assessment and/or had meetings with project staff.

County of Hawai‘i

- Planning Department
- County Council
- Environmental Management Department
- Water Supply Department
- Police Department
- Fire Department

State of Hawai‘i

- Department of Health
- Office of Hawaiian Affairs
- State Historic Preservation Division

Federal

- U.S. Fish and Wildlife Service

Organizations and Individuals

- Christ Lutheran Church
- Hilo Higashi Hongwanji
- Hospice of Hilo
- Hawaii Island Chamber of Commerce
- Big Island Housing Foundation
- YMCA of Hawai‘i
- 18 neighboring property owners

Copies of correspondence from agencies with substantive comments during the preparation of the EA are included in Appendix 1a and are cited in appropriate sections of the text of this EA.

A public information meeting attended by approximately 50 members of the public was held in Hilo on June 6, 2012. The meeting was widely advertised through press releases and email blasts and mailings to neighbors and other parties. The meeting was an open-house format followed by a presentation and a question and answer period. Materials related to the meeting are presented in Appendix 1b.

An additional public meeting was held on September 11, 2012, during the comment period for the Draft EA. Materials related to the meeting are presented in Appendix 1d.

Appendix 1d contains written comments on the Draft EA and the responses to these comments. Various places in the EA have been modified to reflect input received in the comment letters and at the public meeting; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

5 LIST OF DOCUMENT PREPARERS

This Environmental Assessment was prepared for the County of Hawai‘i, Department of Public Works, by Geometrician Associates and SSFM International Inc. The following companies and individuals were involved:

Co-Consultant

Geometrician Associates LLC
Environmental Assessment

Ron Terry, Ph.D.
Principal Scientist

Co-Consultant

SSFM International Inc.
Engineering

Austen Drake, P.E.
Project Manager

Mike Packard, P.E.
Traffic Engineer

Sub-Consultants

Ebisu and Associates
Y. Ebisu, P.E.
Acoustic Engineering

Myounghee Noh and Associates
Myounghee Noh and Jessica Walsh
Phase I Environmental Site Assess.

Rechtman Consulting LLC.
Robert Rechtman, Ph.D.
Archaeology

B.D. Neal and Associates
Barry Neal, M.S
Air Quality

AECOS Inc.
Susan Burr and David Miranda
Water Quality

6 ENVIRONMENTAL ASSESSMENT FINDINGS

Section 11-200-12 of the State Administrative Rules sets forth the criteria by which the significance of environmental impacts shall be evaluated. The following discussion paraphrases these criteria individually and evaluates the project's relation to each.

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources*. The project corridor is dominated by non-native, invasive species and contains only a few individuals of a limited number of common native species. No natural water bodies would be affected in any way and no significant natural resources will be irrevocably committed or lost. The State Historic Preservation Division is expected to concur with the archaeological finding that no adverse effect to historic properties will occur.

2. *The project will not curtail the range of beneficial uses of the environment*. Future beneficial uses of the environment will in general be maintained by the proposed project.

3. *The project will not conflict with the State's long-term environmental policies*. The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. A number of specific guidelines support these goals. The project's goals of improving transportation for vehicles, bicycles and pedestrians, and allowing the orderly development of public lands for educational and other non-profit uses, satisfies elements of the State's environmental policies.

4. *The project will not substantially affect the economic or social welfare of the community or State*. The improvements will benefit the social and economic welfare of Hawai‘i by improving public facilities in Hilo and specifically the UH Hilo area.

5. *The project does not substantially affect public health in any detrimental way*. No adverse effects to public health are anticipated.

6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. The project will foster the orderly expansion of UH Hilo, serving growth that has explicitly been specified in the Hawai‘i County General Plan. No population growth is expected

7. *The project will not involve a substantial degradation of environmental quality*. The implementation of best management practices for all construction will ensure that the project will not degrade environmental quality in any substantial way.

8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat*. Impacts to wide ranging threatened or endangered vertebrates will be avoided through construction timing and practices. No rare, threatened or endangered species of flora are present.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions*. Cumulative impacts during construction may occur but can be mitigated by scheduling and coordination; permanent cumulative traffic impacts can be alleviated by adjusting existing university traffic/parking restrictions and mass transit schedules.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* Effects to water quality will be negligible with implementation of standard best management practices that will be required under permits. Air quality would improve with implementation of the project. Limited permanent noise impacts would occur that are not capable of reasonable mitigation. Construction noise impacts will be mitigated through Department of Health permit conditions, including scheduling limitations.

11. *The project will not affect or will likely be damaged as a result of being located within an environmentally sensitive area such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters*. The floodplain will not be adversely modified, and the project will provide an alternate tsunami evacuation route, In general, geologic conditions impose no overriding constraints on the project, and it is not imprudent to construct in terms of geological hazard. The County of Hawai‘i recognizes that most of the surface of Hawai‘i Island is subject to eventual lava inundation, and that roadway infrastructure in places such as Hilo face risk geologically hazardous areas, or other such sensitive land is involved in the area planned for development.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No protected viewplanes will be impacted by the project, which will have no adverse scenic effects.

13. *The project will not require substantial energy consumption*. Energy will be required for construction, but the road will provide a shorter and more direct route for motorists to and from destinations, reducing energy use for motor vehicles. The project will also encourage walking and bicycling to and from UH Hilo.

Based on the findings above, and in consideration of oral and written comments received, the County of Hawai‘i, Department of Public Works has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and section 11-200-12 of the State Administrative Rules, and has issued a Finding of No Significant Impact (FONSI).

REFERENCES

AECOS, Inc. (AECOS). 1994. *An environmental reconnaissance survey of Waiakea Stream, Hilo, Hawaii for a sewerage crossing at U.H. Hilo*. Prep. for Engineering Concepts, Inc. AECOS No. 765A. Honolulu.

_____. 2002. *An Environmental Reconnaissance Survey of Waiakea Stream for the USDA Pacific Basin Agricultural Research Center on the Island of Hawai'i*. Prep. for SSFM Inc. AECOS No. 947A. Honolulu.

_____. 2009. *Stream biological and water quality surveys for the Waiākea Flood Control Project, Hilo, Hawai'i.* Prep. for Wil Chee Planning, Inc. AECOS No. 1198A. Honolulu.

Bird. I. 1974. *Six Months in the Sandwich Islands.* Rutland, VT.: Charles E. Tuttle Co.

Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai'i.* 2 vols. Honolulu: University of Hawai'i Press.

Handy, E.S.C., and E.G. Handy. 1972. Native Planters in Old Hawaii. *B.P. Bishop Museum Bulletin 233*. Honolulu: Bishop Museum Press.

Hawai'i County Department of Public Works (DPW). 2000. *Final Environmental Impact Statement, Puainako Street Extension and Widening Project*. 2000. Prep. in coop. with the U.S. Department of Transportation, Federal Highway Administration (FHWA), State of Hawai'i, Department of Transportation, Highways Division. Hilo, Hawai'i.

_____. 2004. *Kilauea Avenue/Kinoole Street Traffic Circulation and Improvement Study*. Prep. by the Traffic Management Consultant for DPW. Honolulu.

Hawai'i County Planning Department. 2005. *The General Plan, County of Hawai'i*. Hilo. http://www.hawaii-county.com/la/gp/toc.html

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

Hawai'i Department of Land and Natural Resources-Division of Aquatic Resources (DLNR-DAR). 2008. *Atlas of Hawaiian Watershed & Their Aquatic Resources. Island of Hawai'i, Hilo Region Watersheds, Wailoa River*. Available online at URLhttp://www.hawaiiwatershedatlas .com/watersheds/hawaii/82061.pdf. (Accessed June, 2012)

Hawai'i State Department of Transportation (HDOT). 1994. *Bike Plan Hawaii: A State of Hawai'i Master Plan*. Honolulu: HDOT. Updated 2003 online at http://hawaii.gov/dot/highways/Bike/bikeplan/index.htm (Accessed June 2012)

_____. 1998. *Hawai'i Long Range Highway Transportation Plan*. Rept. prep. in coop. with Hawai'i County Depts. of Public Works and Planning and U.S. Dept. of Transportation.

Hawai'i State Department of Transportation and U.S. Department of Transportation, Federal Highway Administration (HDOT&FHWA). 2011. *Highway Noise Policy and Abatement Guidelines*. April 25, 2011 and corrections dated November 29, 2011.

Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawaii*. Washington: U.S. GPO.

Kamakau, S. 1961. *Ruling Chiefs of Hawai'i*. Honolulu: The Kamehameha Schools Press.

Kelly, M., B. Nakamura, and Dorothy Barrére. 1981. *A Chronological History, Land and Water Use in the Hilo Bay Area, Island of Hawai'i*. Honolulu: Bishop Museum Press.

Maly, K.A. 1996. *Historical Documentary Research and Oral History Interviews: Waiākea Cane Lots (12, 13, 17, 18, 19, 20, and 2-A).* Kumu Pono Associates, Hilo, Hawai'i. On file at State Historic Preservation Division, Kapolei, Hawai'i.

McEldowney, H. 1979. *Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo, Hawaii*, Department of Anthropology, Bishop Museum. Prepared for the U.S. Army Engineer District, Pacific Ocean.

Moniz, J.J. 1992. Summary of Prior Archaeological Work: *Historical and Archaeological Synthesis of Land Use and Settlement Patterns Waiākea Ahupua'a. Hilo, Hawaii*. UH Anthropology 645. Historic Preservation, Fall 1992, Honolulu.

Thrum, T. 1923. *Hawaiian Almanac and Annual for 1924*. Honolulu.

U.S. Dept. of Commerce, Economics and Statistics Administration, Bureau of the Census, 2012, http://factfinder.census.gov/.

U.S. Fish and Wildlife Service (USFWS). 2012. *USFWS Threatened and Endangered Species System (TESS).* Washington: GPO. http://ecos.fws.gov/tess_public/StartTESS.do.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawai'i, State of Hawai'i.* Washington: U.S.D.A. Soil Conservation Service.

University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai'i*. 3rd ed. Honolulu: University of Hawai'i Press.

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i.* USGS Misc. Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 1
Public Involvement

Part 1a
Responses to Early Consultation

[This page intentionally left blank]

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Dora Beck, P.E.
Acting Director

Hunter Bishop
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

May 9, 2012

Mr. Ron Terry, Ph.D.
Project Environmental Consultant
Geometrician Associates, LLC
P. O Box 396
Hilo, HI 96721

RE: Early Consultation for Kapi'olani Street Extension Environmental Assessment
South Hilo District, Island of Hawai'i, TMKs: 2-4-001:019, 024, 120, 167, 179 and 183; 2-4-023:022 and 023; 2-4-028:014 and 032; 2-4-056:014, 015, 021, 022 and 028; 2-4-057:024

Dear Mr. Terry,

Please find enclosed comments from our Wastewater Division.

Thank you for allowing us to review and comment on this project.

Sincerely,

Dora Beck

Dora Beck, P.E.
ACTING DIRECTOR

enclosure

cc: WWD

County of Hawai'i is an Equal Opportunity Provider and Employer.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION

COUNTY OF HAWAII – 108 RAILROAD AVENUE – HILO, HI 96720
HILO (808) 961-8338 FAX (808) 961-8644

MEMORANDUM

Date: May 9, 2012

To: DORA BECK, P.E., Acting Director

Via: LYLE HIROTA, P.E., Acting WWD Chief

From: RIZ MANGAOANG, P.E., Acting Deputy WWD Chief

Subject: Early Consultation for Kapiolani Street Extension Environmental Assessment
South Hilo District, Island of Hawaii
TMKs (3) 2-4-001:019, 024, 120, 167, 179 and 183; 2-4-023:022 and 023;
2-4-028:014 and 032; 2-4-056:014, 015, 021, 022 and 028; 2-4-057:024

The Wastewater Division has received the request for early consultation regarding the Environmental Assessment for the proposed Kapiolani Street Extension. The WWD provides the following comments:

- Installation of a sewer collection system in conjunction with the Kapiolani Street Extension should be considered to service future wastewater flows anticipated by the development and occupancy of lands abutting the proposed connector road between Mohouli and Lanikaula Street.
    - Extension of the sewer system to service the proposed development would require approval of the County Council by resolution in accordance with Section §21-26.1 of the Hawai'i County Code (HCC).
    - Laterals would be required to be installed to the property line to provide service to each lot in accordance with Section §21-14 HCC and connection of the proposed structures to the public sewer would also be required in accordance with Section §21-5 HCC.
    - A sewer study would be required to determine the anticipated flows of the proposed development, properly size the collection system for the intended sewer basin, and analyze the adequacy of existing sewer mains to accept future wastewater flows.
    - The County of Hawai'i does not provide sewer capacity reservations for project developments. Connection to the County's sewer system is based on available capacity and provided on a first-come first-served basis.

Should you have any questions, please contact me at (808) 961-8279 or you may contact Mr. Lyle Hirota at (808) 961-8333. Thank you.

Riz Mangaoang, P.E.
Acting Deputy WWD Chief

cc: Lyle Hirota, P.E, Acting WWD Chief
Allan Simeon, P.E., DPW-Engineering

Hawai'i County is an equal opportunity provider and employer.

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawai'i 96721 rterry@hawaii.rr.com

April 18, 2012

Dear Agency or Organization Official or Neighbor:

Subject: Early Consultation for Kapiolani Street Extension Environmental Assessment, South Hilo District, Island of Hawaii, TMKs: 2-4-001:019, 024, 120, 167, 179 and 183; 2-4-023:022 and 023; 2-4-028:014 and 032; 2-4-056: 014, 015, 021, 022 and 028; 2-4-057:024

The County of Hawai'i, Department of Public Works, proposes to extend Kapiolani Street to provide a two-lane road connection between Lanikaula and Mohouli Street in Hilo, Hawai'i (see attached map). The project is planned to include the construction of concrete curb, gutter, and sidewalk, a concrete bridge across Waiakea Stream, drainage improvements, utility installation and relocation, intersection channelization and improvements, traffic signal systems, street lighting, retaining wall construction, property and driveway tie-ins and other related improvements. The project will provide access to undeveloped University of Hawai'i at Hilo lands, help alleviate traffic flow on Kilauea and Kinoole streets, and provide a bike and pedestrian route towards downtown from the University. As the project involves State of Hawai'i land and County of Hawai'i funds, an EA that complies with Chapter 343, Hawai'i Revised Statutes is required.

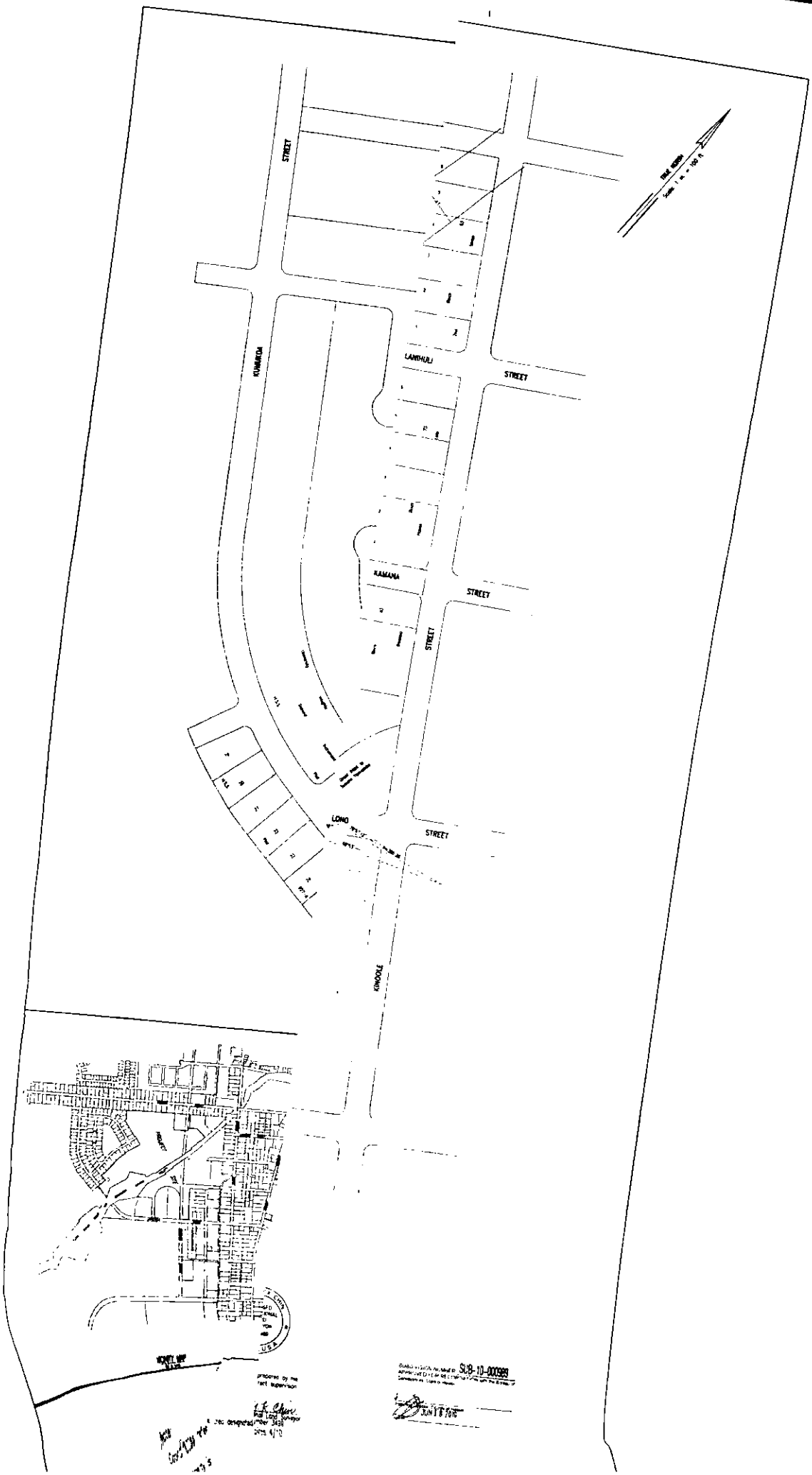
On behalf of the County of Hawai'i, I invite your comments on any special environmental conditions or impacts related to the project. Kindly indicate in your response letter whether you wish to receive notice of the availability of the Draft EA when it is completed. Please contact me at (808) 969-7090, or Allan Simeon of the County of Hawai'i at (808) 961-8925, if you have any questions or require clarification. We thank you in advance for your attention and cooperation.

Ron Terry

Ron Terry, Ph.D.
Project Environmental Consultant

attachment: Project Location Figure

RECEIVED
APR 19 2012
By


STREET
KUHAWIKA
LAMIHULI
STREET
KAMANA
STREET
STREET
LONO
STREET
KINOOLE
TRUE NORTH
Scale 1 in. = 100 ft.
HONEL MAP
SUB-10-000599
JUN 18 2010

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 14, 2012

Geometrician Associates
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment, South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024

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

At this time, enclosed are comments from (i) the Engineering Division, (ii) the Hawaii District Land Office, (iii) the Commission on Water Resource Management, and (iv) the Division of State Parks on the subject matter. Should you have any questions, please feel free to call Kevin Moore at (808) 587-0426. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 20, 2012

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__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 – Hawaii District
X Historic Preservation

RECEIVED
LAND DIVISION
2012 MAY 10 P 3:55
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII
'12 APR 24 AM 08:20 ENGINEERING

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 11, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: _____
Date: 5/10/12

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/LydiaMorikawa
Ref.: EarlyConsultationKapiolaniStExtension
Hawaii.559

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, A and AE. The Flood Insurance Program does not have any regulations for developments within Flood Zone X however; it does regulate developments within Zones A and AE as indicated in bold letters below.**

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

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

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

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

(X) **Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.**

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

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

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

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

(X) **Additional Comments:** **"PLEASE SEE ATTACHED"**

( ) Other: _____

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

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 5/18/12

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

Proposed Kapiolani Street Extension
South Hilo District, Hawaii

ADDITIONAL COMMENTS

For the proposed Kapiolani Street Extension, 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 concrete bridge across Waiakea Stream 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.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

2012 APR 24 P 1:33

RECEIVED
LAND DIVISION
HILO, HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 20, 2012

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__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 – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 11, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: [signature]
Date: 5/7/12

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

75 Aupuni Street, Room 204
Hilo, Hawaii 96720
PHONE: (808) 961-9590
FAX: (808) 961-9599

May 7, 2012

MEMORANDUM

TO: Russell Y. Tsuji, Administrator

FROM: Gordon C. Heit, Hawaii District Land Agent

SUBJECT: Early Consultation for Environmental Assessment for Hawai'i County Department of Public Works Kapiolani Street Extension

LOCATION: Hilo, Island of Hawaii, TMK: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, & 022; 2-4-057:024

APPLICANT: Geometrician Associates, LLC on behalf of Hawai'i County Department of Public Works

Pursuant to your request for comments on the above matter, we offer the following:

TAX MAP KEY	ENCUMBRANCE
3rd/ 2-4-001:0019	E.O. 2125 to the County of Hawaii for Wailoa River and Tributaries Control Project
2-4-001:024	Unencumbered
2-4-001:120	GL S-6019 Christ Lutheran Church
2-4-001:167	E.O. 4372 University of Hawaii at Hilo
2-4-001:179	GL S-5976 Hospice of Hilo
2-4-001:183	Unencumbered
3rd/ 2-4-056:14	Unencumbered
2-4-056:022	GL S-4610 Kamana, Inc.

The above State properties will be affected by the proposed Kapiolani Street extension as described in The County Public Works Department request for early consultation.

Please contact me should you have any questions.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 20, 2012

2012 APR 24 PM 4:17

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__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 – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

RECEIVED
LAND DIVISION
2012 APR 30 P 3:24
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 11, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

Stream Channel Alteration Permit required for new bridge across Waiakea Stream.

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

Signed: RKCHANG
Date: 4/27/12

cc: Central Files

FILE ID: RFD.3584.8
DOC ID: 9242

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

RECEIVED
STATE PARKS
'12 APR 23 P1:23
DEPT OF LAND & NATURAL RESOURCES

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 20, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 APR 30 P 3:23
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__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 – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 11, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: _____
Date: 4/27/12

cc: Central Files

HILO HIGASHI HONGWANJI MISSION
216 MOHOULI STREET • HILO, HAWAII 96720 • PHONE (808) 935-8968

April 30, 2012

Mr. Ron Terry, Ph.D.
Geometrician Assoc., LLC
P.O. Box 396
Hilo, HI 96721-0396

Dear Mr. Terry

Subject: **Early consultation for Kapiolani Street Extension EA**
South Hilo District, Island of Hawaii, TMK: various

Our property is located on the makai Hamakua (northeasterly) corner of the Kapiolani-Mohouli street intersection. We have the following comments or concerns regarding the proposed project and its impact at this intersection:

1) Will the roadway be widened and require the taking of property from either the Mohouli or Kapiolani Street frontages? If at all possible we would prefer no taking of property.

2) If property is taken will the fencing and tile walls be replaced and at what price will property be purchased?

3) Will improvements include curb, gutters and sidewalks along Mohouli street?

4) There are currently striped parking stalls along Kapiolani Street. Are these stalls to be removed?

5) Will the County be installing any drainage improvements at the intersection?

6) What is the timetable for the start and completion of construction?

7) What is the anticipated increase in traffic for both streets?

With regards to the Draft EA we would like to be notified when it is completed. We would not mind receiving an electronic copy of this document. You can contact us at hilohigashi@gmail.com and address correspondence to Mr. Roy Hamakawa, President. Our address and phone number are listed at the top of our letterhead.

Yours truly,

Roy Hamakawa
President

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:
12-077 Kapiolani St.

April 24, 2012

Mr. Ron Terry, Ph.D.
Geometrician
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Early Consultation for Kapiolani Street Extension Environmental Assessment, South Hilo District, Island of Hawaii, TMKs: 2-4-001: 019, 024, 120, 167, 179 and 183; 2-4-023: 022 and 023; 2-4-028: 014 and 032; 2-4-056: 014, 015, 021, 022 and 028; 2-4-057: 024

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated April 18, 2012. Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

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

Sincerely,

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

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

May 1, 2012

Mr. Ron Terry
Geotmetrician Associates, LLC
PO Box 396
Hilo, Hawai'i 96721

SUBJECT: EARLY CONSULTATION FOR KAPIOLANI STREET EXTENSION ENVIRONMENTAL ASSESSMENT
SOUTH HILO DISTRICT, ISLAND OF HAWAII
TAX MAP KEYS: 2-4-001:019, 024, 120, 167, 179 and 183; 2-4-023:022; 2-4-028:014 and 032; 2-4-056:014, 015, 021, 022 and 028; 2-4-057:024

We have no comments to offer at this time in reference to the above-mentioned Early Consultation for Environmental Assessment.

DARREN J. ROSARIO
Fire Chief

RP:lpc

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

April 30, 2012

Mr. Ron Terry, Ph.D., Principal
Geometrician Associates
Project Environmental Consultant
P. O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

SUBJECT: EARLY CONSULTATION FOR KAPIOLANI STREET EXTENSION ENVIRONMENTAL ASSESSMENT, SOUTH HILO DISTRICT, ISLAND OF HAWAII, TMKs: 2-4-001:019, 024, 120, 167, 179 and 183; 2-4-023:022 and 023; 2-4-028:014 and 032; 2-4-056: 014, 015, 021, 022 and 028; 2-4-057:024

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or other public safety concerns. We are not requesting a copy of the Draft EA when completed.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Robert Wagner, S. Hilo Patrol Commander, at 961-2214.

Sincerely,

HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

RW:lli
120241

Terence & Joan Yamamoto
2527 Rainbow Drive
Honolulu, Hawaii 96822

May 1, 2012

Ron Terry, Ph.D
Project Environmental Consultant
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

RE: Early Consultation for Kapiolani Street Extension Environmental Assessment, South Hilo Distl'ict, Island of Hawaii, TMK No.: 2-4-057:024

Dear Dr. Terry:

This is in response to your letter dated April 28, 2012, wherein you invited our comments on any special environmental conditions or impacts related to the above-referenced project, and that we indicate whether we would like to receive notice of the availability of the DRAFT EA when it is completed.

We do not have any comments at this time. However, we do have one question concerning the project and would like to request that we be given notice of the availability of the DRAFT EA when it is completed. We may have comments at that time.

Our question pertains to the nature and extent of the "land acquisitions for 60-feet right-of-way improvements" at the intersection of Lanikaula St. and the existing Kepiolani Street. We are co-owners of the corner lot at this intersection across from the UH Hilo campus, and would appreciate it if you would advise whether the "land acquisitions for 60-feet right-of-way improvements" contemplates the acquisition of land from our parcel of land and/or the UH Hilo campus parcel, or both. The enclosed map that you provided with your letter does not clearly indicate what is contemplated.

I note that the enclosed tax map indicates that there already is an existing 60 foot-wide right-of-way for the currently existing Kapiolani Street. We would appreciate any clarification you may be able to provide about what is indicated on your Plan sheet and the "land acquisitions for 60-feet right-of-way improvements" reference.

Thank you.

Sincerely,

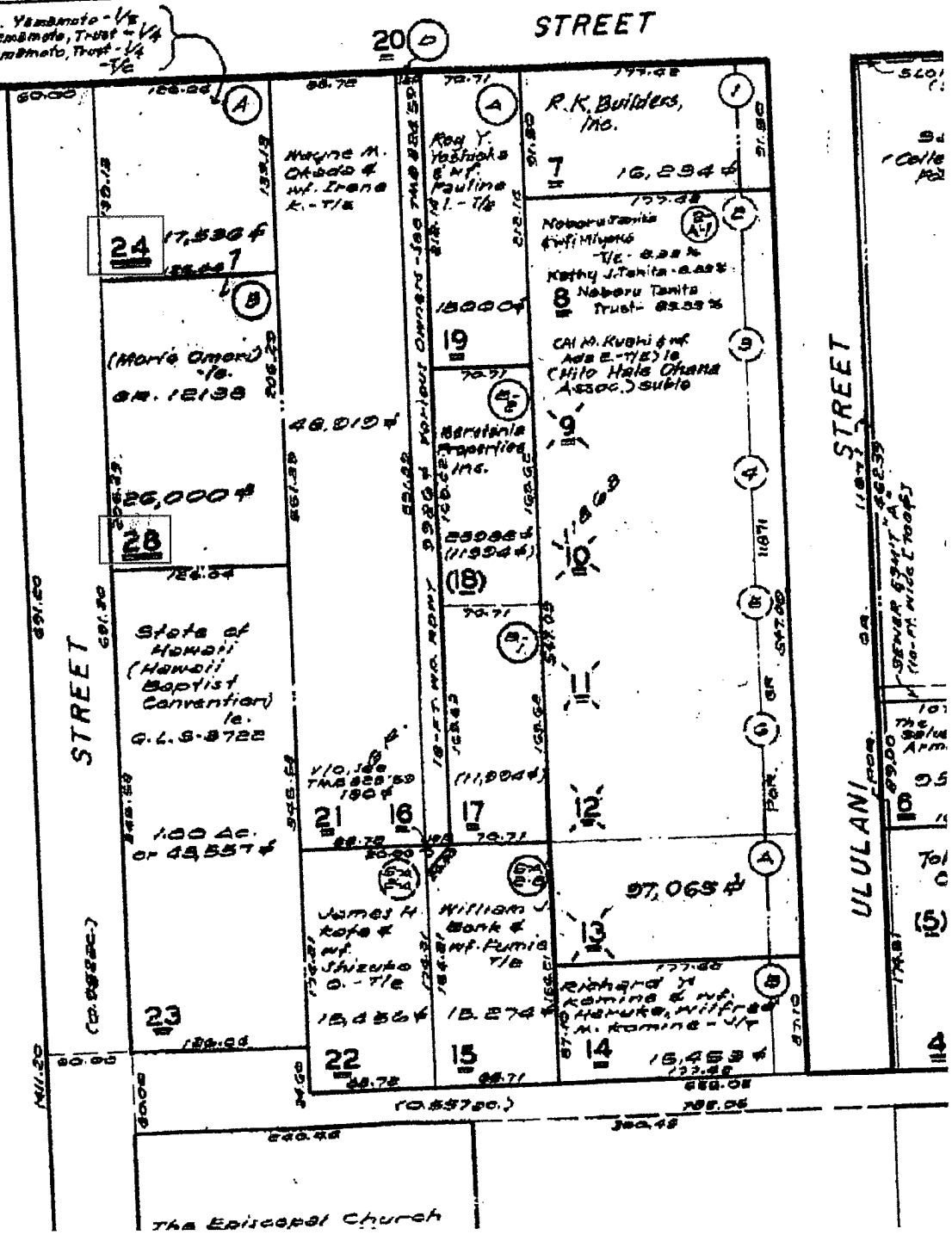
Terence Yamamoto

Encl. (2)
cc: Ms. Deborah Talbot & Family

56

sity of Hawaii)
ANCH

07



William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i

PLANNING DEPARTMENT

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

May 15, 2012

Mr. Ron Terry
Geometrician Associates, LLC
PO Box 396
Hilo, HI 96721

Dear Mr. Terry:

SUBJECT: Pre-Consultation for Draft Environmental Assessment
Project: Kapiolani Street Extension
TMK: (3) 2-4:001:182 and (3) 2-4-056:029; South Hilo, Hawai'i

Thank you for your letter dated April 18, 2012, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the subject project.

The County of Hawai'i, Department of Public Works, proposes to extend Kapiolani Street to provide a two-lane road connection between Lanikaula and Mohouli Street in Hilo, Hawai'i. The project is planned to include the construction of concrete curb, gutter, and sidewalk, a concrete bridge across Waiakea Stream, drainage improvements, utility installation and relocation, intersection channelization and improvements, traffic signal systems, street lighting, retaining wall construction, property and driveway tie-ins and other related improvements.

On June 18, 2010, our office issued final subdivision approval for the "UH Hilo Kapiolani Street Extension" (SUB 10-000989). The purpose of the subdivision was to set aside lots for the future extension of Kapiolani Street. Please note the tax map key (TMK) numbers listed above that were assigned to the subject roadway lots.

According to the County of Hawai'i General Plan 2005 (amended December 2006), the subject area is designated as High Density Urban by the Land Use Pattern Allocation Guide. Also, the subject area is not located within the Special Management Area (SMA).

We have no further comments to offer, at this time. However, please provide our department with a copy of the Draft Environmental Assessment for our review and comment.

If you have any questions, or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,

for BJ LEITHEAD TODD
Planning Director

BJM:cs
P:\wpwin60\Bethany\EA-EIS Review\preconsultdraftea Kapiolani Street Extension.doc

Dr. Terry:

I am writing regarding the Early Consultation for Kapiolani Street Extension Environmental Assessment (FWS 2012-TA-0272). Below are my comments are the proposed project:

The endangered Hawaiian hoary bat (Lasiurus cinereus semotus) may occur within the proposed project area. Hawaiian hoary bats roost in exotic and native woody vegetation at heights greater than 15 feet. If trees or shrubs suitable for bat roosting are cleared during the bat breeding season, there is a risk that breeding bats could inadvertently be harmed or killed. Young bats, which are incapable of flight, are particularly vulnerable during the bat-birthing and pup-rearing season (June 1 through September 15). To minimize potential impacts to the Hawaiian hoary bat, woody plants greater than 15 feet tall should not be removed or trimmed between June 1 and September 15 throughout the development and ongoing operation of the proposed project.

The endangered Hawaii hawk (Buteo solitarius) may be present within the project area. To avoid impacts to Hawaiian hawks we recommend not clearing any brush or trees during their breeding season (March through September). If you are unable to avoid clearing vegetation during these months, we recommend you conduct surveys for nests prior to any clearing activity. Please contact our office for survey methodology and recommendations for avoiding impacts to nests.

Since the proposed project includes construction of a concrete bridge across Waiakea Stream surveys for endangered Hawaiian waterbirds should be conducted in wetland habitats where waterbirds may be present. Our office can be contacted for appropriate survey protocol. In addition, I have copied below our Recommended Standard Best Management Practices for in-water work.

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

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

1. Turbidity and siltation from project-related work shall be minimized and contained 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 special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat 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.) or on beach habitats.

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 introduction, attraction of non-native pests, etc.) of adjacent habitats (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 <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.).

Please let me know if you have any further questions.

Rachel

Rachel Rounds
Fish and Wildlife Biologist
Consultation and HCP Program
US Fish and Wildlife Service
Pacific Islands Field Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850
(808) 792-9454

PUBLIC COMMENT SHEET

KAPI'OLANI STREET EXTENSION

Your comments and suggestions will assist in the responsible development of this roadway project under consideration at this Public Meeting. Space is provided below to write out any comment you may wish to make. Please hand in your statement during this meeting or, if you prefer, mail to the address printed below. We would like to receive your comments by July 1, 2012 in order to ensure they are considered in the Draft Environmental Assessment.

COMMENT OR STATEMENT

SEE ATTACHED

Notice: Copies of all comments provided are available to the public under the Freedom of Information Act. This will include names, address, and any other personal information provided with the Comments. Your comments will be considered with or without the following optional information (please pint):

Name GALEN M. KUBA (gmkuba@hawaii.rr.com)

Address 393 NOE ST., HILO, HI 96720

Representing SELF

Mailing Address: County of Hawai'i
Department of Public Works
Engineering Division
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, HI 96720
Attn: Allan Simeon

12-02956

1. **EVACUATION ROUTE:** Elaborate why the Extension is needed as an evacuation route when the FEMA Flood maps show Ululani, Kinoole & Kilauea to be outside of the Tsunami Inundation area. Further, after the 1960 tidal wave, virtually all residents in Hilo and Waiakea towns, with perhaps a few exceptions, had been relocated to the Waiakea Uka area. Consequently, believe evacuation efforts of downtown Hilo has been greatly minimized and does not justify the construction of this Extension for this purpose.
2. **KAPIONI BETWEEN MOHOULI STREET AND WAIANUENUE AVENUE:**
    a. Kapiolani is a one way street between Waianuenue Avenue and Haili Street in the southerly direction on Sundays and during the morning on school days, so is of limited value as cross town connector.
    b. Except between Mohouli and Wailoa Streets, Kapiolani is a 2-lane road that is too narrow to provide a bike lane without the removing on street parking. Bicycle traffic must share the travel lane with vehicles.
    c. Kukuau Street intersects Kapiolani at an acute angle. Because Kukuau is narrow, turning movements are awkward and difficult.
3. **KAPIOLANI BETWEEN KAWILI AND LANIKAULA STREETS:**
    a. This portion of Kapiolani seems to be offset from the center line of the r-o-w resulting in a very awkward intersection with Lanikaula for motorists, pedestrians and bicyclists. The problem is further exacerbated by a catch basin on the mauka (west) side that is a hazard to motorists.
    b. Kapiolani is a 2-lane road with no usable shoulders. There are no facilities for pedestrians, disabled or bicycles.nans , sidewalks or bicycles.
    c. There is a section of wide shoulder fronting University Palms but is used by students as a parking area. Vehicles are parking perpendicular to the travelway.
    d. Kapiolani is subject to flooding during significant storm events. Runoff appears to be generated by hard surfaces in adjoining areas of the UHHC.
    e. There is a mid-block County bus shelter adjacent to the UHHC parking lot. Buses stop at this location in both the Hilo and Puna directions. There is no X-walk so riders who cross Kapiolani do so at their own risk. Recommend contacting the County bus officials to determine impacts of existing and future bus traffic on Kapiolani.
4. **BRIDGE CROSSING:** The bridge will cross the Wailoa Flood Control. Hydraulically, the bridge must meet with the approval of the Army Corps of Engineers as well as obtaining FEMA approval should the bridge alter the FIRM.
5. **TRAFFIC STUDY:** Would like to see details of study effort. How this project will ease future traffic congestion in Hilo when Kapiolani dead ends at Kawili Street. DPW did a Traffic Circulation Study for Kinoole St. and Kilauea Avenue by The Traffic Management Consultant as it believed that a one-way couplet would be the most cost effective means to relieve traffic congestion in the future.
6. **COMMUNITY INPUT:** Though EJ compliance may not be requirement, believe should still meet with the residents of Lanakila Housing to solicit input and keep them informed about this project
7. **PROJECT PHASING:** Any plans to extend Kapiolani between Lanikaula and Mohouli must also include provisions to improve the segment between Kawili and Lanikaua. To realistically

accomplish this, the project should be phased. Phase 1 may begin with the widening and improvement of Kapiolani from Kawili to Lanikauala and its extension up to the Wailoa Flood Control. Phase 2 would then include the bridge and extension to Mohouli Street. Though there may be other permutations to a phasing plan, any plan should incorporate the Kawili/Lanikaula portion **before** the extension is completed. Phasing would also give the County (and/or State) to secure additional funds as current funding seems to be inadequate.

[This page intentionally left blank]

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 1
Public Involvement

Part 1b
Materials Related to June 6, 2012 Public Meeting

[This page intentionally left blank]

PUBLIC INFORMATIONAL MEETING FOR THE PROPOSED KAPIOLANI STREET EXTENSION

Please join us to learn more about the project and provide your comments

WEDNESDAY, JUNE 6, 2012
County of Hawaii Aupuni Center Conference Room
101 Pauahi Street, Hilo, HI 96720
Table Top Presentations 6:00 p.m. - Formal Presentation at 6:30 p.m.

The County of Hawaii Department of Public Works (DPW) wants your input. DPW is proposing the Kapiolani Street Extension which will extend Kapiolani Street from Lanikaula Street to Mohouli Street. The 0.5 mile extension will improve traffic flow on Kilauea Street and Kinoole Street, provide an alternative evacuation route during tsunami, and provide a bike and pedestrian route. The project may include the construction of a concrete bridge across Waiakea Stream, drainage improvements, utility installation and relocation, channelization, traffic signal systems, and appropriate intersection improvements. An Environmental Assessment will be completed to assess impacts and identify mitigation measures.

For information and special accommodations, auxiliary aid and/or services to participate in this meeting (i.e. sign language interpreter, large print), please call (808) 961-8321.

http://www.hawaiicounty.gov/public-works/

KAPIʻOLANI STREET EXTENSION
PUBLIC INFORMATION MEETING NO. 1
Aupuni Center Conference Room
June 6, 2012

6:00 PM **OPEN HOUSE PORTION**

Station 1: Project Location Map
- Roadway Corridor and Proposed Typical Section

Station 2: Environmental Flowchart
- Board 4 – Environmental Flowchart

6:30 PM **FORMAL PRESENTATION**

Welcome and Introduction

Project History and Description

Project Process & Schedule

Progress to Date

7:00 PM **Next Steps and Closing**

Question and Answer Session

SSFM INTERNATIONAL

COUNTY OF HAWAII — STATE OF HAWAII

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension
DATE: June 6, 2012
PURPOSE: Public Informational Meeting No. 1
MEETING SITE: County of Hawaii, Aupuni Street Complex, Conference Room

	Name	Organization or Address	Phone	Email
1	Rodney Oshiro	—	—	—
2	Debra Nakaji			
3	ALBERT NAKAJI		964.5039	waltz@hawaiiantel.net
4	WANNIE SUBICA	IMATA & ASSOC	937-9103	
5	Rayelle Subica	" "	" "	—
6	Allan Simen	DPW - ENG		
7	Delani Osorio	Biglsland Housing Foundation	969 3327	
8	BRIAN SHIMON	~~[illegible]~~ WAIAKEA	AKA Bible Church 756	6471
9	Bill Walter	WeBC (Shipman)		
10	Thomas Roth	"	965-5770	

DATE: June 6, 2012

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension

LOCATION: County of Hawaii, Aupuni Street Complex, Conference Room

PURPOSE: Public Informational Meeting No. 1

	Name	Organization or Address	Phone	Email
11	M/M ROBERT USAGAWA	27 HOOMALA ST. HILO 96720 (Pr 237 MOHOULI ST)	959-6941	robert.usagawa@hawaiiantel.net
12	LESLIE ISEMOTO	ISEMOTO CONTRACTING 648 PIILANI, HILO	935-7194	ieclese@ilhawaii.net
13	GALEN KUBA	393 NOE ST. HILO, HI	896 1306	gmkuba@hawaii.rr.com
14	Gayle Cho	Hawaii CC	256-9746	gaylec@hawaii.edu
15	Earl Fujishige	Waiakea Uka Bible Church	987-0295	efujishi@yahoo.com
16	MARK NAKASHIMA	STATE HOUSE	586-6680	repnakashima@hawaii.gov
17	Harvey Taira	Suisan Co.	937-8609	harveyt@suisan.com
18	Dinnie Kysar	Destination Hilo	963-5091	cldymoon@hawaiiantel.net
19	Gary Kysar	Christ Lutheran Church	963-5091	" "
20	R MARGADANT	108 RAILROAD AVE	961-8279	rmargadant@cahawaii.com
21	Norman Stetteland	409 Pohakulani	959-4031	
22	Larry Black	104 Kapaa St.	969.7011	
23	Ian Sakai	Waiakea Uka Bible Church 187 Ainako Ave.	961-0037	songsakai@yahoo.com
24	Song Sakai	" " "	" "	songsakai@yahoo.com
25	Rachel Jeff Axelbank	44-3283 Konopa Mauka Rd Honokaa	339-5773	rachel@rachelandjeffaxelbank.com
26	Greg Ayau	Bank of Hawaii	854-2015	

DATE: June 6, 2012

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension

LOCATION: County of Hawaii, Aupuni Street Complex, Conference Room

PURPOSE: Public Informational Meeting No. 1

	Name	Organization or Address	Phone	Email
27	Harry Yada	UH Hilo	933-3267	hyada@hawaii.edu
28	Hugh H Willocks	Willocks Const. Co	938-2370	hughh@hwilocks hawaii.com
29	Susan Gagorik	Planning Dept.	961-8154	sgagorik@co.hawaii.hi.us
30	Harvey Helene Tajiri	569 Puloku Hilo	960-6287	helene96720@gmail.com
31	Miles Yoshioka	Hi Island Chamber of Comm.	935-7178	admin@hicc.biz
32	Sandy Anderson	702 Huewa Pl Hilo	925 262-9973	
33	Jim Anderson	702 Huewa Pl. Hilo	925-262-9973	
34	Helen Hemmes	333 Kalili St	808-935-6214	hemmesh@hawaiiantel.net
35	Bob Rechtman	Rechtman Consulting LLC	969-6066	bob@rechtmanconsulting.com
36	~~Amy Miwa~~	~~COH.~~ Duplicate		
37	Brenda Ho	Hospice of Hilo - Hilo	969-1733	brendah@hospiceofhilo.org
38	DAN KUNERT	1092 W KAWAICANI ST	959-9953	dkunato@yahoo.com
39	BOB Williams	~~Hawaii Island~~ Veterans, LLC	961.5764	bobwilliams63@msn.com
40	Boyd Belchie		935-4216	dhbelchie@gmail.com
41	Daniel Belchie		935-4216	"
42	Barry Mark	Ameriprise Financial	933-9606	barrymark@hawaiiantel.net

DATE: June 6, 2012

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension

LOCATION: County of Hawaii, Aupuni Street Complex, Conference Room

PURPOSE: Public Informational Meeting No. 1

	Name	Organization or Address	Phone	Email
43	Gerald DeMello	381 Hili ✓	961-2128	gmello@hawaii.edu
44	Larry Chang	State House	586-6120	repchang@capitol.hawaii.gov
45	Mary Begier	101 Aupuni #315	935-0737	mary@marybegier.com
46	FRED YAMASHIRO	TO LAND OF HAWAII 96720	960-2416	fred.yamashiro@gmail.com
47	Ken Goodenow	Self		goodenowe@hawaiiantel.net
48	Donald Ikeda	25 Aupuni st Hilo county council	961-8015	dikeda@co.hawaii.hi.us
49	Amy Miwa	✓	✓	amiwa@co.hawaii.hi.us
50	FRESH ONISHI	✓		
51	[illegible]			
52	Robert Nishimoto	Self	935-0814	nishicost888@gmail.com
53	Jeff Melrose	Island Planning	969-8322	jeff@isleplan
54				
55	Koelani Willington	COH		
56	Warren Lee	COH		
57	Brandon Gonzalez	COH		
58				

KAPIʻOLANI STREET EXTENSION
PUBLIC INFORMATION MEETING NO. 1
Aupuni Center Conference Room
June 6, 2012
MEETING NOTES

Comments and questions during the Open House and Q&A session focused on the following issues:

- Many comments that project should include a sewer line with adequate capacity to serve potential users as part of road construction project, perhaps in partnership with UH Hilo
- Suggestion that bike lanes definitely be included
- Opinion that sewer line should be on mauka side of Kapiolani Street
- Question on source of funding and whether project would actually be built
- Question on timetable for completion
- Landscaping with large trees to provide attractive appearance and plants that will provide erosion protection on slopes
- Concern with motorists parking on bike lanes
- Question on whether parking would be allowed on street
- Comment on need for bus pullout and influence of buses on traffic
- Question on necessity of doing hydraulic studies, particularly when so many have been done for Waiakea Drainage
- Comment that the Nowelo Street bridge required a Department of Army 404 permit, so our bridge, which is downstream, may require one as well; team needs to work early with U.S. Army Corps of Engineers
- Question on whether there was early indication of any serious environmental concerns
- Comment that project should assist University in next steps to make Kapiolani Street between Lanikaula and Kawili workable for pedestrians, cyclists, motorists, and property owners
- Concern for access to adjacent proposed uses, including a church behind the YMCA and new units for the Big Island Housing Foundation
- Clarification of information presented by team that the undeveloped State land is under the jurisdiction of DLNR and not yet assigned to UH Hilo

[This page intentionally left blank]

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 1
Public Involvement

Part 1c
Comments to Draft EA and Responses

[This page intentionally left blank]

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

August 22, 2012

Mr. Ron Terry
Geometrician Associates
PO Box 396
Hilo, HI 96721

Dear Mr. Terry,

SUBJECT: KAPIOLANI STREET EXTENSION
TMK: (3RD) 2-4-001:019, 024, 120, 167, 179, 181, 182 AND 183; 2-4-023:009-010, 024-026,; 2-4-025:014-015 AND 032; 2-4-056:004-006, 014-015, 021-022, 028-029 AND 030; 2-4-057:024, 025 AND 028.

The Hawai'i Fire Department does not have any comments to offer at this time regarding the above-referenced draft Environmental Assessment.

Thank you for the opportunity to comment.

Sincerely,

DARREN J. ROSARIO
Fire Chief

KT:lc

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

Darren J. Rosario, Chief
Hawai‘i County Fire Department
25 Aupuni Street
Hilo HI 96720

Dear Chief Rosario:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawai‘i

Thank you for your comment letter on the Draft EA dated August 22, 2012, in which you stated that your agency had no comments to offer at this time. We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
SUMNER ERDMAN
LORETTA J. FUDDY, A.C.S.W., M.P.H.
NEAL S. FUJIWARA
JONATHAN STARR
TED YAMAMURA

WILLIAM M. TAM
DEPUTY DIRECTOR

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

August 29, 2012

Ref.: RFD.3584.8

Mr. Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

Request for Determination
Draft Environmental Assessment for
Kapiolani Street Extension, Waiakea Stream
South Hilo, Hawaii, TMK: (3) 2-4-010:019

We are responding to your request to the Commission on Water Resource Management (Commission) regarding the Draft Environmental Assessment for Kapiolani Street Extension, Waiakea Stream in South Hilo, Hawaii (TMK: (3) 2-4-010:019).

The Commission 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), Hawaii Revised Statutes (HRS), Chapter 174C, and Hawaii Administrative Rules Chapter 13-169 (Protection of Instream Uses of Water).

Under HRS §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 as a "watercourse with a definite bed and banks which periodically or continuously contains flowing water." HRS §174C-3. 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 the bridge will be a clear span bridge across a lined flood control levee for Waiakea Stream at this location.

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.

If you have any questions, please contact Robert Chong in the Stream Protection and Management Branch at (808) 587-0266, or robert.k.chong@hawaii.gov.

Very truly yours,

WILLIAM M. TAM
Deputy Director

c.: Hawaii County Department of Public Works

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

William M. Tam, Director
Hawai‘i State Commission on Water Resource Management
P.O. Box 621
Honolulu HI 96809

Dear Mr. Tam:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawai‘i

Thank you for the comment letter dated August 29, 2012, indicating that based on the information provided, the Commission will not require a Stream Channel Alteration Permit (SCAP) for the proposed project, because the bridge will be a clear span bridge across a lined flood control levee for Waiakea Stream at this location. In response to your statement that the project may require other agency approvals, please note that the County is coordinating with a number of other State, County and federal agencies on this matter.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

Japanese Chamber of Commerce & Industry of Hawaii

Aug. 28, 2012

Allan Simeon
County of Hawaii Dept. of Public Works, Engineering Division
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, HI 96720

Dear Allan:

The Japanese Chamber of Commerce & Industry of Hawaii (JCCIH) would like to go on record to support the Kapi'olani Street extension project. In addition to improving traffic flow in the surrounding areas and providing an alternate evacuation route, this project will open up access to several acres of land owned by the University of Hawaii at Hilo (UHH).

UHH is a tremendous asset to our community and island, and has the potential to continue to grow and better serve the educational needs of students throughout our state, inclusive of Mainland and international students. Completing this extension will help ease traffic flow around the UHH campus and open up their lands along the proposed route of this extension.

We strongly urge approval of this project so it can move forward in a timely manner.

If there are any questions, feel free to contact our office at (808) 934-0177 attention: Government Affairs Committee Chair.

Sincerely,

Jon J. Arizumi
JCCIH, President

Carol A. VanCamp
JCCIH, Government Affairs Committee, Chair

714 Kanoelehua Avenue • Hilo, Hawai'i 96720
Telephone: 808-934-0177 • Fax: 808-934-0178
email: jccil@jccih.org • www.jcci.org

12-043

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

Jon J. Arizumi, President, and
Carol A. VanCamp, Government Affairs Committee Chair
Japanese Chamber of Commerce & Industry of Hawaii
714 Kanoelehua Avenue
Hilo HI 96720

Dear Mr. Arizumi and Ms. VanCamp:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawai‘i

Thank you for the comment letter dated August 28, 2012, providing your organization’s support based on your assessment that it can improve flow in the surrounding areas, provide an alternate evacuation route, and open up access for the University of Hawai‘i at Hilo and thus better serve the educational needs of students.

We very much appreciate your review of the document and your attendance at informational meetings. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 18, 2012

Geometrician Associates
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment and Anticipated FONSI for Kapiolani Street Extension, County of Hawaii, Department of Public Works, Applicant, South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024

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

At this time, enclosed are comments from (i) the Hawaii District Land Office, and (ii) the Division of Forestry and Wildlife on the subject matter. Should you have any questions, please feel free to call Kevin Moore at 587-0426. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

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

2012 AUG 24 P 1:48
RECEIVED
LAND DIVISION
HILO, HAWAII

August 23, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 SEP -7 A 10:13
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment and Anticipated FONSI for Kapiolani Street Extension
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

One copy of the above referenced document is available for review at the Land Division office in Honolulu. It is also available on line at: http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2012-08-23-HA-DEA-AFNSI-Kapiolani-Street-Extension.pdf. We would appreciate your comments on this document. Please submit any comments by September 17, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

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

Signed: [signature]
Name: GORDON C. HEIT
Date: 9/6/12

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

75 Aupuni Street, Room 204
Hilo, Hawaii 96720
PHONE: (808) 961-9590
FAX: (808) 961-9599

September 6, 2012

MEMORANDUM

TO: Russell Y. Tsuji, Administrator

FROM: Gordon C. Heit, Hawaii District Land Agent

SUBJECT: Draft Environmental Assessment for Hawai'i County Department of Public Works Kapiolani Street Extension

LOCATION: Hilo, Island of Hawaii, TMK: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, & 022; 2-4-057:024

APPLICANT: Geometrician Associates, LLC on behalf of Hawai'i County Department of Public Works

Pursuant to your request for comments on the above matter, we offer the following:

TAX MAP KEY	ENCUMBRANCE
3rd/ 2-4-001:0019	E.O. 2125 to the County of Hawaii for Wailoa River and Tributaries Control Project
2-4-001:024	Unencumbered
2-4-001:120	GL S-6019 Christ Lutheran Church
2-4-001:167	E.O. 4372 University of Hawaii at Hilo
2-4-001:179	GL S-5976 Hospice of Hilo
2-4-001:183	Unencumbered
3rd/ 2-4-056:14	Unencumbered
2-4-056:022	GL S-4610 Kamana, Inc.

The above State properties will be affected by the proposed Kapiolani Street extension as described in The County Public Works Department draft environmental assessment. All unencumbered properties, or portions thereof will require set aside to the County of Hawaii for roadway purposes. All encumbered State properties (leases and Executive Orders) identified in the DEA will require the withdrawal of any portions identified within the Kapiolani Street extension and set aside to the county for roadway purposes.

Please contact me should you have any questions.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 23, 2012

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment and Anticipated FONSI for Kapiolani Street Extension
LOCATION: South Hilo, Hawaii; TMKs: (3) 2-4-001:019, 024, 120, 167, 179 & 183; 2-4-023:022 & 023; 2-4-028:014 & 032; 2-4-056:014, 015, 021, 022 & 028; and 2-4-057:024
APPLICANT: Geometrician Associates, LLC for County of Hawaii, Department of Public Works

One copy of the above referenced document is available for review at the Land Division office in Honolulu. It is also available on line at: http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2012-08-23-HA-DEA-AFNSI-Kapiolani-Street-Extension.pdf. We would appreciate your comments on this document. Please submit any comments by September 17, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

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

Signed: K L Imoto
Name: Roger H. Imoto
Date: 8/27/12

cc: Central Files

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

Russell Y. Tsuji, Administrator
Hawai‘i State DLNR Land Division
P.O. Box 621
Honolulu HI 96809

Dear Mr. Tsuji:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawai‘i

Thank you for your comment letter dated August 23, 2012, on the Draft EA. We first wish to acknowledge the no-comment by the Division of Forestry and Wildlife. In regard to the memo from the Hawai‘i District Land Division, the Final EA has been amended to include the information on property encumbrances that you have provided in Appendix 9, which lists affected properties, their owners and the nature of the effect.

We very much appreciate your review of the document, including circulation to various DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

KAPIOLANI STREET EXTENSION - DRAFT ENVIRONMENTAL ASSESSMENT

I would like to offer commentary on how this project fulfills the Complete Streets (CS) mandate, but will have to defer until such time as the policy document is available.

It appears that this project meets some of the CS goals by providing sidewalks and bike lanes. However, it must be clearly understood that sidewalks do not necessarily accommodate all pedestrians and bike lanes do not accommodate all bicyclists. This is especially pertinent in Hawaii County where driving a motor vehicle is not the primary mode of transportation for half of the population.

In the interest of general CS principles and value engineering concepts, please consider the following recommendations:

1) Asymmetric Design – place a single 5-foot wide sidewalk on one side and a standard AASHTO Shared-Use Path (SUP) on the opposite side. This accommodates all non-motorized modes, (including roller, rollerblades, toy bikes, and skates skateboards – often restricted) while reserving the bike lanes for more skilled bicyclists and mopeders.
2) Integrated Bike Lane Gutter Pan – provide a monolithic smooth surface (no broom ridges or grooves) that reduces road width and material cost while providing a superior accommodation for bicyclists. When used in conjunction with asphalt travel lanes narrowed lane perception induces traffic calming. Successfully applied on Palani Road (Kona – 2012).
3) Rolled Curbs – apply at driveway aprons to increase the level walking surface on sidewalks. Successfully utilized in various subdivisions and used near front entrance to Target (Hilo – 2012).
4) Spillway inlets – redesigned drainage inlets will provide adequate drainage while creating a better facility for bicycles by reducing the hazard area. Successfully applied on Ane Keohokalole Highway (Kona – 2012).
5) Raised Crosswalks – placed at driveways, parking entry, commercial areas, and residential or local roads and adding sinusoidal approaches for travel lanes. This emphasizes the pedestrian zone along sidewalks by providing a superior level "path of travel" that accommodates both those with disabilities and without. It fully complies with ADA (28 CFR Part 36) and significantly reduces cost compared to curb ramps.
6) Matched Right-of-way – simply reduces the amount of land required for the same LOS for motor vehicles, pedestrians and bicyclists. Wider right-or-way is always required at intersections while narrower cross-sections will reduce costs between intersections. Successfully integrated into Ma`a Way (Kona 2012).
7) Colored Bike Box and Bike Detection – placed at major intersections provide opportunity for traffic and bicycles to maneuver together more safely and efficiently at intersection. NACTO provides examples. MUTCD has not delegated a color yet – Light blue is suggested to provide contrast with both ac and Pcc surfaces and white pavement markings.

Network Integration – in addition to Bike Plan Hawai`i and intersections shown in Draft EA, a future connection should be allocated in the design for a pathway along the Wailoa drainage channel. Actual construction may be deferred, but planning and design must be done now.

Thank you,

Bob Ward
77-6526 Ho`olaupa`i St.
Kailua Kona, HI 96740
rgward007@hawaii.rr.com

Aloha Allan and Ron,

I would like to be able to offer comments on the Kapiolani Street Extension - especially on how this project fulfils Complete Streets. I have reviewed Act 54 of 2009 (the Hawai`i State Complete Streets law); HRS 264-20.5 (the codification of the Complete Streets law); Hawai`i County Council Resolution 171-11 - dated 10/18/2011 (supporting Complete Streets); and the County DPW report - dated 04/11/2012 (listing Complete Street projects). However, I have not yet found the County Complete Streets Policy.

I absolutely want to support development of this project and how it can provide Connectivity and accommodate Transportation Choices. So I am sure you understand my dilemma of affirming that this project actually conforms to Complete Streets Policy if the policy is not available. **What can we do to work through this?**

We need to be extremely careful about how terms such as "sidewalk" and "bike lane" are defined and translate to what is actually provided and how they are utilized. Two brief examples:

1) Sidewalks as reflected in the typical cross-section and county standard plans propose a width of 7-feet. HOWEVER, once utility boxes, access covers, manhole frames, fire hydrants, signal boxes, street light foundations, street signs, curb ramps, utility poles, guy wires and driveway aprons (that are not shown in the cross-section) are added, this can be quickly reduced to 3-feet or even less. This is well below AASHTO minimums and barely meets ADA - **does this conform to Complete Streets Policy?**

2) Bike Lanes require more than just a dimensional context. The bike lane recently opened by the county on the mauka side of Ane Keohokalole Highway is dimensionally adequate for projected use, curb structure, parking management, and gradient. HOWEVER, when constructed by slip form paver, the friction tines were inadvertently not lifted leaving dozens of longitudinal grooves that adversely impact balance and stability for any 2-wheeled vehicle and over time will accumulate all the shards of glass and debris that will greatly increase the chance of tire failure - **does this conform to Complete Streets Policy?**

Complete Streets goes beyond simply providing an appealing cross-section but must have a sharpened focus on the actual details to provide the optimum "Path of Travel" for all users.

Bob Ward
rgward007@hawaii.rr.com

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

Bob Ward
77-6526 Hoʻolaupaʻi St.
Kailua Kona HI 96740

Dear Mr. Ward:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawaiʻi

Thank you for the email and comment letter that you submitted concerning the Draft EA. We understand and appreciate your statement that sidewalks do not necessarily accommodate all pedestrians and bike lanes do not accommodate all bicyclists. In answer to your specific comments:

1. *Consider asymmetric design*. The current County standard for a Collector road calls for 7-foot sidewalks. This width is basically just enough to allow for the installation of utility poles and light standards while at the same time meeting ADA requirements.

2. *Integrated bike lane gutter pan*. During the final design the County will evaluate the options for an integrated bike lane/gutter pan. Within the detailed design there is a need to balance the depth of flow in the gutter pan and the width of the flow path. The wider flow paths result in increased flooded lane widths and reduced efficiency for the drain inlets to intercept the flow in the curb & gutter. This results in increased carry-over and additional flow in the downstream areas. Concrete surfacing of the bike lane would also increase the construction costs, compared to asphalt pavement.

3. *Rolled curbs*. The DPW Policy Manual states that a straight battered curb is superior to the rolled curb because of:

a. Better drainage characteristics
b. Maintenance of the roadway with brooms is easier with the straight curb
c. Rolled curb is easily mountable making it hazardous to sidewalk traffic
d. If a moving vehicle hits a rolled curb, the driver is more likely to lose control than if he/she hits a straight battered curb.
e. Rolled curb does not make a smooth driveway
f. Rolled curb is only allowed on minor streets in residential zones where the slope of the road does not exceed 10%
g. Rolled curb is not allowed at bridges

4. *Spillway inlets.* During final design the County will consider a gutter inlet similar or identical to the one used in the Ane Keohokalole project. The County will examine the applicability for the spillway inlets, as the use of spillway inlets would require dropping sidewalk grade relative to the shoulder/gutter slopes, and drainage runoff might be directed to adjacent properties.

5. *Raised crosswalks*. Drop driveways or regular driveways with an ADA accessible path on the property line side of the driveway will be provided. Please note that there will be very few driveways on the Kapiolani Street Extension.

6. *Matched right-of-way.* The existing 60-foot right-of-way will be utilized except at intersections. This width is controlled by existing conditions, standards for Collector Roads, and ROW previously allotted by the DLNR.

7. *Colored bike box and bike detection*. During final design this option will be reviewed. Although there is no standard in place, the Federal Highways Administration (FHWA) has issued an interim approval for the optional use of green colored pavement in marked bicycle lanes and in extensions of bike lanes through intersections and in other traffic conflict areas. Since this optional color coding would not be specific to this project, the County intends to wait until there is a standard in the *Manual on Uniform Traffic Control Devices* and review its use on a wider policy basis to ensure consistency in application.

8. *Network integration.* The County is aware of and supports in concept the plan for a future pathway on the Wailoa drainage canal. Accommodation for a future connection will be more thoroughly investigated during final design. At the moment, a stubout is discouraged because there is currently no improved pathway along the drainage channel, and placement would expose the County to liability. A future connection would likely involve only minor improvements, including removal or modification of a section of the curb, gutter and sidewalk.

9. *Complete Streets policy for County*. The County understands that in Act 54, Session Laws of Hawaii 2009), the State of Hawai‘i requires all counties to adopt a Complete Streets Policy. Although the County has not yet adopted a Complete Streets Policy, it support and will attempt to have the designs conform with the State law in the interim.

10. *Sidewalks.* Current ADA guidelines require a 48-inch accessible path excluding the curb for new construction. This reduces to 32-inch at pinch points (utility areas, etc.) not wider than 24 inches. There will be enough space with a 7-foot sidewalk as long as utilities and roadway furniture are placed correctly. AASHTO recommends a minimum sidewalk width of 4 feet in residential areas, with a recommended range of 4 to 8 feet in commercial areas. The sidewalks planned for the Kapiolani Street Extension meet and exceed all minimum standards.

11. *Bike lane grooves*. The roadway and bike lanes for the Kapiolani Street Extension will be constructed of asphalt and will not experience the problems you mention.

In closing, please note that the County sincerely appreciates your constructive review of this and other projects. DPW has the difficult task of building new roads and maintaining old ones under shrinking budgets and growing requirements. Nevertheless, the County is committed to implementing Complete Streets in the best manner possible. If you have any questions about the EA, please contact me at (808) 969-7090, and for further input regarding the project, please contact Allan Simeon at 961-8925.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

September 24, 2012

Ron Terry
Geometrician Associates
P.O. Box 396
Hilo, HI 96721

DRAFT ENVIRONMENTAL ASSESSMENT
KAPI'OLANI STREET EXTENSION
TAX MAP KEY 2-4-001:019, 024, 120, 167, 179, 181, 182, AND 183; 2-4-023:009-010, 019-023, 024-026; 2-4-028:014-015, AND 032; 2-4-056:004-006, 014-015, 021-022; 028-029, AND 030; 2-4-057:024, 025, AND 028

We have reviewed the subject Draft Environmental Assessment and have the following comments and conditions.

The Department maintains and operates existing waterlines and other appurtenances in the proposed project area. Should the proposed street improvements require the relocation, adjustment, and/or modification of the Department's existing water system facilities, the owner/applicant shall be responsible for the construction work and costs for said work.

The applicant shall also provide our department with construction plans for review and approval so that we may identify and mitigate any affected water system facilities.

Should there be any questions, please contact Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Quirino Antonio, Jr., P.E.
Manager-Chief Engineer

RQ:dfg

copy – Allan Simeon, County of Hawai'i, Department of Public Works

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 fax: (866) 316-6988 PO Box 396 Hilo Hawaii 96721
rterry@hawaii.rr.com

October 9, 2012

Quirino Antonio, Manager-Chief Engineer
Hawai‘i County DWS
345 Kekuanaoa Street, Suite 20
Hilo HI 96720

Dear Mr. Antonio:

Subject: Comment to Draft Environmental Assessment and Anticipated Finding of No Significant Impact (FONSI) for Kapiolani Street Extension, South Hilo District, Island of Hawai‘i

Thank you for the comment letter dated September 24, 2012, indicating the DWS maintains and operates existing waterlines and other appurtenances in the proposed project area, and that if the proposed project requires the relocation, adjustment, and/or modification of DWS facilities, DPW will be responsible for the construction work and costs for said work. As requested, DPW will provide DWS with construction plans for review and approval so that you may identify and mitigate any affected water system facilities.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Allan Simeon, P.E., DPW and Austen Drake, P.E., SSFM International Inc.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 1
Public Involvement

Part 1d
Materials Related to September 11, 2012 Public Meeting

[This page intentionally left blank]

KAPIʻOLANI STREET EXTENSION
PUBLIC INFORMATION MEETING NO. 2
Hawaii County Council Chambers
25 Aupuni Street, Hilo, HI 96720
September 11, 2012

5:30 PM TABLE TOP PRESENTATIONS

Sign-in Table

- Sign in Sheets, Agenda, Comment Sheets, Signup Sheet for verbal comment/questions
- Board 1 - Welcome

Station 1: Project Location Map

- Table 1 – Roadway Corridor/Proposed Typical Sections
- Board 2 – Project Location Map

Station 2: Environmental Flowchart

- Table 2 – Draft EA
- Board 3 – Environmental Flowchart

Station 3: Traffic

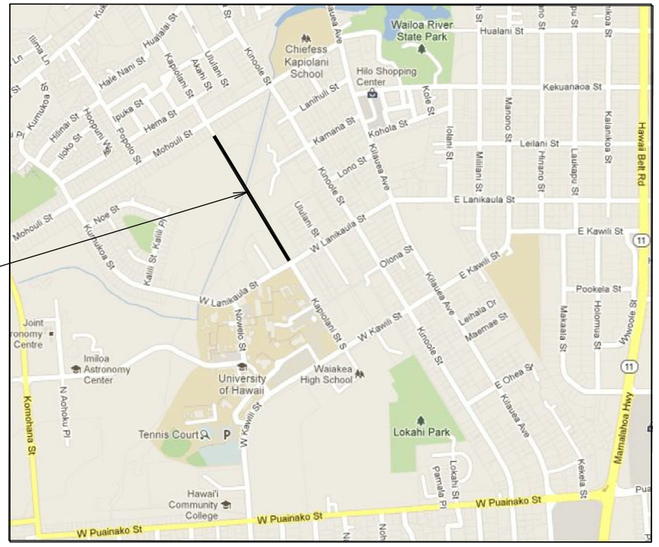
- Board 4 – Exist/ Future ADT and LOS

6:00 PM FORMAL PRESENTATION

- Welcome and Introduction
- Project History and Description
- Project Process and Schedule
- Progress to Date
- Traffic Impacts
- Environmental Impacts

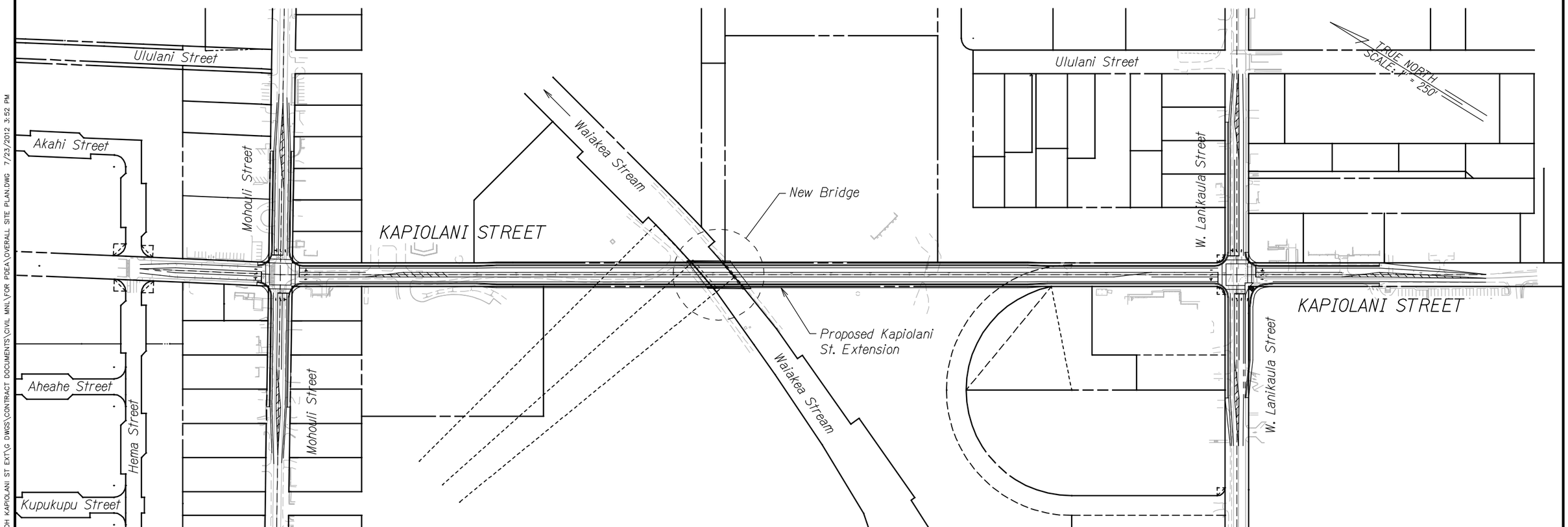
6:30 PM Next Steps and Closing

Question and Answer Session



N

VICINITY PLAN
NOT TO SCALE



GRAPHICAL SCALE:

250′ 125′ 0 250′ 500′

Scale: 1″ = 250′

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
99 Aupuni Street, Suite 120
Hilo, Hawaii 96720

OVERALL SITE PLAN
KAPIOLANI STREET EXTENSION
Project No. E-4039

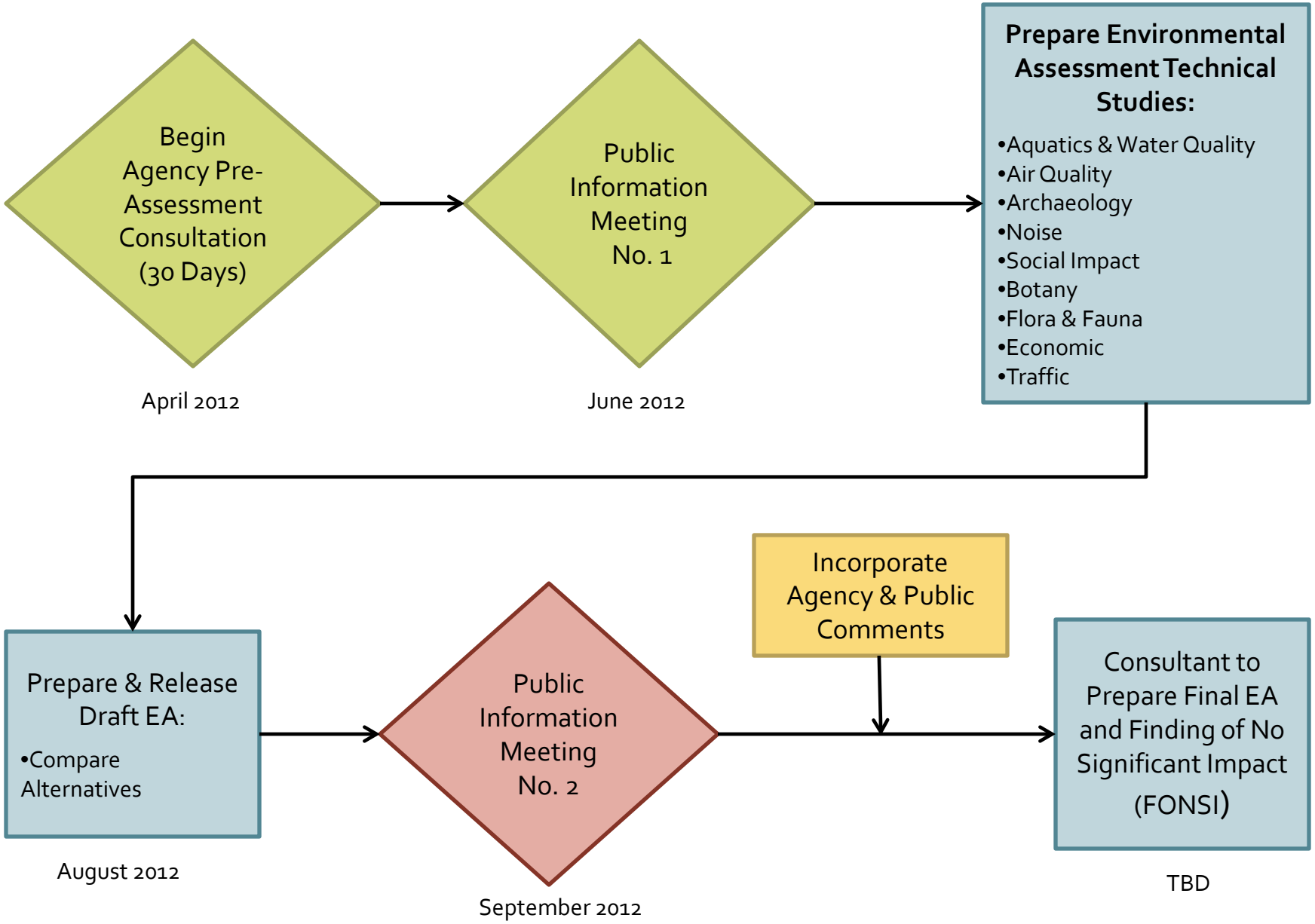
Scale: 1″ = 250′

Date: July 2012

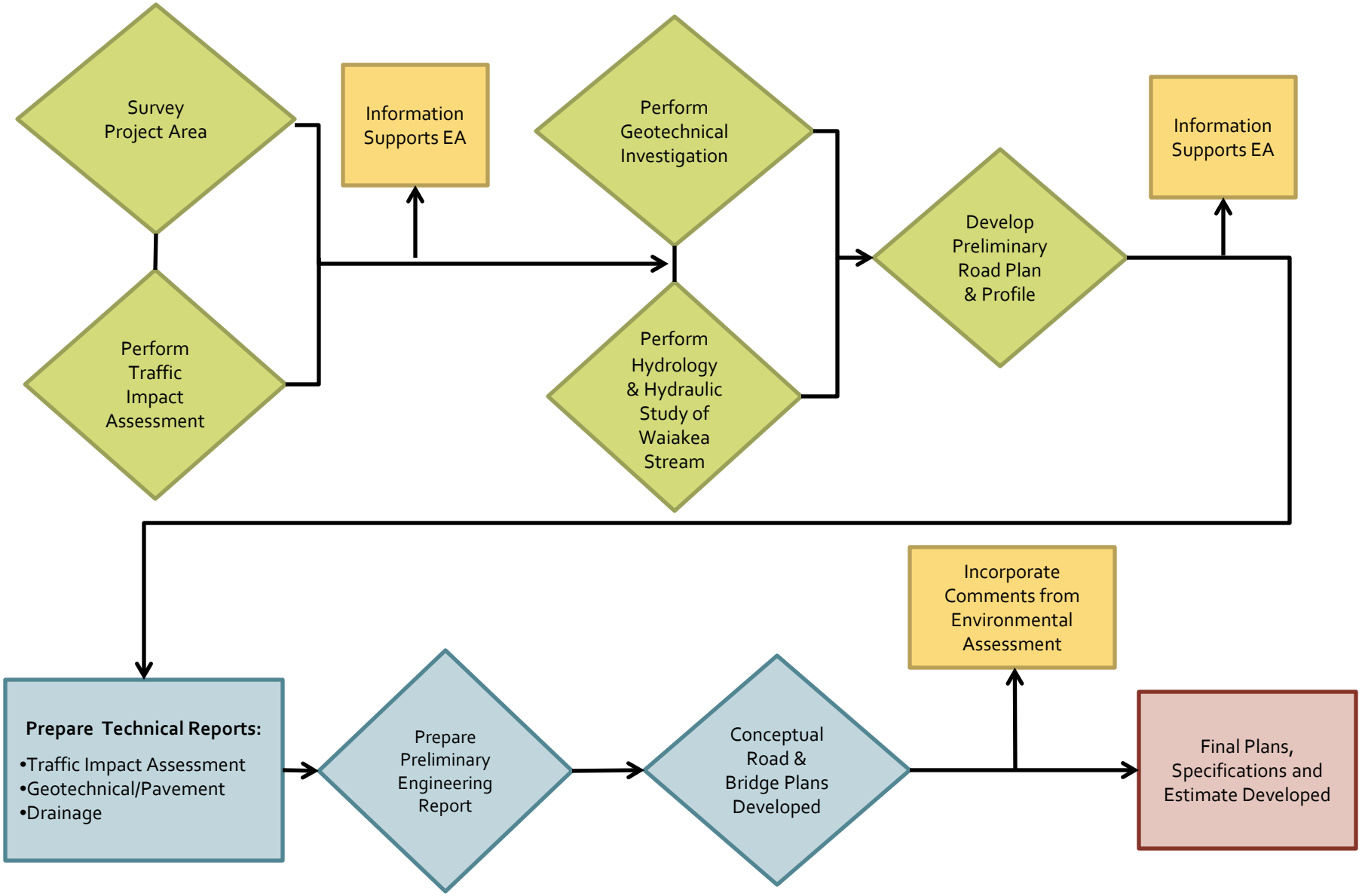
FIGURE
1-4a

M:\2011\2011_120.000 COH KAPIOLANI ST EXT\G DWGS\CONTRACT DOCUMENTS\CIVIL MNL\FOR PDEA\OVERALL SITE PLAN.DWG 7/23/2012 3:52 PM

The Environmental Review Process



The Design Process



PUBLIC COMMENT SHEET

KAPIʻOLANI STREET EXTENSION

Your comments and suggestions will assist in the responsible development of this roadway project under consideration at this Public Meeting. Space is provided below to write out any comment you may wish to make. Please hand in your statement during this meeting or, if you prefer, mail to the address printed below. Comments need to be postmarked on or before September 24th to be considered in the FINAL Environmental Assessment.

COMMENT OR STATEMENT

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Notice: Copies of all comments provided are available to the public under the Freedom of Information Act. This will include names, address, and any other personal information provided with the Comments. Your comments will be considered with or without the following optional information (please pint):

Name _____

Address _____

Representing _____

Mailing Address: County of Hawaiʻi
Department of Public Works
Engineering Division
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, HI 96720
Attn: Allan Simeon

SSFM INTERNATIONAL

99 Aupuni Street, Suite 202
Hilo, Hawaii 96720
Phone: (808) 933-2727
Fax: (808) 887-8885
www.ssfm.com

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension
DATE: September 11,2012
PURPOSE: Public Informational Meeting
MEETING SITE: Hawaii County Council Chambers

Name	Organization or Address	Phone	Email
Donna Eckersley	County	961-8268	deckersley@co.hawaii.hi.us
Donald Ikeda	County	987-4208	dikeda@co.hawaii.hi.us
Fresh Onishi	County	961-8396	
Donald Oda	Private	935-4216	
Tom Pabis	Hilo	959-5730	
Keith Marrack	Edward Jones	935-1970	keith.marrack@edwardjones.com
Brenda Ho	Hospice of Hilo	969-1733	brendah@hospiceofhilo.org
Harry Yada	UH Hilo	933-3267	hyada@hawaii.edu
Bill Walton	WH Shipman	966-9325	
Earl Fujishige	Waiakea Uka Bible Church	959-6138	efujishi@yahoo.com

Name	Organization or Address	Phones	Email
Helene Tajiri	569 Puloku St. - Hilo 96720 Waiakea Uka Bible Church	808-960-6287	helene96720@gmail.com
Ian Sakai	187 Ainako Ave. Hilo 96720 Waiakea Uka Bible Church	961-0037	songsakai@yahoo.com
Brad Kurokawa	Ki Concepts		bradk@kilandarch.com
Norman Stettelbach	Christ Lutheran Church	959-4031	

SSFM INTERNATIONAL

99 Aupuni Street, Suite 202
Hilo, Hawaii 96720
Phone: (808) 933-2727
Fax: (808) 887-8885
www.ssfm.com

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension
DATE: September 11,2012
PURPOSE: Public Informational Meeting
MEETING SITE: Hawaii County Council Chambers

Name	Organization or Address	Phone	Email
Ron Terry	Geometrician	—	—
Senator Gil Kanetk			
Barry Mark	UHH	987-2016	barrymark@hawaiiantel.net
Darren Tagawa	1328 Ululani Hilo HI 96720	987 9216	dtrebel@hotmail.com
Gerald Demello	381 Hiili St, Hilo, Hi	961-2128	gmello@hawaii.edu
Conrad Hokama		935-5485	~~conrad~~
Amy Miwa	County council	961-8015	amiwa@co.hawaii.hi.us
Sara Narimatsu	853 W. Kawailani St. Hilo 96720	959-4148	ssn74529@hotmail.com
Layne Narimatsu	"	"	lnari@hotmail.com
Song Sakai	Waiakea UKA Bible Church	961-0039	songsakai@yahoo.com

SSFM
INTERNATIONAL

99 Aupuni Street, Suite 202
Hilo, Hawaii 96720
Phone: (808) 933-2727
Fax: (808) 887-8885
www.ssfm.com

SIGN-IN SHEET

PROJECT: Kapiolani Street Extension
DATE: September 11,2012
PURPOSE: Public Informational Meeting
MEETING SITE: Hawaii County Council Chambers

Name	Organization or Address	Phone	Email
Katrin Fritzer	Planning Department	(808) 938-0271	kfritzer@co.hawaii.hi.us
Austen Drake	SSFM	(808) 933-2727	
Larry Barbeck	WUBC	(808) 987-4503	
Doug Zang	SSFM		
Brian Shinoda	~~WUBC~~ WAIAKEA UKA BIBLE CHURCH	756 6471	
LESLIE ISEMOTO	ISEMOTO CONTRACTING	935-7194	iccleseilhawaii.net
Dinnie Kysar		963-5091	cldymoon@hawaiiantel.net
Gary Kysar	Christ Lutheran Church	"	"
Brad Kurakawa			
BARRY TANIGUCHI	PO Box 4353, HILO 96720	981-9583	barry_taniguchi@ ~~ktasuperstores.com~~

Name	Organization or Address	Phones	Email
ZACH MERMEL		987-1816	zach.mermel@gmail.com
Susan Gagorik	Planning Dept	961-8154	sgagorik@hawaincounty.gov

KAPI‘OLANI STREET EXTENSION
PUBLIC INFORMATION MEETING NO. 2
Aupuni Center Conference Room
September 11, 2012
MEETING NOTES

Q. Has the team considered roundabouts?
A. Yes, and though they may work from a traffic standpoint, they require far greater right-of-way than is available at either intersection, where developed uses are presently very close to the current right-of-way limits.
Q. Will all necessary funding be available? If not all, are there priorities for phasing?
A. Currently there is $8.7 million, and DPW is attempting to make the project come in on budget, which may require phasing. The roadway, bridge and intersections, including traffic signals, are critical elements.
Q. What is the construction schedule?
A. Design is scheduled to be complete by August 2013 (excluding DPW review time), and construction may take about another year from Notice to Proceed.
Q. Will the bridge accommodate a really large flood, e.g., the November 2000 event?
A. Local residents and County officials agree that the channel was not overtopped in this area during that large event, which was greater than a 100-year flood. The bridge will be several feet higher than the top of the channel and will provide adequate freeboard for most conceivable events.
Q. Will there be landscaping?
A. There is a landscape architect on board, and this will be investigated during preliminary design during the next few months. The University may be able to assist in improving and maintaining landscaping as well.
Q. Who owns the adjacent land, which now provides green space?
A. Aside from the intersection corners, it is almost all owned by the State. Most of the land will probably be developed by the University, which will include open space in its plans, similar to the current campus.
Q. Will utilities be included?
A At the present time, only electrical lines are planned, in order to serve street lighting. Water service for the properties that could be developed can be obtained more easily at other, existing locations. Sewer facilities will require much more consideration because the difficult of achieving gravity flow with the bridge, and furthermore, there are no parties who have been identified as funders. It is recognized that various potential users of the land wish to have sewer lines to connect to in order to facilitate and lessen the cost of their developments.

NOTICE

Notice is hereby given that the County of Hawai'i, Department of Public Works has scheduled a public informational meeting for the proposed Kapi'olani Street Extension, Lanikāula Street to Mohouli Street. The meeting will be held on Tuesday, September 11, 2012 at 5:30 p.m., at the Hawai'i County Council Chambers, 25 Aupuni Street, Hilo.

The primary purpose of this meeting is to announce the availability of the Draft Environmental Assessment (DEA) and solicit comments on the DEA. The meeting agenda will include an open house portion from 5:30 p.m. to 6:00 p.m. with a short formal presentation at 6:00 p.m. The public is encouraged to arrive at the meeting prior to the formal presentation to view the project displays.

The project proposes to extend Kapi'olani Street 0.5-mile from Mohouli Street to W. Lanikaula Street to improve traffic flow on Kīlauea Avenue, Kino'ole Street, and the surrounding streets; accommodate bike and pedestrian travel; and provide an alternate emergency evacuation route. Construction plans include drainage improvements, utility relocation, traffic signals at two intersections, and a concrete bridge across Waiākea Stream. The DEA assesses impacts and identifies mitigation measures for this project.

Copies of the DEA will be available at the Hilo Library, 300 Waianuenue Avenue and the Department of Public Works, 101 Pauahi Street, Suite 7, Hilo, Hawai'i. Or, to view the online version at the State Office of Environmental Quality Control website: http://oeqc.doh.hawaii.gov/shared%20documents/environmental_notice/current_issue.pdf

If you have any concerns or are interested in this project, we sincerely encourage your participation. For information and special accommodations, auxiliary aid and/or services to participate in this meeting (i.e. sign language interpreter, large print), please call (808) 961-8321.

The 30-day public comment period ends September 24, 2012. Please submit comments to:

Mailing Address: County of Hawai'i
Department of Public Works
Engineering Division
Aupuni Center
101 Pauahi Street, Suite 7
Hilo, HI 96720
Attn: Allan Simeon

Email Address: asimeon@co.hawaii.hi.us

Phone Number: (808) 961-8630

Website Address: http://www.hawaiicounty.gov/public-works/

(015r1 Hawaii Tribune-Herald: August 28, 2012)

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 2
Botanical Survey

[This page intentionally left blank]

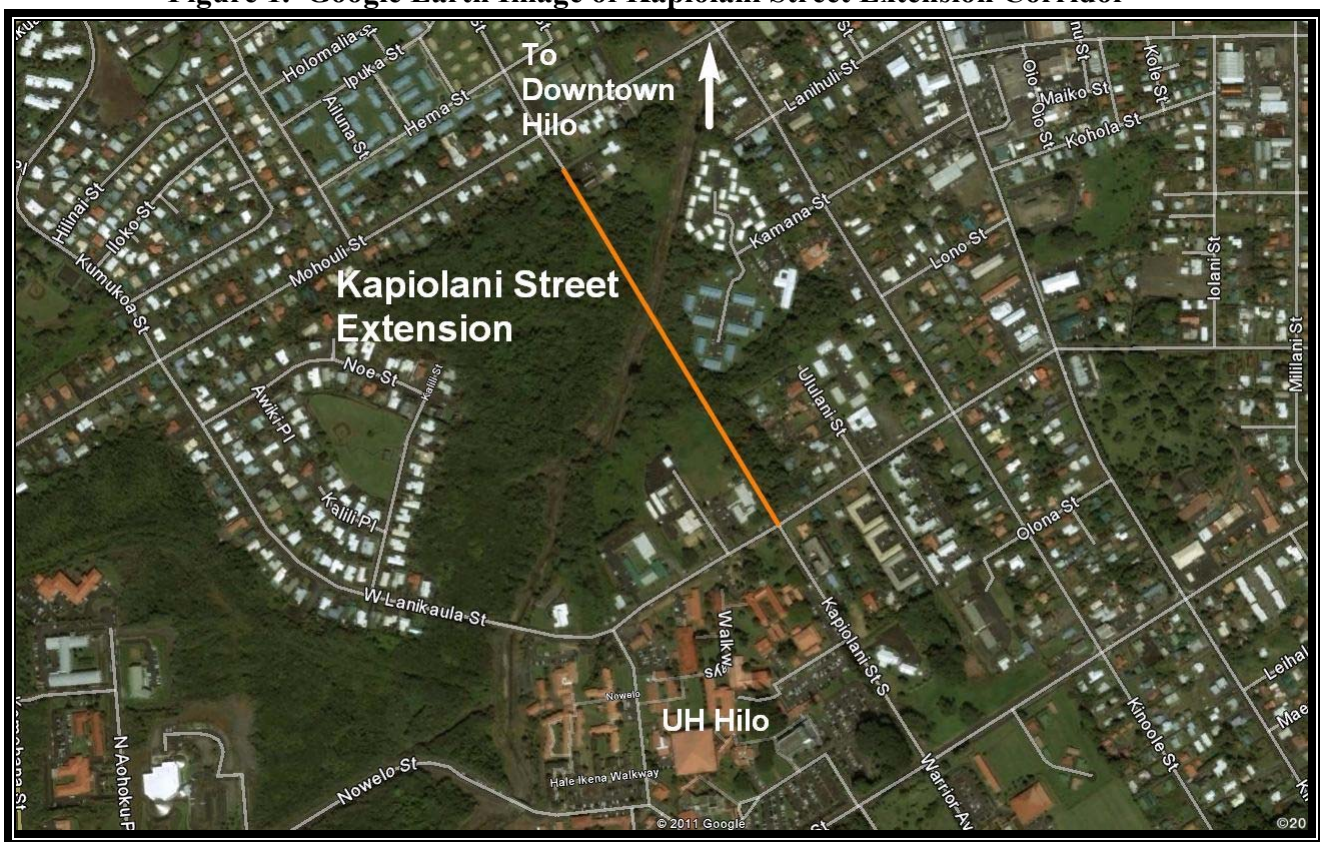
Botanical Survey
Proposed Kapiolani Street Extension
South Hilo District, Island of Hawai‘i

By Ron Terry, Ph.D., and Layne Yoshida, B.A.
Geometrician Associates, LLC
Prepared for SSFM International Inc.
June 2012

Introduction

This report describes the results of a botanical survey of an approximately 200-foot wide, 0.45-mile long corridor surrounding the proposed Kapiolani Street Extension. This proposed project is planned by the Hawai‘i County Department of Public Works as a two-lane road connection between Lanikaula and Mohouli Streets in Hilo, Hawai‘i (Figure 1). The new road would be almost entirely contained on existing County right-of-way, TMKs 2-4-001:181 and 182 and 2-4-056:029. The project will also require as yet undetermined by small areas of right-of-way acquisition from properties on the corners of Lanikaula and Mohouli Streets and various other adjacent properties for intersection improvements, drainage features, slope easements and utility structures.

Figure 1. Google Earth Image of Kapiolani Street Extension Corridor



Objectives and Methodology

The objectives of the botanical survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify and record the location of any threatened or endangered plant species. The area was surveyed by biologists Layne Yoshida and Ron Terry on one day in May 2012. Species were identified in the field and, as necessary, collected and keyed out in the laboratory. Special attention was given to the possible presence of any federally (USFWS 2012) listed threatened or endangered plant species.

Geologic Setting

Geologically, the site is located on the flanks of Mauna Loa volcano on surface lava flows that occurred from 5,000 to 10,000 years before the present (Wolfe and Morris 1996). The project site soil is classified by the Natural Resources Conservation Service (formerly Soil Conservation Service) as Keaukaha extremely rocky muck on 6-20% slopes, an organic and strongly acid soil that is approximately 0 to 8 inches thick, with about 25% of the area occupied by lava outcrops. Its capability subclass is VIIs, which means that this soil has very severe limitations that make it very unsuited for cultivation, and restrict its use to mainly pasture and woodland or wildlife (U.S. Soil Conservation Service 1973). Rainfall in the area is uniformly high, exceeding 120 inches per year. A poorly developed natural drainage network on the relatively young lava surface has been completely transformed by excavation of a deep drainage channel (the Waiākea Stream – see Figure 2) that conveys overland flow into Waiākea/Wailoa Pond prior to flowing into the ocean.

Figure 2. Waiākea Stream (Artificial Drainage Channel)

Vegetation

The natural vegetation of Hilo was most likely lowland rain forest dominated by ‘ohi‘a (*Metrosideros polymorpha*), uluhe (*Dicranopteris linearis*) and hala (*Pandanus tectorius*) (Gagne and Cuddihy 1990). These original communities, however, have been destroyed or heavily degraded by cattle grazing, agriculture and clearing for farms and residences, and the vegetation of Hilo is now either managed (i.e., farms, pasture, urban or landscaped grounds) or adventive “communities” of various alien weeds. In the Kapiolani Street Extension area, the vegetation is an overgrown forest of weedy trees with a weedy understory. Dominant canopy species are Chinese banyan (*Ficus microcarpa*), Java plum (*Syzygium cumini*), alistonia (*Alistonia macrophylla*), king palm (*Archontophoenix alexandrae*), bingabing (*Macaranga mappa*), avocado (*Persea americana*), charcoal tree (*Trema orientalis*), melochia (*Melochia umbellata*). The northern portion is dominated by bamboo (possibly *Gigantochloa* sp.). Vegetation in and around the artificial Waiākea Stream channel is managed with herbicide and mowing and no riparian vegetation exists in the area of the Kapiolani Extension. A former drainage channel has been completely cut off from water and no longer has riparian vegetation.

Flora

A full list of the 114 +/- plant species found on the site is contained in the table in Table 1, attached to this report. It should be noted that if an introduced species was restricted within the study corridor to a developed property such as a residence or institution, it was not necessarily noted in the survey, as such plants are not of conservation concern and sampling them might involve unnecessary disturbance to a property owner or resident.

The flora is overwhelmingly dominated by non-native, weedy species. No notable or valuable specimens of non-native trees are present. Only six of the plant species present in the corridor are natives. No endemic natives (found in Hawai‘i and nowhere else) were found. The six natives were all indigenous (found in Hawai‘i as well as elsewhere). There were three ferns: sword fern (*Nephrolepis exaltata*), an adiantum (*Adiantum capillus-veneris*), and ekaha (*Lepisorus thunbergianus*); one herb: popolo (*Solanum americanum*); one sedge (*Pycreus polystachyos*; and one vine: morning glory (*Ipomoea indica*). All are very common throughout windward Hawai‘i.

Threatened and Endangered Species

No listed or proposed threatened or endangered plant species were found. Given the context and limited vegetated area, it is unlikely that one would be found unless it were planted intentionally as part of landscaping.

Impacts and Mitigation Measures

The proposed Kapiolani Street Extension is not expected to have any direct adverse impact on the botanical resources or vegetation of Hilo or the island of Hawai‘i. In order to minimize indirect adverse impacts, care should be taken during and after the construction of the road to avoid introduction of any invasive alien species that are not already prevalent in the area.

REFERENCES

Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds. *Manual of the Flowering Plants of Hawai'i*. 2 vols. Honolulu: University of Hawai'i Press.

U.S. Fish and Wildlife Service (USFWS). USFWS Threatened and Endangered Species System (TESS). Washington: GPO. http://ecos.fws.gov/tess_public/StartTESS.do Accessed 2012.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawai'i, State of Hawai'i.* Washington: U.S.D.A. Soil Conservation Service.

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i.* USGS Misc Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

Table 1
Plants Observed in 200-foot Wide Kapiolani Street Extension Study Corridor

Scientific Name	Family	Common Name	Life Form	Status*
Adiantum capillus-veneris	Pteridaceae	Adiantum	Fern	I
Ageratum conyzoides	Asteraceae	Ageratum	Herb	A
Ageratum houstonianum	Asteraceae	Ageratum	Herb	A
Alistonia macrophylla	Apocynaceae		Tree	A
Alocasia macrorrhizos	Araceae	Ape	Herb	A
Amaranthus spinosus	Amaranthaceae	Amaranthus	Herb	A
Archontophoenix alexandrae	Arecaceae	King Palm	Tree	A
Ardisia crenata	Myrsinaceae	Hilo Holly	Shrub	A
Axonopus fissifolius	Poaceae	Carpet Grass	Herb	A
Begonia hirtella	Begoniaceae	Begonia	Herb	A
Begonia sp.	Begoniaceae	Begonia	Herb	A
Bidens pilosa	Asteraceae	Bidens	Herb	A
Brachiaria mutica	Poaceae	California Grass	Herb	A
Buddleia asiatica	Buddleiaceae	Dog Tail	Shrub	A
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A
Chamaesyce hirta	Euphorbiaceae	Hairy Spurge	Herb	A
Chamaesyce hypericifolia	Euphorbiaceae	Graceful Spurge	Herb	A
Chamaesyce prostrata	Euphorbiaceae	Prostrate Spurge	Herb	A
Chloris barbata	Poaceae	Chloris	Herb	A
Chloris radiate	Poaceae	Chloris	Herb	A
Christella dentata	Thelypteridaceae	Cyclosorus	Fern	A
Clidemia hirta	Melastomataceae	Clidemia	Herb	A
Clusia rosea	Clusiaceae	Autograph Tree	Tree	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Conyza bonariensis	Asteraceae	Conyza	Herb	A
Cordyline fruticosa	Agavaceae	Ki	Shrub	A
Crotalaria incana	Fabaceae	Rattlepod	Herb	A
Crotalaria sp.	Fabaceae	Crotalaria	Herb	A
Cuphea carthagenensis	Lythraceae	Cuphea	Herb	A
Cyperus sp.	Cyperaceae	Cyperus	Herb	A
Desmodium tortuosum	Fabaceae	Desmodium	Herb	A
Desmodium triflorum	Fabaceae	Desmodium	Herb	A
Dieffenbachia sp.	Araceae	Dumb Cane	Herb	A
Digitaria sp.	Poaceae	Crabgrass	Herb	A
Dioclea wilsonii	Fabaceae	Sea Bean	Vine	A?
Diplazium esculentum	Athyriaceae	Paca	Fern	A
Dissotis rotundifolia	Melastomataceae	Dissotis	Herb	A
Dracaena marginata	Agavaceae	Dracena	Shrub	A
Dracaena sp.	Agavaceae	Dracena	Shrub	A
Drymaria cordata	Caryophyllaceae	Drymaria	Herb	A
Eleusine indica	Poaceae	Wiregrass	Herb	A
Emilia sonchifolia	Asteraceae	Flora's Paintbrush	Herb	A
Epipremnum pinnatum	Araceae	Pothos	Vine	A
Eragrostis brownie	Poaceae	Eragrostis	Herb	A

Table 1, cont'd				
Scientific Name	Family	Common Name	Life Form	Status*
Eragrostis cilianensis	Poaceae	Eragrostis	Herb	A
Eragrostis tenella	Poaceae	Love Grass	Herb	A
Erechtiies hieracifolia	Asteraceae	Fireweed	Herb	A
Erechtites valerianifolia	Asteraceae	Fireweed	Herb	A
Ficus microcarpa	Moraceae	Chinese Banyan	Tree	A
Filicium decipiens	Sapindaceae	Fern Tree	Tree	A
Fimbristylis dichotoma	Cyperaceae	Fimbrystylis	Herb	A
Gigantochloa sp.??	Poaceae	Dwarf Bamboo	Shrub	A
Hippobroma longiflora	Campanulaceae	Star-of-Bethlehem	Herb	A
Hyptis pectinata	Lamiaceae	Hyptis	Shrub	A
Impatiens sp.	Balsaminaceae	Impatiens	Herb	A
Indigofera suffruticosa	Fabaceae	Indigo	Herb	A
Ipomoea alba	Convolvulaceae	Moon Flower	Vine	A
Ipomoea indica	Convolvulaceae	Morning Glory	Vine	I
Ipomoea ochracea	Convolvulaceae	Ipomoea	Vine	A
Kyllinga brevifolia	Cyperaceae	Kyllinga	Herb	A
Lantana camara	Verbenaceae	Lanatana	Shrub	A
Lepisorus thunbergianus	Polypodiaceae	Pleopeltis	Fern	I
Macaranga mappa	Euphorbiaceae	Bingabing	Tree	A
Macroptilium lathyroides	Fabaceae	Cow Pea	Herb	A
Malvastrum coromandelianum	Malvaceae	Malvastrum	Herb	A
Mangifera indica	Anacardiaceae	Mango	Tree	A
Melastoma candidum	Melastomataceae	Melastoma	Shrub	A
Melochia umbellata	Sterculiaceae	Melochia	Tree	A
Mimosa pudica	Fabaceae	Sleeping Grass	Herb	A
Momordica charantia	Cucurbitaceae	Momordica	Vine	A
Monstera deliciosa	Araceae	Monstera	Herb	A
Musa (x) paradisiaca	Musaceae	Banana	Shrub	A
Nephrolepis exaltata	Nephrolepidaceae	Sword Fern	Fern	I
Nephrolepis multiflora	Nephrolepidaceae	Sword Fern	Fern	A
Paederia foetida	Rubiaceae	Maile Pilau	Vine	A
Panicum maximum	Poaceae	Guinea Grass	Herb	A
Panicum repens	Poaceae	Torpedo Grass	Herb	A
Paspalum conjugatum	Poaceae	Hilo Grass	Herb	A
Paspalum urvillei	Poaceae	Paspalum	Herb	A
Persea americana	Lauraceae	Avocado	Tree	A
Philodendron spp.	Araceae	Philodendron	Vine	A
Phyllanthus debilis	Euphorbiaceae	Niruri	Herb	A
Phymatosorus grossus	Polypodiaceae	Maile Scented Fern	Fern	A
Pilea microphylla	Urticaceae	Pilea	Herb	A
Pityrogramma austroamericana	Pteridaceae	Gold Fern	Fern	A

Table 1, cont'd				
Scientific Name	Family	Common Name	Life Form	Status*
Plantago lanceolata	Plantaginaceae	Plantago	Herb	A
Polygala paniculata	Polygalaceae	Polygala	Herb	A
Psidium cattleianum	Myrtaceae	Waiawi	Tree	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Pterolepis glomerata	Melastomataceae	Pterolepis	Herb	A
Pycreus polystachyos	Cyperaceae	Cyperus	Herb	I
Rhododendron sp.	Ericaceae	Azalea	Shrub	A
Rhodomyrtus tomentosa	Myrtaceae	Downy Myrtle	Shrub	A
Rhynchelytrum repens	Poaceae	Natal Red Top	Herb	A
Rubus rosifolius	Rosaceae	Thimbleberry	Herb	A
Sacciolepis indica	Poaceae	Glenwood Grass	Herb	A
Sambucus Mexicana	Caprifoliaceae	Elderberry	Shrub	A
Schefflera actinophylla	Araliaceae	Octopus Tree	Tree	A
Schinus terebinthifolius	Anacardiaceae	Christmas Berry	Tree	A
Setaria palmifolia	Poaceae	Palmgrass	Herb	A
Solanum americanum	Solanaceae	Popolo	Herb	I
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A
Spermacoce assurgens	Rubiaceae	Buttonweed	Herb	A
Spermacoce mauritiana	Rubiaceae	Spermacoce	Herb	A
Sporobolus sp.	Poaceae	Dropseed	Herb	A
Stachytarpheta sp.	Verbenaceae	Stachytarpheta	Shrub	A
Stenotaphrum secundatum	Poaceae	Buffalo Grass	Herb	A
Synedrella nodiflora	Asteraceae	Synedrella	Herb	A
Syngonium sp.	Araceae	Syngoium	Vine	A
Syzygium cumini	Myrtaceae	Java Plum	Tree	A
Trema orientalis	Ulmaceae	Charcoal Tree	Tree	A
Wedelia trilobata	Asteraceae	Wedelia	Herb	A
Youngia japonica	Asteraceae	Youngia	Herb	A

*A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species (none present)

[This page intentionally left blank]

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 3
Water Quality and Aquatic Biology Report

[This page intentionally left blank]

AECOS No. 1311

Water quality and biological surveys of Waiākea Stream for the Kapiʻolani Street Extension Project Hilo, Hawaiʻi

Prepared by:

AECOS Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe, Hawaiʻi 96744-3221

June 19, 2012

Water quality and biological surveys of Waiākea Stream for the Kapiʻolani Street Extension Project, Hilo, Hawaiʻi

June 19, 2012 | ***DRAFT*** | *AECOS* No. 1311

Susan Burr and David Miranda
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe , Hawaiʻi 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

The Kapiʻolani Street Extension Project ("Project") in Hilo, Hawaiʻi (Fig. 1) will connect the northern segment of Kapiʻolani Street with the southern segment. The Project comprises construction of a bridge over Waiākea Stream. *AECOS*, Inc. was contracted by SSFM International, Inc.[1] to ascertain biological resources and assess water quality of Waiākea Stream. For these purposes, a field survey of the area was undertaken by *AECOS* biologists in April 2012.

Stream Description

Waiākea Stream is tributary to Wailoa River. The Wailoa River system is listed in the Hawaiʻi Watershed Atlas as a third order perennial[2] stream that extends approximately 40.6 km (25.2 mi) from the Waiākea Forest Reserve down to the Hilo Harbor at Waiākea Pond (DLNR-DAR, 2008). Total area of the Wailoa River system watershed is estimated at 255.4 km^2 (98.6 mi^2).

A description of Wailoa River and Waiākea Stream is provided in *AECOS* (2010):

[1] Report prepared for SSFM International, Inc. for environmental entitlements. This report is expected to become part of the administrative and/or public record for the project.
[2] A perennial stream has year-round, continuous flow in at least part of its bed; flow need not be continuous from upper reaches to the sea.

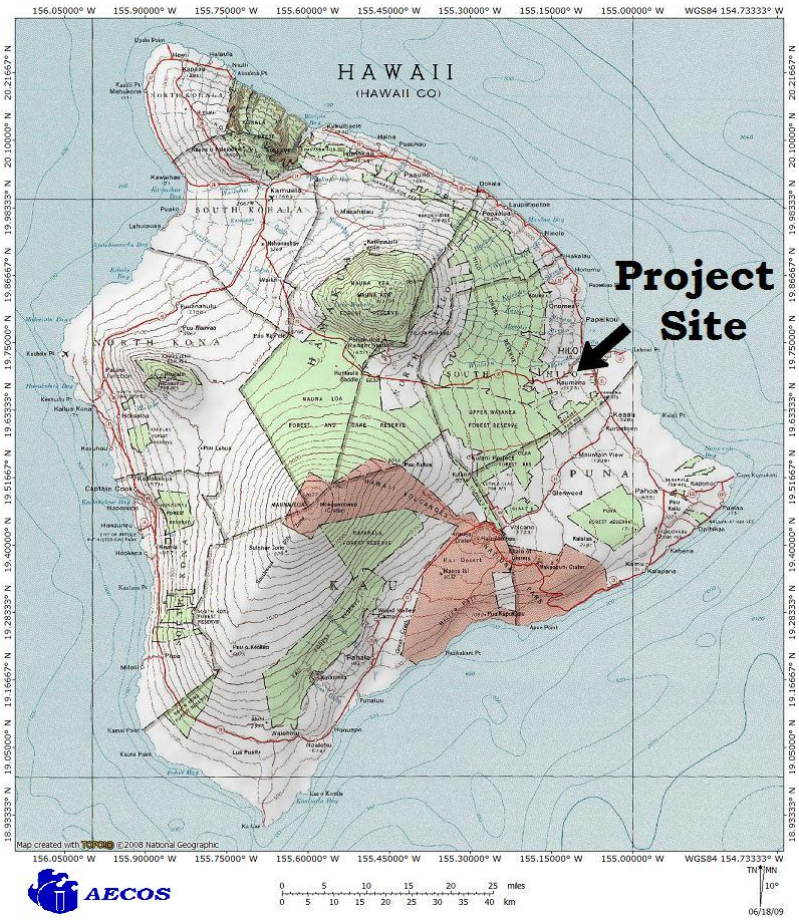


Figure 1. General location of Project in Hilo, Hawai'i.

"Wailoa [River] is a perennial system and one of the few stream systems draining Mauna Loa (south) despite high annual rainfall averaging over 100 inches [250 cm] in the Hilo area and nearly 200 inches [500 cm] at Mountainview (Telliaferro, 1959). However, an absence of perennial streams is characteristic of volcanic high islands were the surface material is composed of geologically recent lava flows. In contrast, the older Mauna Kea slopes north of Hilo are deeply dissected. The Hāmākua Coast which extends north along the north flank of Mauna Kea supports many streams, including the extensive Wailuku River system located on the cleft between Mauna Kea and Mauna Loa and discharging into the southwest corner of Hilo Bay. Wailoa [River

> system] is located on the south side of the contact boundary between Mauna Kea and Mauna Loa,
>
> Waiākea Stream has several branches, some fed by springs at higher elevations above Hilo and some segments are perennial. Certainly between about the 1000-ft (305-m) elevation and the University of Hawaiʻi campus at around 150 ft (46 m above sea level) [and farther downstream to Kinoʻole Street at less than 20 ft (6 m) above sea level (ASL)], Waiākea Stream is intermittently flowing."

Though Waiākea Stream may be perennial in the upper reach, it is clearly an interrupted stream (flow discontinuous in middle and lower reach). The 1881 lava flow has buried some segments of the stream and forced flow underground. Several branches and man-made ditches carry flow intermittently to Waiākea Stream.

Project Area Description

The Project is located on the coastal plain at an approximate elevation of 6 m (20 ft) above sea level (ASL). Lower Waiākea Stream, including the segment within the main survey area (from Kinoʻole Street to West Lanikāula Street), is a modified channel, designed to move freshet flows quickly through Hilo to Waiākea Pond in the lowlands at Wailoa River State Park and from there directly into Hilo Harbor. In the Project area, the channel is lined with a levee and has reveted margins. Large concrete box culverts are associated with road crossings. No substantial part the lower segment of Waiākea Stream is perennial flowing, although Waiākea Pond backs up into the channel under Kilauea Avenue.

Dense basalt outcrops, boulder-embedded concrete, and smooth concrete comprise the substratum of the stream bed in the Project area. Where the bed is dense basalt, pools of water are retained, and these pools are fed by both the considerable rainfall received in the Hilo area and, in some cases, influent flow producing short segments of interconnected pools.

Survey Methods

AECOS, Inc. biologists surveyed Waiākea Stream between Kinoʻole Street and West Lanikāula Street on April 11, 2012 to evaluate water quality and identify aquatic and riparian vegetation and aquatic animals within the Project area. The survey included observations made at several additional points on the stream

extending from Waiākea Pond, through Waiākea Homesteads, to near the headwaters in the Waiākea Forest Reserve (Fig. 2).

Figure 2. Waiākea Stream showing stream survey area, bridge crossing, and observation stations.

Water Quality Survey

Biologists measured selected parameters and collected water samples at three stations (Fig. 3) in Waiākea Stream. Because the stream was not flowing through the Project area at the time of our survey, the water quality stations were established in relatively large isolated pools (Fig. 4). Station "1-Upstream" was located in a spring-fed pool just downstream from West Lanikāula Street. Station "3-Project" was located in an isolated pool at the proposed site for the Kapiʻolani Bridge. Station "2-Downstream" was located in an isolated pool upstream from the concrete-lined bottom near Kinoʻole Street.

At each of the three stations, biologists made *in situ* field measurements (temperature, pH, and dissolved oxygen) and collected samples for analyses

(conductivity, turbidity, total suspended solids, and nutrients) in the laboratory. The samples were collected in one 1-L and two 250-mL plastic bottles that were pre-rinsed (unless they contained acid as a preservative) with the water to be sampled prior to sampling. The samples were placed on ice and taken to the *AECOS* Laboratory in Kāneʻohe for analyses (*AECOS* Laboratory Log No. 28173). Table 1 lists the analytical methods used for each water quality parameter measured to characterize water quality.

Figure 3. April 11, 2012 water quality sampling stations.

Table 1. Analytical methods used for April 11, 2012 water quality analysis of Waiākea Stream.

Analysis	Method	Reference
Temperature	thermister calibrated to NBS. Cert. thermometer/ SM 2550 B	SM (1998)
Conductivity	SM 2510-B	SM (1998)
pH	SM 4500 H+	SM (1998)
Dissolved Oxygen	SM 4500-O G	SM (1998)

Table 1 (continued).

Analysis	Method	Reference
Turbidity	EPA 180.1 Rev 2.0	USEPA (1993)
Total Suspended Solids	SM 2540 D	SM (1998)
Nitrate + Nitrite	EPA 353.2 Rev 2.0	USEPA (1993)
Total Nitrogen	persulfate digestion/ EPA 353.2	Grasshoff et al. (1986)/ USEPA (1993)
Total Phosphorus	persulfate digestion/ EPA 365.1 Rev 2.0	Grasshoff et al. (1986)/USEPA (1993)

Figure 4. Photos of water quality stations sampled on April 11, 2012

Fig. 5 shows locations of water quality sampling stations used in several previous surveys of the stream (*AECOS*, 2009, 2002, and 1997).

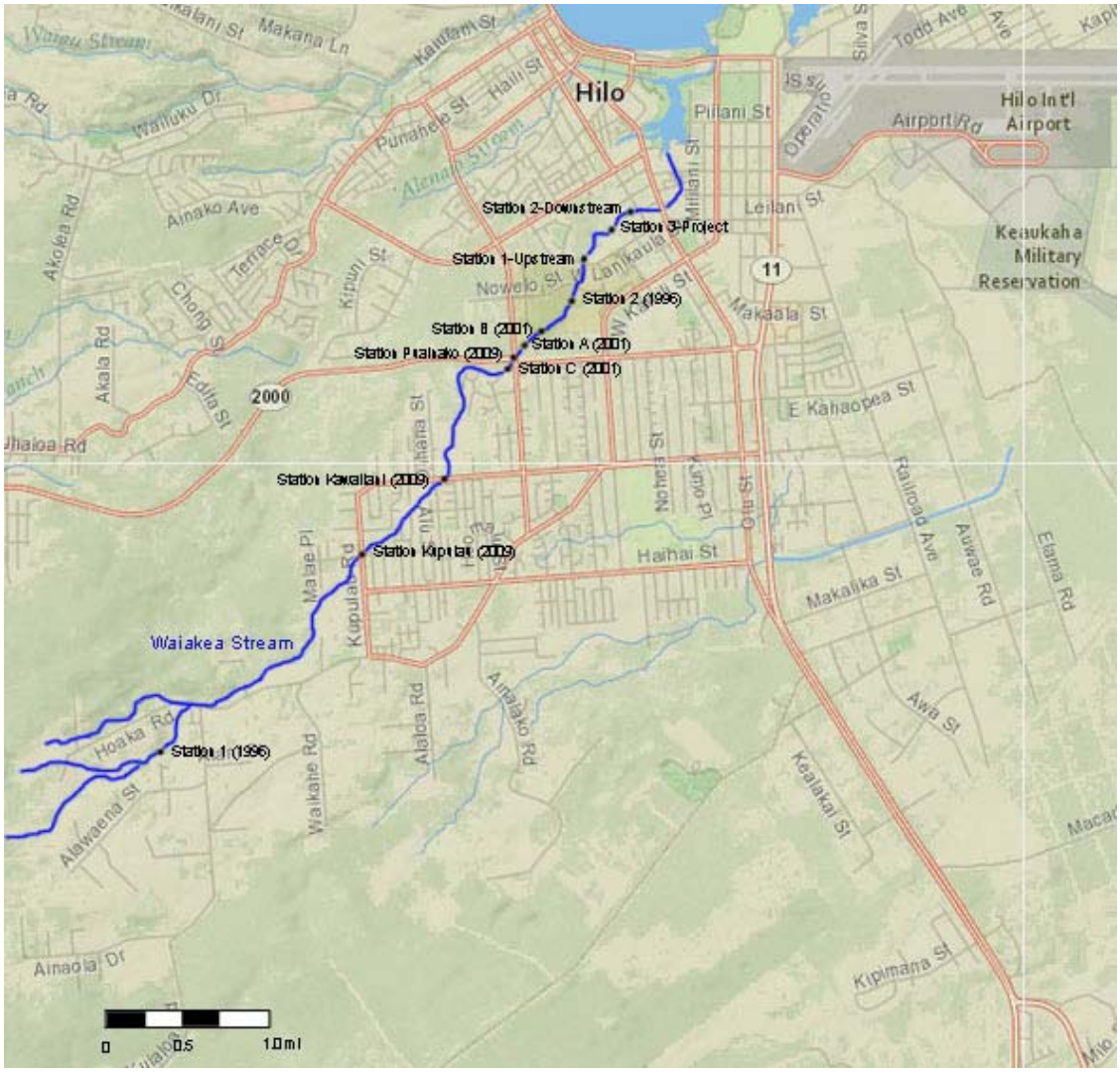


Figure 5. *AECOS* Water quality sampling stations on Waiākea Stream (1996, 2001, 2009, and 2012).

Botanical Survey

The botanist covered the survey area on foot and noted plant species within the channel and along the tops of the banks as they were encountered. As the survey progressed, notes were made on relative abundances of each species (e.g. rare, common, abundant). Photographs were taken, or specimens collected for closer inspection, of plants not readily identified in the field.

Aquatic Biota Survey

The aquatic biologist made observations and used hand nets to collect aquatic organisms for closer observations from the pools in Waiākea Stream within the Project area. As the survey progressed, the biologist made notes on relative abundances of each species (e.g. rare, common, abundant). Algal specimens and dragonfly larvae were collected for identification in the laboratory. Additional observations were made from various other points in Waiākea Stream beyond the Project area to assess the potential for migration of native amphidromous[3] animals and the distribution of naturalized species throughout the stream.

Results

Water Quality

Water quality results for the April 11, 2012 sampling event are presented in Tables 2 and 3. Also included are historical water quality data collected from Waiākea Stream in 1996, 2001, and 2009 (*AECOS*, 1996, 2002, and 2009).

Sta. 1-Upstream was established in a series of relatively deep pools fed by spring water and Stas. 3-Project and 2-Downstream were established in isolated pools without visible flow. Despite these differences, the water quality of the three stations sampled in 2012 is fairly consistent throughout the Project vicinity. Temperature was fairly low at Sta. 1-Upstream (21.8˚C). Conductivity was low at all stations in 2012 (42 to 59 umhos/cm) and at all previous sampling stations (14.6 to 88 umhos/cm). pH ranged from a low of 6.13 at Sta. Kupulau in 2009 to a high of 8.70 at Sta. 3-Project in 2012. The water was supersaturated (>100%) with oxygen more often than not (in 64% of the samples) and at all three stations in 2012.

[3] Meaning they move between fresh and salt water during their life cycle.

Table 2. Physical water quality characteristics of Waiākea Stream on April 11, 2012 with historical data from previous surveys (*AECOS*, 1996, 2002, and 2009).

Station	Time	Temp. °C	Conductivity µmhos/cm	pH	DO mg/l	DO sat. %
April 2012						
Sta. 1-Upstream	1145	21.8	42	7.33	9.24	106
Sta. 3-Project	1300	25.5	59	8.70	11.15	137
Sta. 2-Downstream	1240	25.0	56	7.66	9.35	114
June 2009						
Kupulau	1255	24.9	88	6.13	6.69	81
Kawailani	1325	31.1	53	8.20	12.89	174
Puainako	1350	31.8	60	8.28	12.98	177
November 2001						
Sta. A	1150	27.4	--	--	6.14	78
Sta. B	1200	24.9	--	--	7.20	87
Sta. C	1220	23.9	--	--	5.88	70
August 1996						
Hoaka Road	--	23.6	14.6	--	9.30	110
UH-Hilo	--	27.7	26.9	--	8.95	114

Turbidity and total suspended solids (TSS) were very low at all three stations in 2012 (0.34 to 0.94 ntu and 0.7 to 1.8 mg/l, respectively). Higher values were recorded in 2009 (2.72 to 11.6 ntu and 5 to 27 mg/l, respectively), but comparable values were recorded in 1996 and 2001 (1.4 to 2.0 ntu and 0.9 to 1.8 mg/l, respectively). Nitrate-nitrite (NO_3+NO_2) values were low in 2012 (37 to 69 µg N/l) and very low in 1996, 2001, and 2009 (<1 to 28 µg N/l). Though not measured in 2012 because there are no criteria for streams for this parameter, ammonia (NH_3) was very low or low in 1996, 2001, and 2009 (<1 to 106 µg N/l). Total nitrogen (TN) was low in 2012 (174 to 258 µg N/l), though elevated in 2009 (765 to 1920µg N/l). Total phosphorus ranged from 11 to 110 µg P/l.

Table 3. Physical and chemical water quality characteristics of Waiākea Stream on April 11, 2012 with historical data from previous *AECOS* surveys.

	Turbidity (ntu)	TSS (mg/l)	NO_3+NO_2 (μg N/l)	NH_3 (μg N/l)	Total N (μg N/l)	Total P (μg P/l)
April 2012						
Sta. 1-Upstream	0.34	0.7	69	--	174	11
Sta. 3-Project	0.68	0.8	37	--	192	42
Sta. 2-Downstream	0.94	1.8	67	--	258	27
June 2009						
Kupulau	2.72	5	<1	5	765	41
Kawailani	5.12	10	<1	<1	1100	94
Puainako	11.6	27	<1	<1	1920	110
November 2001						
Sta. A	--	0.9	2	<1	230	42
Sta. B	--	1.5	2	28	363	41
Sta. C	--	1.8	19	106	680	44
August 1996						
Hoaka Road	1.4	1.06	28	26	321	16
UH-Hilo	2.0	1.22	5	1	292	18

Botanical Survey

A checklist of plants recorded from within the vicinity of Waiākea Stream in the Project area in April 2012 is presented as Table 4. Entries are arranged alphabetically under plant family names (standard practice). Included in the list are scientific name, common name, and status (whether indigenous [Ind], endemic [End], or naturalized non-native [Nat]) for each species observed. In addition to identifying the plants present, qualitative estimates of plant abundance were made. These are coded in the table as explained in the legend to Table 4.

A total of 96 species of plants were recorded in the survey as growing in the stream channel, along the stream banks, and casually noted as growing nearby. Only 5% of the species are native: three fern species, *akolea*, *neke*, and *ʻiwaʻiwa*, (*Lepisorus thunbergiana*, *Cyclosorus interruptus*, and *Adiantum capillus-veneris*)

Table 4. Checklist of plants observed in the vicinity of Waiākea Stream between Kinoʻole Street and West Lanikāula Street on April 11, 2012.

Species	Common name	Status	Abundance
PTERIDOPHYTES			
BLECHNACEAE			
Blechnum appendiculatum (Forssk.) Brownsey & Jermy	blechnum fern	Nat	C (locally)
NEPHROLEPIDACEAE			
Nephrolepis multiflora (Roxb.) Jarrett ex Morton	Asian sword fern	Nat	C
POLYPODIACEAE			
Lepisorus thunbergianus (Kaulf.) Ching	pākahakaha, *ʻākōlea*	**Ind**	R
*Phymatosorus grossus*Langsd. & Fisch.) Brownlie	*lauaʻe*	Nat	C
SCHIZAEACEAE			
Lygodium japonicum (L.) P. Beauv.	Japanese climbing fern	Nat	R
THELYPTERIDACEAE			
Thelypteris interrupta (Willd) K. Iwats.	*neke*	**Ind**	O
Thelypteris dentata (Forssk.) E.P. St. John	wood fern	Nat	C
PTERIDACEAE			
Adiantum capillus-veneris L.	*ʻiwaʻiwa*	**Ind**	C (locally)
Pityrogramma austroamericana Domin	goldback fern	Nat	O
DICOTYLEDONES			
ACANTHACEAE			
Asystasia gangetica (L.) T. Anderson	Chinese violet	Nat	C
Thunbergia fragrans Roxb.	sweet clock-vine	Nat	R
AMARANTHACEAE			
Amaranthus sp.	pigweed	Orn	R
ANACARDIACEAE			
Mangifera indica L.	mango	Nat	R
Rhus sandwicensis A. Gray	*neneleau*	**End**	R
Schinus terebinthifolius A. Gray	Christmas berry	Nat	R
ARALIACEAE			
Schefflera actinophylla (Endl.) Harms	octopus tree	Nat	O
ASTERACEAE			
Ageratum conyzoides L.	*maile hohono*	Nat	C
Bidens alba (L) DC.	Spanish needle	Nat	A
Conyza bonariensis (L) Cronquist	hairy horseweed	Nat	A
Emilia fosbergii Nicolson	pualele	Nat	U
Erechtites hieracifolia (L) Raf. ex DC.	fireweed	Nat	C
Sphagneticola trilobata (L) Pruski	wedelia	Nat	C
Taraxacum officinale F.H. Wigg.	common dandelion	Nat	O
BALSAMINACEAE			
Impatiens walleriana Hook. f.	buzzy lizzy	Nat	C
BEGONIACEAE			
Begonia hirtella Link	begonia	Nat	A

Table 4 (continued).

Species	Common name	Status	Abundance
BIGONACEAE			
Spathodea campanulata P. Beauv.	African tuliptree	Nat	C
BRASSICACEAE			
Cardamine flexuosa With.	bittercress	Nat	C
BUDDLEIACEAE			
Buddleja asiatica Lour.	dogtail	Nat	C
CAMPANULACEAE			
Hippobroma longiflora (L.) G. Don	star of Bethlehem	Nat	C
CECROPIACEAE			
Cecropia obtusifolia Bertol.	guarumo	Nat	R
CLUSIACEAE			
Clusia rosea Jacq.	autograph tree	Nat	C
COMMELINACEAE			
Commelina diffusa Burm. f	*honohono*	Pol	C
CONVOLVULACEAE			
Ipomoea alba L.	moonflower	Nat	O
Ipomoea obscura (L.) Ker Gawl.	obscure morning-glory	Nat	O
CUCURBITACEAE			
Momordica charantia L.	bitter melon	Nat	R
DIOSCOREACEAE			
Dioscorea bulbifera L.	*hoi*, bitter yam	Pol	R
EUPHORBIACEAE			
ıesyce hypericifolia (L.) Millsp.	graceful spurge	Nat	O
Euphorbia heterophylla L.	*kaliko*	Nat	O
Macaranga mappa (L.) Müll. Arg.	bingabing	Nat	C
FABACEAE			
Falcataria moluccana (Miq.) Barneby & Grimes	albizia	Nat	U
Canavalia cathartica Thouars	*maunaloa*	Nat	O
Chamaecrista nictitans (L.) Moench	partridge pea	Nat	C
Crotalaria micans Link	rattlepod	Nat	C
Desmodium incanum DC	Spanish clover	Nat	C
Macroptilium lathyroides (L.) Urb.	cow pea	Nat	O
Mimosa pudica L.	sensitive plant	Nat	O
Senna alata (L.) Roxb.	candle bush	Nat	R
LAMIACEAE			
Hyptis pectinata (L.) Poit.	comb hyptis	Nat	R
LYTHRACEAE			
Cuphea carthagenensis (Jacq.) J.F. Macbr.	tarweed	Nat	A
Cuphea hyssopifolia Kunth	Mexican false heather	Nat	O
MELASTOMATACEAE			
Clidemia hirta (L.) D. Don	Koster's curse	Nat	O
Dissotis rotundifolia (Sm.) Triana	pinklady	Nat	O
Heterocentron subtriplinervium (Link & Otto) A. Braun & Bouché	pearlflower	Nat	R
Tetrazygia bicolor (Mill.) Cogn.	---	Nat	C
MORACEAE			
Ficus sp.	rubber tree	Nat	O

Table 4 (continued).

Species	Common name	Status	Abundance
MYRTACEAE			
Psidium cattleianum Sabine	strawberry guava	Nat	C
Psidium guajava L.	common guava	Nat	O
Rhodomyrtus tomentosa (Aiton) Hassk.	rose myrtle	Nat	R
Syzygium cumini (L.) Skeels	Java plum	Nat	R
Ludwigia octovalvis (Jacq.) P.H. Raven	primrose-willow	Nat	O
Ludwigia palustris (L.) Elliot	water purslane	Nat	R
POLYGALACEAE			
Polygala paniculata L.	bubblegum plant	Nat	AA
RUBIACEAE			
Spermacoce assurgens Ruiz & Pav.	buttonweed	Nat	U
Paederia scandens L.	*maile pilau*	Nat	O
SAPINDACEAE			
Filicium decipiens (Wight & Arnott) Thwaites	Japanese fern tree	Nat	O
SCROPHULARIACEAE			
Torenia asiatica L	torenia	Nat	U
SOLANACEAE			
Solanum americanum Mill.	*pōpolo*	Nat	O
STERCULIACEAE			
Melochia umbellata (Houtt.) Stapf	melochia	Nat	C
ULMACACEAE			
Trema orientalis (L.) Blume	gunpowder tree	Nat	C
UURTICACEAE			
Pilea microphylla (L.) Liebm.	artillery plant	Nat	C
VERBENACEAE			
Lantana camara L.	lantana	Nat	A
Stachytarpheta urticifolia Sims	vervain	Nat	O
MONOCOTYLEDONES			
AGAVACEAE			
Cordyline fruticosa (L.) A. Chev	*kī*, ti	**Pol**	O
ARACEAE			
Epipremnum pinnatum (L.) Engl.	centipede vine	Nat	O
ARECACEAE			
Archontophoenix alexandrae (F. Muell.) H. Wendl. & Drude	Alexandra palm	Nat	O
CANNACEAE			
Canna indica L.	Indian shot	Nat	R
CYPERACEAE			
Cyperus haspan L.	haspan flatsedge	Nat	U
Cyperus polystachyos Rottb.	manyspike flatsedge	Nat	C
Kyllinga nemoralis (J.R. Forst. & G. Forst.) Dandy ex Hutch. & Dalziel	white kyllinga	Nat	C
Rhynchospora caduca Elliot	anglestem beakrush	Nat	U
JUNCACEAE			
Juncus planifolius R. Br.	broadleaf rush	Nat	C
PANDANACEAE			
Pandanus tectorius Parkinson ex Z.	*hala*	**Ind**	R

Table 4 (continued).

Species	Common name	Status	Abundance
POACEAE			
Bambusa sp. (thin green stems)	bamboo	Nat	C
Chloris barbata Sw.	swollen fingergrass	Nat	R
Coix lachryma-jobi L.	Job's tears	Nat	C
Melinus repens (Willd.) Zizka	Natal redtop	Nat	AA
Panicum maximum Jacq.	guinea grass	Nat	C
Panicum repens L.	Wainaku grass	Nat	O
Paspalum conjugatum P.J. Bergius	Hilo grass	Nat	C
Paspalum dilatatum Poir	Dallis grass	Nat	U
Paspalum urvillei Steud.	Vasey's grass	Nat	R
Pennisetum purpureum Schumach.	elephant grass	Nat	O
Sacciolepis indica (L.) Chase	Glenwood grass	Nat	C
Setaria palmifolia (J. Koenig) Stapf	palmgrass	Nat	C
Setaria parviflora (Poir.) Kerguélen	---	Nat	C

Key to Table 4

Status = distributional status

End = endemic; native to Hawai'i and found naturally nowhere else;
Ind = indigenous; native to Hawai'i, but not unique to the Hawaiian Islands;
Nat = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation;
Orn = ornamental or cultivated plant;
Pol = Polynesian introduction before 1778.

Abundance = abundance for the vegetation in the survey area:

R - Rare - a plant species observed only one to three times;
U - Uncommon - a plant species observed four to twelve times;
O - Occasional - a plant that was observed regularly around the site;
C - Common - a plant observed with regularity, considered an important part of the vegetation;
A - Abundant - a plant found in large numbers, may be locally dominant.
AA - Abundantly abundant - a plant found in large numbers throughout the survey area.

and two others, *neneleau* and *hala* (*Rhus sandwicensis* and *Pandanus tectorius*). Two additional species are considered to have been introduced to the Islands by Polynesian migrants before the arrival of Capt. James Cook: *hoi* (*Dioscorea bulbifera*) and *kī* or ti (*Cordyline fruticosa*), increasing the ratio of all pre-1778 species up to 7%. *Neneleau* is endemic (unique to the Hawaiian Islands). In a 2009 survey of Waiākea Stream, which included a larger survey area, 127 plants were identified, with 9% truly native plant species and 16% pre-1778 species identified (*AECOS*, 2010).

Aquatic Biota Survey

Table 5 is a listing of aquatic species identified in Waiākea Stream. Introduced poeciliids are by far the most abundant organisms in the Project area. Green swordtail (*Xiphophorus helleri*) and guppy (*Poecilia reticulata*) have dominated the fauna in every survey conducted by *AECOS* since 1993 (*AECOS*, 1994, 1996, 1997, 2002, and 2009), with dominance appearing to shift from guppies (*AECOS*, 1994, 1996, 1997) to swordtails (*AECOS*, 2002, 2009, and present survey) in more recent years. *'O'opu nākea* (*Awaous guamensis*) is often observed resting on the bottom of the deeper pools, particularly those that harbor benthic algae and are partially shaded. Dragonflies (Odonata) are often observed near Waiākea Stream, as the adults cruise the channel and surrounding area. The spring-fed and ephemeral pools provide habitats for odonate nymphs and other aquatic insects such as the water boatman (*Trichocorixa reticulata*). Additionally, introduced amphibians (the bullfrog, *Lithobates catesbeianus* and the cane toad, *Rhinella marina*) lay eggs and the tadpoles mature in the ponds.

Table 5. Checklist of aquatic animals observed in Waiākea Stream.

PHYLUM, CLASS ORDER, FAMILY Species	Common name	Status	Abundance	
	ALGAE			
CYANOPHYCOTA, CYANOPHYCEAE				
NOSTOCALES, OSCILLATORIACEAE				
Oscillatoria sp	cyanobacteria	**Ind**	A (2, 4, 5)	
CHLOROPHYTA, CHLOROPHYCEAE				
ZYGNEMATALES, ZYGNEMATACEAE				
Spirogyra sp.	green filamentous algae	**Ind**	C (2)	O (4, 5)
	INVERTEBRATES			
ARTHROPODA, INSECTA				
ODONATA, AESHNIDAE				
Anax sp.	*pinao*, naiad	**Ind**	O (6)	
Anax junius (Drury, 1773)	*pinao*, common green darner, adult	**Ind**	O (1)	C (3, 4, 5)
ODONATA, LIBELLULIDAE				
Crocothemis servilia (Drury, 1773)	scarlet skimmer, naiad	Nat	O (1)	
Crocothemis servilia (Drury, 1773)	scarlet skimmer, adult	Nat	C (1)	U (3)
Orthemis ferruginea (Fabricius, 1775)	roseate skimmer, adult	Nat	U (3)	

Table 5 (continued).

PHYLUM, CLASS ORDER, FAMILY Species	Common name	Status	Abundance
ODONATA, LIBELLULIDAE			
Pantala flavescens (Fabricius, 1798)	pinao, globe skimmer, naiad	**Ind**	C (4, 5)
Pantala flavescens (Fabricius, 1798)	pinao, globe skimmer, adult	**Ind**	R (1) C (2, 3) A (4, 5)
ODONATA, COENAGRIONIDAE			
Enallagma civile (Hagen, 1861)	familiar bluet, adult	Nat	U (5, 6)
Ischnura ramburii (Selys, 1850)	Rambur's forktail, adult	Nat	R (1) U (3, 4)
Megalagrion hawaiiense (McLachlan, 1883)	Hawai'i damselfly, adult	**End**	R (3)
HEMIPTERA, CORIXIDAE			
Trichocorixa reticulata (Guérin-Méneville, 1857)	water boatman	Nat	R (1)
ARTHROPODA, MALACOSTRACE			
DECAPODA, CAMBARIDAE			
Procambarus clarkii (Girard, 1852)	red swamp crayfish	Nat	O (1, 3, 5, 6) C (2, 4)
MOLLUSCA, GASTROPODA			
BASOMMATOPHORA, PHYSIDAE			
Physa sp.	pouch snail	Nat	R (1)
BASOMMATOPHORA, LYMNAEIDAE			
unidentified Lymnaeidae	pond snail	Nat	R (6)
VERTEBRATES			
CHORDATA, ACTINOPTERYGII			
PERCIFORMES, ELEOTRIDAE			
Eleotris sandwicensis (Vaillant and Sauvage, 1875)	*'o'opu akupa*	**End**	U (3)
PERCIFORMES, GOBIIDAE			
Awaous guamensis (Valenciennes in Cuvier and Valenciennes, 1873)	*'o'opu nākea*	**Ind**	C (1, 6) O (3)
CYPRINODONTIFORMES, POECLIIDAE			
Gambusia affinis (Baird and Girard, 1853)	mosquitofish	Nat	C (1) U (2)
Poecilia reticulata Peters, 1859	guppy, rainbowfish	Nat	C (1) O (2) A (3, 4, 5, 6)
Poecilia sp. hybrid complex (*salvatoris/mexicana* group)	liberty/Mexican molly	Nat	A (1)
Xiphophorus helleri Heckel, 1848	green swordtail	Nat	A (1, 2, 3, 4, 5, 6)
CHORDATA, AMPHIBIA			
ANURA , BUFONIDAE			

Table 5 (continued).

PHYLUM, CLASS ORDER, FAMILY Species	Common name	Status	Abundance
Rhinella marina (Linnaeus, 1758)	cane toad, tadpole	Nat	A (1, 3, 4, 5) O (6)
Rhinella marina (Linnaeus, 1758)	cane toad, juvenile	Nat	A (1, 2, 3)
RANIDAE			
Lithobates catesbeianus (Shaw, 1802)	American bullfrog, tadpole	Nat	A (1, 3) C (4, 5)
Lithobates catesbeianus (Shaw, 1802)	American bullfrog, adult	Nat	U (2) C (3)
CHORDATA, AVES			
ANSERIFORMES , ANATIDAE			
Anas platyrhynchos Linnaeus, 1758	mallard	Nat	O (1)

Key to Table 5

Status:

Nat - naturalized. An introduced or exotic species;
Ind - indigenous. A native species also found elsewhere in the Pacific;
End - endemic - A native species found only in the Hawaiian Islands.

Abundance:

P - present; abundance unknown;
R - rare; only one to three individuals seen;
O - occasional; three to twelve individuals seen;
C - common; many individuals seen;
A - abundant; numerous.

Notes:

(1) - Observed in the present survey.
(2) - Reported in *AECOS* (2009).
(3) - Reported in *AECOS* (2002).
(4) - Reported in *AECOS* (1997).
(5) - Reported in *AECOS* (1996).
(6) - Reported in *AECOS* (1994).

The Hawai'i Watershed atlas (DLNR-DAR, 2008) lists all five native amphidromous *'o'opu* or gobies (*Stenogobius hawaiiensis*, *Eleotris sandwicensis*, *Awaous guamensis*, *Sicyopterus stimpsoni*, and *Lentipes concolor*) and *ōpae 'ōeha'a* or prawn (*Macrobrachium grandimanus*) as present in the estuary and/or lower reach of Wailoa River. The atlas lists four native damselflies as present in the middle reach (*Megalagrion blackurni* and *M. xanthomelas*) or headwaters (*M. calliphya* and *M. hawaiiense*) of Wailoa River. An adult *M. hawaiiense* was observed in a previous survey of Waiākea Stream near Komohana Street (AECOS, 2002).

Assessment

Water Quality

With regards to state water quality standards, Waiākea Stream is a Class 2 inland water body except for the headwaters in the Waiākea Natural Area Reserve, which are Class 1. Waiākea Stream discharges into Hilo Bay, which is considered a Class A embayment (HDOH, 2009).

Waiākea Stream is listed on the Hawaiʻi Department of Health (HDOH) 2006 list of impaired waters in Hawaiʻi, prepared under Clean Water Act §303(d) (HDOH, 2008). The "impaired" listing is based upon visual observations made from 2001 to 2004. The listing indicates that Waiākea Stream may not meet Hawaiʻi water quality standards for TN, NO_3+NO_2, and TP. Waiākea Stream is listed as a "Category 3" water body, meaning that "there is [sic] insufficient available data and/or information to make a use support determinations [sic]" and as a "Category 5" water body, meaning that "[a]vailable data and/or information indicate that at least one or more designated use is not being supported or is threatened, and a [total maximum daily load or] TMDL is needed." Waiākea Stream has been assigned a TMDL priority code of "high," and a TMDL is purportedly in progress.

State water quality criteria for streams are shown in Table 6. The criteria for temperature and pH are based on deviations from ambient conditions. Criterion for DO saturation is a minimum value and conductivity is based upon a not to exceed value. Criteria for TSS, turbidity, and nutrients are based on geometric means and not to exceed values 10% and 2% of the time.

The purpose of the water quality measurements presented in this report is to characterize the existing aquatic environments, not to establish compliance with Hawaiʻi water quality standards. In fact, the water analyzed from Waiākea Stream was collected from isolated pools, which cannot be strictly compared with criteria for streams, which are flowing waters. Additionally, because the criteria for turbidity, TSS, and nutrient measurements are based on making comparisons to geometric mean values, a minimum of three separate samples per sampling location would be required to generate a proper statistic. Ideally, multiple samplings would encompass a "typical" range of conditions for the location.

Overall, samples collected from the project area on April 11, 2012 demonstrate very good water quality. Recent rainfall and ephemeral flow in the stream channel is likely the source of water in these stations, as indicated by low

conductivity. All three stations harbored dense mats of filamentous green algae, which resulted in elevated DO readings and elevated pH at Sta. 3-Project. Low ammonia concentrations at all stations sampled in 2009 may have indicated that water flow is fairly frequent, since biotic waste was not accumulating in sampled pools that contained both fish and invertebrates.

Table 6. Selected state of Hawai'i water quality criteria for streams (HAR §11-54-5.2; HDOH, 2009).

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

Upper values are for the wet season (November 1 through April 30).
Lower *italicized* values are for the dry season (May 1 through October 31).

Other "standards":
- pH units shall not deviate more than 0.5 units from ambient conditions and not lower than 5.5 nor higher than 8.0
- Dissolved oxygen shall not decrease below 80% of saturation.
- Temperature shall not vary more than 1C^{o} from ambient conditions.
- Conductivity shall not be more than 300 µmhos/cm.

In 2012, water clarity was good and turbidity and TSS levels were low. TN values were typical for Hawaiian streams in rural or undeveloped watersheds, though NO_3+NO_2 values were very low. The lower inorganic nutrients (nitrate + nitrite at least) and abundant benthic algae, suggest these plants are utilizing

available dissolved nutrients to support growth. Total P values were fairly typical for Hawaiian streams in rural or undeveloped watersheds

Temperatures of isolated pools, such as those often found in the Project vicinity, can become quite high. Isolated pools may be stagnant with high primary productivity, causing daytime super-saturation with oxygen and elevating pH levels. At night, DO may drop to very low values. These water quality problems can lead to odors and fish kills. The data collected from this sampling event do not support the decision to list Waiākea Stream as impaired for nutrients.

It is not expected that the Kapiʻolani Street Extension Project will have a long term negative impact on water quality in Waiākea Stream. Water quality impacts generated by construction should be minimal if effective best management practices (BMPs) are employed. Construction plans should incorporate BMPs to prevent degradation of the water of Waiākea Stream.

A Clean Water Act (CWA) permit will be required for the Project if structures will be placed below the ordinary high water mark (OHWM). If a CWA permit is required, the water quality standards presented in Table 6 may be used, together with "baseline" data collected from a series of preconstruction sampling events, to evaluate data collected to monitor the effectiveness of the BMPs. The evaluation process will include a set of decision rules developed as part of the data quality objectives (DQO) process in an applicable monitoring and assessment program (AMAP) developed in accordance with a CWA Section 401 Water Quality Certification (WQC).

Botanical Resources

Most of the plant species recorded within the Project area are widespread species; most are common weedy species. One of the plant species recorded, *neneleau* (*Rhus sandwicensis*), is endemic, but relatively common on windward Hawaiʻi Island. None of the species is listed as endangered or threatened or proposed for inclusion as a listed species by federal or state governments (USFWS, 2008, 2012). The County of Hawaiʻi maintains the stream in the project area as a flood control channel by regularly spraying the vegetation with herbicides and removing larger vegetation with chain saws.

Aquatic Biota

No aquatic species protected by State of Hawaiʻi, Administrative Rules (DLNR, 1998, 2007), nor federally endangered or threatened species (USFWS, 2008, 2012) were observed in Waiakea Stream within the Project area. The native

stream macrofauna are diadromous: eggs are laid in the stream and the larvae that hatch from these eggs move down stream and out into the ocean where they develop for a time before migrating back into fresh water to grow to maturity (Ford and Kinzie, 1982; Kinzie, 1988). Construction should be phased such that at no time is the entire stream bed blocked in a manner that would prevent upstream migration of the native amphidromous fauna when there is stream flow. Construction BMPs developed to prevent degradation of the water of Waiākea Stream are essential to protect the aquatic biota downstream.

Megalagrion xanthomelas, is reported (DLNR-DAR, 2008) as occurring in the middle and upper reaches of Waiākea Stream, well upstream from the Project area. *M. xanthomelas* is a candidate species for listing on the endangered species list (USFWS, 2012). This species tends to breed in coastal wetlands fed by basal springs or in the lower reaches of perennial streams, although will opportunistically exploit temporary pools bordering flashy streams. Eggs are laid on aquatic vegetation (Polhemus and Asquith, 1996). To limit impact to this species, aquatic vegetation in the Project area should be maintained to the extent practical and rugosity of the streambed maintained to allow for the formation of temporary pools after freshets.

References

AECOS, Inc. (AECOS). 1994. An environmental reconnaissance survey of Waiakea Stream, Hilo, Hawaii for a sewerage crossing at U.H. Hilo. Prep. for Engineering Concepts, Inc. *AECOS* No. 765A: 9 pp.

_____. 1996. An Environmental Assessment for a Bridge Crossing of Waiakea Stream at University of Hawaii, Hilo, Hawai'i. *AECOS* No. 765B: 10 pp.

_____. 1997. An Assessment of Stream Impacts for a bridge crossing of Waiakea Stream at University of Hawaii, Hilo, Hawai'i. Prep. for Engineering Concepts, Inc. *AECOS* No. 765C: 12 pp.

_____. 2002. An Environmental Reconnaissance Survey of Waiakea Stream for the USDA Pacific Basin Agricultural Research Center on the Island of Hawai`i. Prep. for SSFM Inc. *AECOS* No. 947A: 14 pp.

_____. 2009. Stream biological and water quality surveys for the Waiākea Flood Control Project, Hilo, Hawaiʻi. Prep. for Wil Chee Planning, Inc. *AECOS* No. 1198A: 13 pp.

AECOS, Inc. (AECOS). 2010. Flora and fauna surveys for the Waiākea Flood Control Project, Hilo, Hawaiʻi. Prep. for Wil Chee Planning, Inc. AECOS No. 1198B: 28 pp.

Ford, J. I. and R. A. Kinzie III. 1982. Life crawls upstream. *Nat. Hist.*, 91: 61-67.

Grasshoff, K., M. Ehrhardt, and K. Kremling (eds). 1999. Methods of Seawater Analysis (3rd ed). Wiley-VHC. 419 pp.

Hawaiʻi Department of Health (HDOH). 2008. 2006 State of Hawaii Water Quality Monitoring and Assessment Report: Integrated Report to the U.S. Environmental Protection Agency and The U.S. Congress Pursuant To Sections §303(D) and §305(B), Clean Water Act (P.L. 97-117). 279 pp.

_____. 2009. Hawaiʻi Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards. State of Hawaiʻi, Department of Health. 92 pp.

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

Hawaiʻi Department of Land and Natural Resources (DLNR). 2007. Hawaiʻi Fishing Regulations. State of Hawaiʻi. Administrative Rule §13-95, §13-100, and §188-43.

Hawaiʻi Department of Land and Natural Resources-Division of Aquatic Resources (DLNR-DAR). 2008. Atlas of Hawaiian Watershed & Their Aquatic Resources. Island of Hawaiʻi, Hilo Region Watersheds, Wailoa River. Available online at URL: http:// http://www.hawaiiwatershedatlas .com/watersheds/hawaii/82061.pdf; last visited June 5, 2012.

Kinzie, R. A. III. 1988. Habitat utilization by Hawaiian stream fishes with reference to community structure in oceanic stream islands. *Environ. Biol. of Fishes,* 22: 179-192.

Polhemus, D. A. and A. Asquith. 1996. *Hawaiian Damselflies: A Field Identification Guide*. Bishop Museum Press. 122 pp.

Standard Methods (SM). 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. 1998. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA, & WEF. 1220 pp.

Telliaferro, W. J. 1959. Rainfall of the Hawaiian Islands. State of Hawaiʻi, Hawaiʻi Water Authority, Honolulu, Hawaii. 394 pp.

U.S. Environmental Protection Agency (USEPA). 1993. Methods for the Determination of Inorganic Substances in Environmental Samples. EPA 600/R-93/100.

U.S. Fish and Wildlife Service (USFWS). 2008. Part II. Department of the Interior. Fish and Wildlife Service. 50 CFR 17. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates or Proposed for Listing as Endangered or Threatened: Annual Notice of Findings on Resubmitted Petitions: Annual Description of Progress on Listing Actions. Proposed Rule. *Federal Register*, 73 (238; December 10, 2008): 75175-75244.

_____. 2012. USFWS Threatened and Endangered Species System (TESS). Available online at URL: http://ecos.fws.gov/tess_public/; last accessed June 5 2012.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 4
Archaeological Inventory Survey

[This page intentionally left blank]

RC-0770

An Archaeological Inventory Survey for the Proposed Kapiʻolani Street Extension Project (TMKs: 3-2-4-01:181, 182, and 3-2-4-56:029)

Waiākea Ahupuaʻa
South Hilo District
Island of Hawaiʻi

PREPARED BY:

Matthew R. Clark, B.A.,
J. David Nelson, B.A.,
and
Robert B. Rechtman, Ph.D.

PREPARED FOR:

Ron Terry, Ph.D.
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

June 2012

RECHTMAN CONSULTING, LLC
507-A E. Lanikaula St. Hilo, Hawaii 96720
phone: (808) 969-6066 fax: (808) 443-0065
e-mail: bob@rechtmanconsulting.com
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

An Archaeological Inventory Survey for the Proposed Kapiʻolani Street Extension Project (TMKs: 3-2-4-01:181, 182, and 3-2-4-56:029)

Waiākea Ahupuaʻa
South Hilo District
Island of Hawaiʻi

Rechtman Consulting

EXECUTIVE SUMMARY

At the request of Ron Terry, Ph.D. of Geometrician Associates, LLC, on behalf of the County of Hawai‘i, Department of Public Works, Rechtman Consulting, LLC conducted an archaeological inventory survey of a 200-foot wide corridor for the proposed extension of Kapi‘olani Street between Mohouli and Lanikāula Streets in Hilo Town, Waiākea Ahupua‘a, South Hilo District, Island of Hawai‘i. The proposed road construction will occur on three, 60-foot wide, state-owned parcels (TMKs: 3-2-4-01:181, 182, and 3-2-4-56:029), and will connect the existing paved portion of Kapi‘olani Street that extends southeast from Mohouli Street (on TMK: 3-2-4-01:181 por.) with the existing intersection of Kapi‘olani and Lanikāula Streets near the University of Hawai‘i at Hilo campus. The road will also cross the “Wailoa River & Tributaries Flood Control Project” drainage channel (TMK: 3-2-4-01:019), which will necessitate the construction of a bridge. While the finished road will extend in a straight line across the above mentioned parcels, to allow for appropriate slope contours along either side of the roadway, portions of neighboring parcels may have to be acquired. For this reason, the survey corridor also included the undeveloped portions of several parcels located adjacent to the roadway (portions of TMKs: 3-2-4-01:024, 120, 179, 183, and 3-2-4-56:014, 015, 021, 022, 028, 030). The survey corridor extended 70 feet into these parcels on either side of the proposed road alignment. Also, intersection improvements at Mohouli Street and Lanikāula Street may require that portions of six additional parcels are impacted during construction; four at the intersection of Mohouli Street (portions of TMKs: 3-2-4-23: 022, 023 and 3-2-4-28:014, 032), and two at the intersection of Lanikāula Street along the existing portion of Kapi‘olani Street (portions of TMKs: 3-2-4-01:167 and 3-2-4-57:024). All six of these parcels located at the Kapi‘olani Street intersections are already developed, and any impacts will be minimal requiring no more than an additional 3 feet of land along the existing roadways.

As a result of the current inventory survey four archaeological sites dating to the Historic Period were recorded within the survey corridor. The sites include a modified drainage (Site 29370) and earthen ditch (Site 29371) seemingly designed to control water flow from the Waiākea Stream basin during times of heavy rain, a piled cobble mound (Site 29372), and the remnants of the old Hilo Dairy buildings (Site 29373) including several concrete foundations, metal roofing material, and a bottle dump. All of the sites are located within the main 200-foot wide survey corridor. No archaeological resources were identified at the intersections of Kapi‘olani and Mohouli/Lanikāula Streets.

All of the recorded sites date to the Historic Period (likely the early to middle twentieth century) and are associated with either flood control from the Waiākea Stream basin, the cultivation of sugarcane for the Waiākea Sugar Company, or the former Hilo Dairy. All four are considered significant under Criterion d for information yielded relative to twentieth century land use within the study area. The data collection at and about these sites in the form of archival research, and field recordation and photography is substantial enough to have mitigated any potential impacts to the sites from the proposed construction of the Kapi‘olani Street extension; therefore no further historic preservation work is the recommended treatment.

CONTENTS

INTRODUCTION....1
Project Area Description....1
BACKGROUND....8
Culture-Historical Context....8
Previous Archaeological Studies....24
CURRENT PROJECT EXPECTATIONS....25
FIELDWORK....26
Methods....26
Findings....26
SUMMARY....46
SIGNIFICANCE EVALUATION AND TREATMENT RECOMMENDATIONS....47
REFERENCES CITED....48

FIGURES

1. Project area location....2
2. Tax Map Keys (TMKs): 3-2-4-01 and 3-2-4-56 showing the current survey corridor....3
3. Existing intersection of Kapiʻolani and Lanikāula Streets, view to the south....4
4. Existing intersection of Kapiʻolani and Mohouli Streets, view to the northwest....4
5. "Wailoa River & Tributaries Flood Control Project" drainage channel, view to south....5
6. Aerial view of the survey corridor (from Google Earth)....6
7. Vegetation in the central portion of the survey corridor, view to northwest....7
8. Vegetation in the southeastern portion of the survey corridor, view to northwest....7
9. Existing road and vegetation in the northwestern portion of the survey corridor, view to northwest....8
10. Portion of 1891 Hawaiʻi Registered Map No. 1561 showing Hilo Town and vicinity....10
11. Portion of a 1918 Waiākea Mill Company field map showing the current project area....13
12. Hawaiʻi Registered Map No. 2600 showing the current survey corridor....14
13. Hawaiʻi Territory Survey Plat 789 showing the Waiākea Cane Lots for lease in August 1923 and the current survey corridor....15
14. 1945 Map of the Waiākea Mill Company Railroad Right of Ways (C.S.F. 5737), showing Lot 2 of the Waiākea Homesteads....16
15. 1946 map (C.S.F. 10296) showing the withdrawl of a portion of the General Lease No. 2618 to Kazuo Miyasaki for the Mohouli Heights Subdivision....17

16. 1947 Hawai‘i Territory Survey Plat 911 showing the Mohouli Heights House Lots and highlighting (in red) the four lots examined as part of this study at the intersection of Mohouli and Kapi‘olani Streets. 18

17. Portion of an October 14, 1954 aerial photograph of Hilo Town showing the centerline of the proposed road corridor. 19

18. U. S. Army Corps of Engineers map of the “Wailoa Stream & Tributaries Flood Control Project.” 21

19. Portion of a January 16, 1965 aerial photograph of Hilo Town showing the centerline of the proposed road corridor. 22

20. Hawai‘i Registered Map No. 4103 (May 10, 1957) showing the proposed extension of Kapi‘olani Street. 23

21. Site location map. 27

22. SIHP Site 29370 plan view. 28

23. Filled in section of the SIHP Site 29370 modified drainage, view to the northeast. 29

24. SIHP Site 29370, aligned small boulders along the northwest edge of the drainage to the southwest of the proposed road centerline, view to the northeast. 30

25. SIHP Site 29370, aligned small boulders along the northwest edge of the drainage, view to the northwest. 30

26. SIHP Site 29370, retaining wall along the northwestern gulch edge northeast of the centerline, view to the northeast. 31

27. SIHP Site 29370, stacked southeastern edge of the retaining wall, view to the north. 31

28. SIHP Site 29370, L-shaped cobble alignment (crude dam), view to the southwest of the down slope, northeastern edge. 32

29. SIHP Site 29371, earthen ditch, view to the northwest near the southeast end. 33

30. SIHP Site 29372, cobble mound, view to the southwest. 34

31. SIHP Site 29372 plan view. 35

32. SIHP Site 29372, cobble alignment extending northwest from the north corner of the mound, view to the northwest. 36

33. SIHP Site 29373 plan view. 37

34. SIHP Site 29373 Feature A, bathroom structure, view to the south. 39

35. SIHP Site 29373 Feature A, concrete sink basin, view to the east. 39

36. SIHP Site 29373 Feature A, concrete toilet base, view to the south. 40

37. SIHP Site 29373 Feature B, loading ramp, view to the west. 41

38. SIHP Site 29373 Feature B, collapsed southwestern edge, view to the north. 41

39. SIHP Site 29373 Feature C, concrete foundation, view to the west. 42

40. SIHP Site 29373 Feature C, concrete foundation, view to the south. 43

41. SIHP Site 29373 Feature C, recessed area in the southwest corner, view to the west. 43

42. SIHP Site 29373 Feature D, corrugated metal roofing and concrete slab (to right), view to the south. 44

43. Hilo Dairy M. Miyasaki milk bottle. 45

44. MM on bottom of bottle. 45

TABLES

1. Archaeological sites recorded during the current inventory survey. 26

2. Site significance and treatment recommendations. 46

INTRODUCTION

At the request of Ron Terry, Ph.D. of Geometrician Associates, LLC, on behalf of the County of Hawaiʻi, Department of Public Works, Rechtman Consulting, LLC conducted an archaeological inventory survey of a 200-foot wide corridor for the proposed extension of Kapiʻolani Street between Mohouli and Lanikāula Streets in Hilo Town, Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figure 1). The proposed road construction will occur on three, 60-foot wide, state-owned parcels (TMKs: 3-2-4-01:181, 182, and 3-2-4-56:029), and will connect the existing paved portion of Kapiʻolani Street that extends southeast from Mohouli Street (on TMK: 3-2-4-01:181 por.) with the existing intersection of Kapiʻolani and Lanikāula Streets near the University of Hawaiʻi at Hilo campus (Figure 2). The road will also cross the "Wailoa River & Tributaries Flood Control Project" drainage channel (TMK: 3-2-4-01:019), which will necessitate the construction of a bridge. While the finished road will extend in a straight line across the above mentioned parcels, to allow for appropriate slope contours along either side of the roadway portions of neighboring parcels may have to be acquired. For this reason, the survey corridor also included the undeveloped portions of several parcels located adjacent to the roadway (portions of TMKs: 3-2-4-01:024, 120, 179, 183, and 3-2-4-56:014, 015, 021, 022, 028, 030). The survey corridor extended 70 feet into these parcels on either side of the proposed road alignment. Also, intersection improvements at Mohouli Street and Lanikāula Street may require that portions of six additional parcels are impacted during construction; four at the intersection of Mohouli Street (portions of TMKs: 3-2-4-23: 022, 023 and 3-2-4-28:014, 032), and two at the intersection of Lanikāula Street along the existing portion of Kapiʻolani Street (portions of TMKs: 3-2-4-01:167 and 3-2-4-57:024). All six of these parcels located at the Kapiʻolani Street intersections are already developed, and any impacts will be minimal requiring no more than an additional 3 feet of land along the existing roadways.

This project was undertaken in compliance with the Historic Preservation Review (HAR) process requirements (HAR 13§13-275-5) of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) and the County of Hawaiʻi Planning Department. The report contains background information outlining the project area's physical and culture-historical contexts, a summary of previous archaeological work in the vicinity of the project area, and a discussion of current survey expectations based on that information. Also included are an explanation of the project's methods, a description of the archaeological sites encountered, along with interpretation and evaluation of those resources, and treatment recommendations for each of the documented sites.

Project Area Description

The current project area consists of a 200-foot (61-meter) wide survey corridor that runs for roughly 2,040 feet (622 meters) in a straight line between the current Lanikāula Street/Kapiʻolani Street intersection and the existing paved portion of Kapiʻolani Street that extends southeast from Mohouli Street (see Figure 1). The proposed road construction will occur on three, 60-foot (18-meter) wide, state-owned parcels (TMKs: 3-2-4-01:181 por., 182, and 3-2-4-56:029) created specifically for the extension of Kapiʻolani Street (see Figure 2). The proposed Kapiʻolani Street extension will also cross the "Wailoa River & Tributaries Flood Control Project" drainage channel (TMK: 3-2-4-01:019), which was built during the 1960s to control flood waters. The drainage ditch separates TMK: 3-2-4-01:182 from 3-2-4-56:029. To avoid unknowingly impacting (directly or indirectly) nearby archaeological resources during road construction activities, and to allow for the potential acquisition of adjacent properties for additional slope contour purposes, the width of the survey corridor was expanded 70 feet (21.5 meters) beyond the boundaries of the three main study parcels to ensure that all proximate archaeological features would be identified and mitigated prior to the proposed development. For this reason the survey corridor also included, in addition to the three study parcels, undeveloped portions of ten neighboring parcels (TMKs: 3-2-4-01:24, 120, 179, and 183, and 3-2-4-56:014, 015, 021, 022, 028, and 030). Separate from the survey corridor are the six developed parcels located at the intersections with Mohouli and Lanikāula Streets (TMKs: 3-2-4-01:167; 3-2-4-23:022, 023; 3-2-4-28:014, 032; and 3-2-4-57:024), which may be minimally impacted for improvements to the existing intersections (Figures 3 and 4).

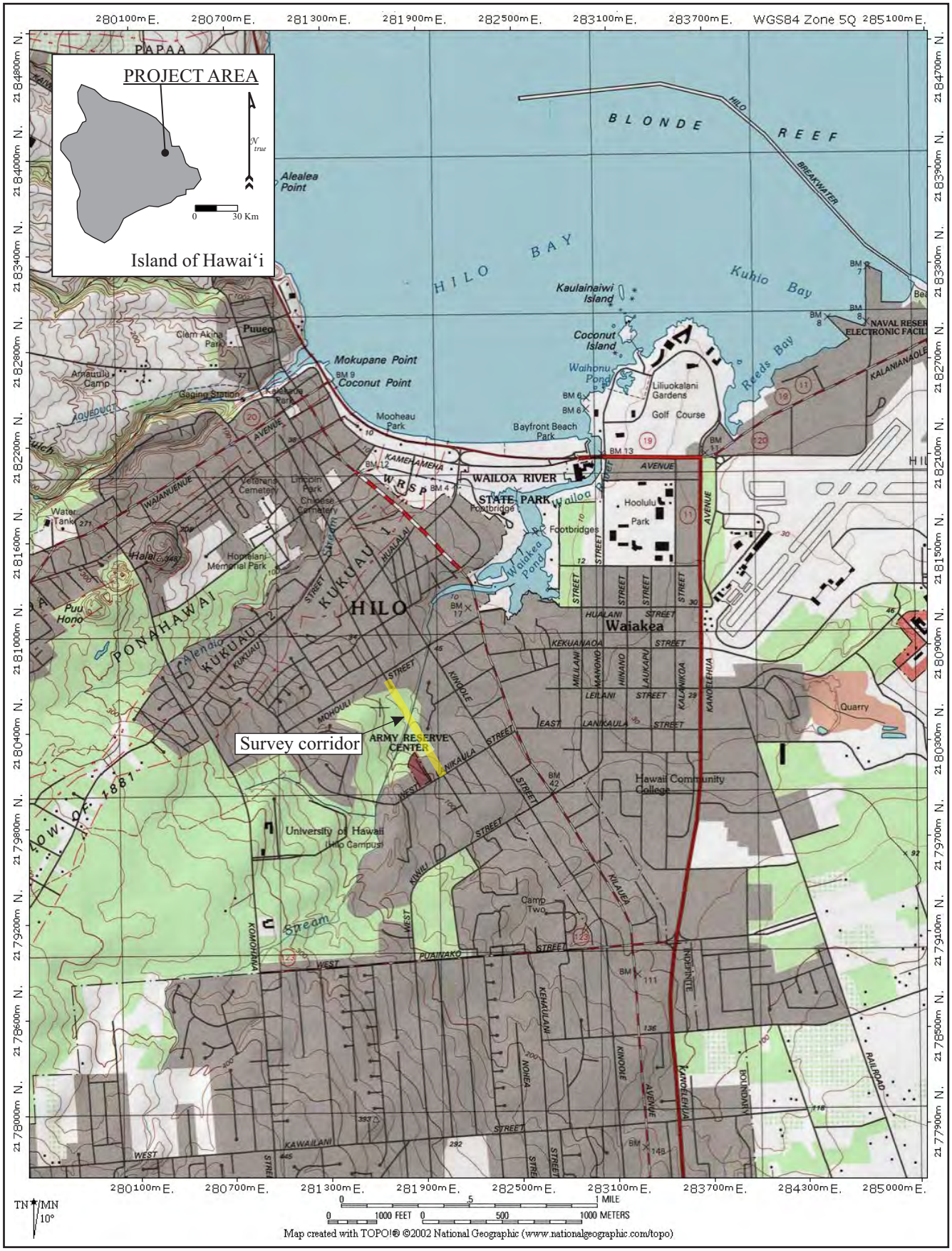


Figure 1. Project area location.

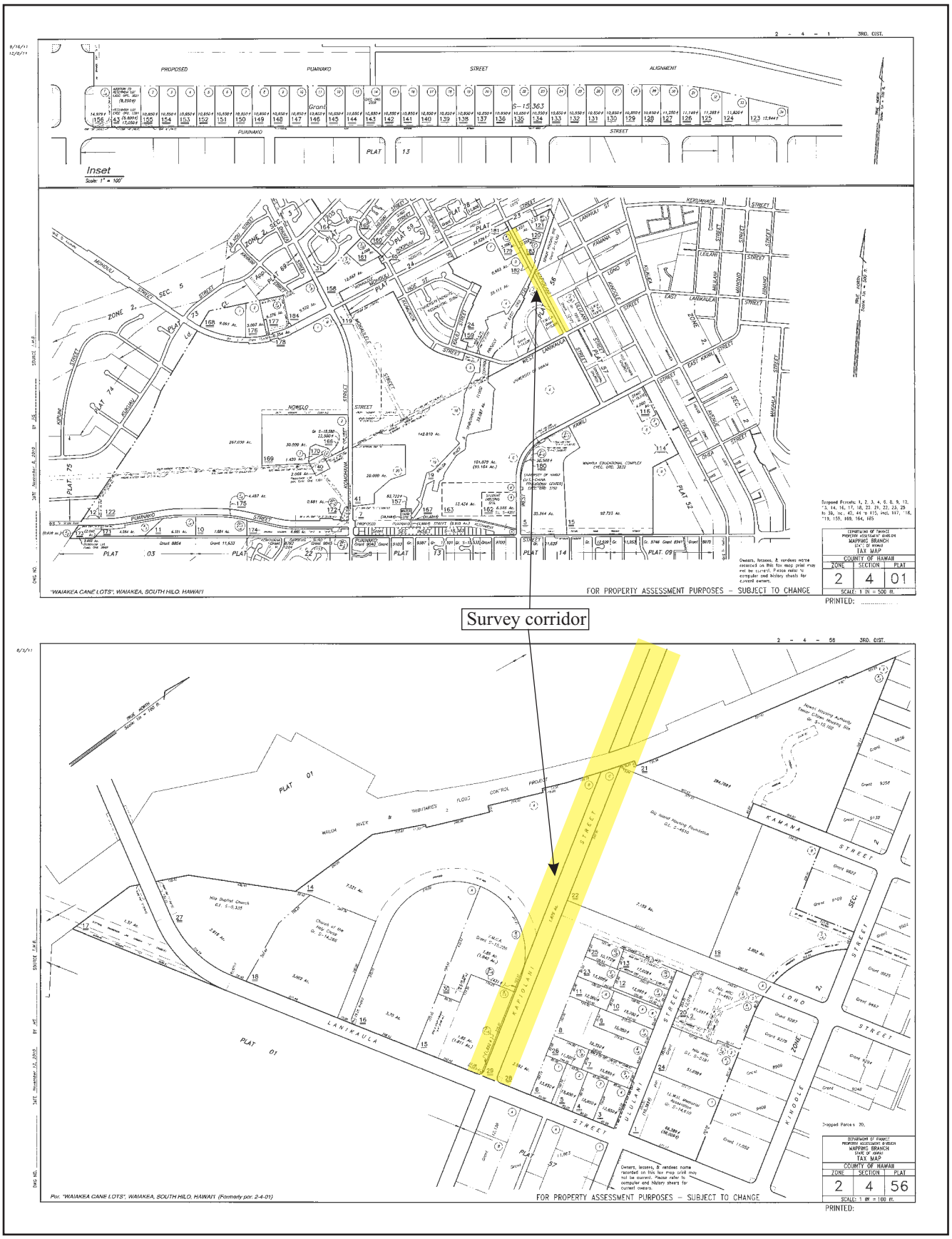


Figure 2. Tax Map Keys (TMKs): 3-2-4-01 and 3-2-4-56 showing the current survey corridor.

Figure 3. Existing intersection of Kapiʻolani and Lanikāula Streets, view to the south.

Figure 4. Existing intersection of Kapiʻolani and Mohouli Streets, view to the northwest.

The survey corridor is located at approximately 60-80 feet above sea level. The soil in the northwestern portion of the study area is classified as Keaukaha extremely rocky muck (rKFD), a dark brown and strongly acid soil that is approximately 8 inches thick, and follows the undulating topography of the underlying *pāhoehoe* flow. The soil in the southern portion of the study area is classified as Papai extremely stony muck (rPAE), a well-drained, thin, extremely stony organic soil formed over fragmented *ʻaʻā*. The permeability of these soils is rapid, runoff moderate, and erosion hazard slight; the Capability Subclass is IV, and the soils of this type are mainly used for pasture and woodland (Sato et al. 1973). These soils have formed over Mauna Loa lava flows that are approximately 750-1,500 years old (Wolfe and Morris 1996). The two soil types are separated by a drainage channel that was formerly the Waiākea Stream basin. Water flow through this drainage channel was redirected during the 1960s into the "Wailoa River & Tributaries Flood Control Project" drainage channel (Figure 5), which now bisects the survey corridor northwest of the natural drainage channel, directing flood waters into the Waiākea fish pond and the Wailoa River. At the time of the current fieldwork the centerline of the proposed road alignment had been recently marked in the field with flagging tape and lathe every 100 feet by surveyors.

Figure 5. "Wailoa River & Tributaries Flood Control Project" drainage channel, view to south.

Vegetation in the survey corridor is dense and varied (Figure 6). The northwestern and southeastern portions of the project area contain a secondary growth of tall trees and palms with a thick to moderate understory of various grasses, vines, shrubs, and ferns. The central portion of the project area, between the two drainage channels contains a thick growth of bamboo, and a few tall trees (Figure 7). The existing vegetation pattern indicates that the study property has undergone substantial alteration in the past, including mechanized clearing and earth moving. The terrain and vegetation in the southeastern portion of the survey corridor (Figure 8), on the Lanikāula Street side of the natural drainage channel, indicates that this area was formerly planted in sugarcane. One property along the Kapiʻolani Street alignment adjacent to Lanikāula Street in this area (TMK: 3-2-4-56:15) has already been developed and is home to the Hilo Y.M.C.A.. In the northwestern portion of the project area, between Mohouli Street and the "Wailoa River & Tributaries Flood Control Project" drainage channel, a portion of Kapiʻolani Street (closest to Mohouli Street) has already been built and paved. Two lots along this existing paved portion of Lanikāula Street have been developed; one with a church (TMK: 3-2-4-01:120), and the other with the Hospice of Hilo (TMK: 3-2-4-01:179; currently under construction). The remainder of the Kapiʻolani Street alignment, up to the drainage channel, has been grubbed and is currently drivable. The vegetation pattern along either side of drivable road suggests that this area was once cleared land. Lease agreements (on file at the DLNR-Land Division Hilo office) indicate that this area was fenced pasture until the mid-1960s. The central portion of the survey corridor, between the two drainages does not appear to have undergone substantial land clearing in the past. Ground surface in this area consists primarily of exposed *pāhoehoe* bedrock covered by the aforementioned thick growth of bamboo.

Figure 6. Aerial view of the survey corridor (from Google Earth).

Figure 7. Vegetation in the central portion of the survey corridor, view to northwest.

Figure 8. Vegetation in the southeastern portion of the survey corridor, view to northwest.

Figure 9. Existing road and vegetation in the northwestern portion of the survey corridor, view to northwest.

BACKGROUND

To generate a set of expectations regarding the nature of archaeological resources that might be encountered within the survey corridor, and to establish an environment within which to access the significance of any such resources, a general culture-historical background for the region and a summary of previous archaeological studies conducted nearby the project area are presented.

Culture-Historical Context

This section summarizes the general cultural history of Hilo and more specifically the history of Waiākea Ahupuaʻa. For a more in-depth historical background the reader is referred to Kelly et al. (1981), Maly (1996a), Maly (1996b), Moniz (n.d.), and McEldowney (1979).

The earliest historical knowledge of Hilo comes from legends written by Kamakau (1961) of a 16th century chief ʻUmi-a-Liloa (son of Liloa) who at that time ruled the entire island of Hawaiʻi. Descendants of Umi and his sister-wife were referred to as "Kona" chiefs, controlling Kaʻū, Kona, and Kohala, while descendants of Umi and his Maui wife were "Hilo" chiefs, controlling Hāmākua, Hilo, and Puna (Kelly et al. 1981). According to Kamakau (1961) both sides fought over control of the island, desiring access to resources such as feathers, *māmaki* tapa, and canoes on the Hilo side; and *wauke* tapa, and warm lands and waters on the Kona side (c.f. Kelly et al. 1981).

Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into *ahupuaʻa* that today retain their original names (Kelly et al. 1981). These include the *ahupuaʻa* of Puʻuʻeo, Piʻihonua, Punahoa, Pōnohawai, Kūkūau and Waiākea. The design of these land divisions was that residents could have access to all that they needed to live, with ocean resources at the coast, and agricultural and forest resources in the interior. However, only Piʻihonua and Waiākea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly et al. 1981).

Historical accounts (McEldowney 1979) indicate that much of Waiākea was in a zone of agricultural productivity. As Isabella Bird recorded upon arriving in Hilo in 1873:

> Above Hilo, broad lands sweeping up cloudwards, with their sugar cane, *kalo*, melons, pine-apples, and banana groves suggest the boundless liberality of Nature. (Bird 1964:38)

Handy and Handy (1972) also describe the general region as an agricultural area:

> On the lava strewn plain of Waiakea and on the slopes between Waiakea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in all the lower fern-forest zone above Hilo town along the course of the Wailuku River. (Handy and Handy 1972:539)

Maly (1996a) refers to a 1922 article from the Hawaiian Language newspaper, *Ka Nupepa Kūʻokuʻa*, where planting on *pāhoehoe* lava flats is described:

> There are *pahoehoe* lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (*mau kaʻau*) of them. The house sites are still there, not one or two but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors. (Maly 1996a:A-2)

Hilo was one of the larger population centers on the Island of Hawaiʻi, and also an area frequented by the *aliʻi* (Moniz n.d.). Captain George Vancouver, an early European explorer who met with Kamehameha I at Waiākea in 1794, recorded that Kamehameha was there preparing for his invasion of the neighbor islands, and that Hilo was an important center because his canoes were being built there (Moniz n.d.:7). The people of Hilo had long prepared for Kamehameha's arrival and collected a large number of hogs and a variety of plant foods, to feed the ruler and his retinue. Kelly et al. (1981) surmises that the people of Hilo had actually prepared for a year prior to Kamehameha's visit and expanded their fields into the open lands behind Hilo to accommodate the increased number of people that would be present. Kelly et al. (1981) also speculates that many of the fish ponds in Waiākea were created to feed Kamehameha, his chiefs, and craftsmen. It was during this early Historic Period that Waiākea Ahupuaʻa became part of Kamehameha I's personal land holdings (Moniz n.d.:11).

William Ellis, one of the first missionaries to arrive in Hawaiʻi, spent five days in Waiākea in 1823 (Ellis 1963). He described it as a well-watered place, with some of the heaviest rains and densest fog he had encountered on the island. He considered the inhabitants lucky because of the well-stocked fishponds, fertile soil, and nearby woods as a source of lumber. Ellis (1963) estimated that nearly 400 houses were present near the bay, with a population of not less than 2,000 inhabitants. Ellis eventually set up a mission station in Waiākea that lasted until 1825, when it was moved to Punahoa 2nd Ahupuaʻa (Moniz n.d.).

As a result of the *Māhele* in 1848, Waiākea Ahupuaʻa was set aside as Crown Lands (for the occupant of the throne). Additionally, according to Moniz (n.d.:12) twenty-six *kuleana* claims (LCAw.) were registered for lands in Waiākea; most of these lands were centered along fishponds or major inland roads, and none were in the immediate vicinity of the current study area. Most of the awards were for houselots and cultivated sections. The *kuleana* awarded nearest the current project area were LCAw. 2402 to Keaniho and LCAw. 2663 to Kahue (Figure 10), both were agricultural lots located side by side along the boundary between Waiākea and Kūkūau 1st *ahupuaʻa* (Maly 1996b). One of the Land Commission Awards (LCAw. 7713) was for the *ʻili* of Piʻopiʻo, which was traditionally the residence of chiefs, and which later served as the location of the original mission station in Waiākea (Moniz n.d.:9). This land was given by Kamehameha I to his wife Kaʻahumanu, and then awarded to Victoria Kamalumalu during the *Māhele*. Kamehameha IV, Alexander Liholiho, as the occupant of the throne during the *Māhele*, received the rest of the *ahupuaʻa*.

Following the *Māhele*, Kamehameha IV leased large portions of Waiākea to outside interests for pasture and sugarcane cultivation (Moniz n.d.). In 1861 S. Kipi leased the Crown Lands of Waiākea for the rate of $600 dollars a year to be used as pasture land for five years (Kelly et al. 1981; Maly 1996a). In 1874 the first lease for sugarcane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996a). This lease was eventually transferred to the Waiākea Mill Company, founded by Alexander Young and Theo H. Davis, and the Waiākea Sugar Plantation was established in 1879.

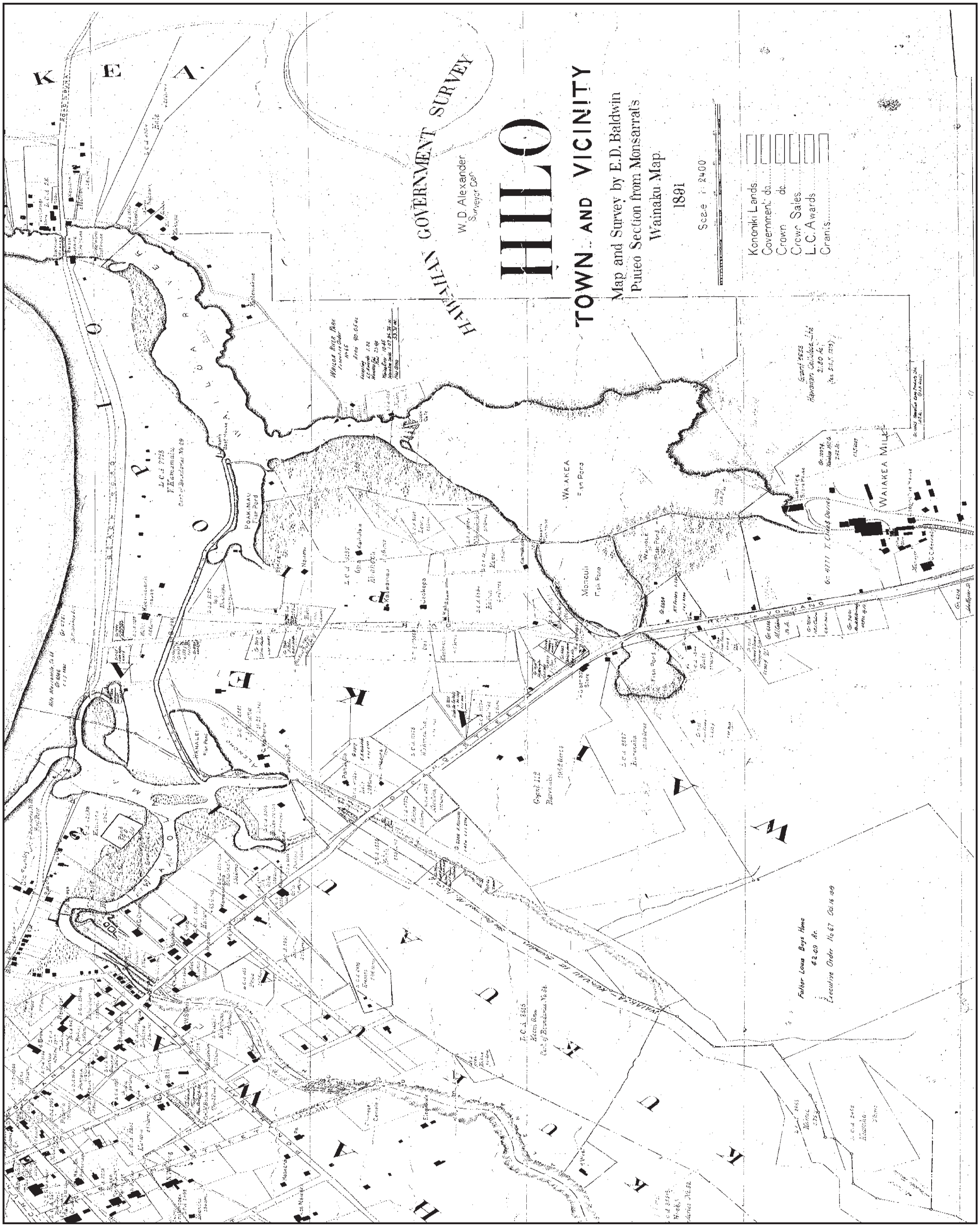


Figure 10. Portion of 1891 Hawai'i Registered Map No. 1561 showing Hilo Town and vicinity.

The Waiākea Mill Company started with about 350 acres of cultivated lands they had acquired from Lyman. The Waiākea sugar mill, built in 1879, was located at the inland end of Waiākea fish pond (see Figure 10), and the company lands extended south from the mill to the uplands of Waiākea Ahupuaʻa (Kelly et al. 1981). In 1888 the company acquired a 30-year lease that increased their land holdings in Waiākea Ahupuaʻa. When the lease ran out in 1918 the land under cultivation had increased to nearly 7,000 acres. A 1918 map of the Waiākea Mill Company's fields shows that the current survey corridor extended southeast from Mohouli Street, which was no more than a path at that time leading to Father Louis Boy's home, a Catholic orphanage for boys established by Father Aloysius Borghouts in ca. 1916, across uncultivated land into the 141-acre Field 4 at its northwestern end (Figure 11). Two alignments of temporary railroad tracks are shown crossing the survey corridor.

When the Waiākea Mill Company's lease of Waiākea Ahupuaʻa expired in 1918 the land fell under new homesteading laws that required the government to lease portions of it to individual homesteaders who would be willing to grow sugarcane (Kelly et al. 1981). Waiākea Ahupuaʻa was divided up by the Territory of Hawaiʻi into house lots, homesteads, and cane lots of various sizes for lease and purchase (Figure 12). The house lots, centered along Kīlauea Avenue, were primarily for the working men and their families to establish residences. The homesteads and cane lots stretched west of Kīlauea Avenue, encompassing much of the already cultivated cane lands of Waiākea. The first series of homesteads were created by 1919, followed by the cane lots. The lots ranged in size from 10 to 76 acres (Kelly et al. 1981). Lanikāula and Mohouli Streets were created as part of the Waiākea Cane Lot Subdivision.

Contracts drawn up between the homesteaders and the Waiakea Mill Company stipulated that the Homesteaders were expected to care for, harvest, and arrange for transport of the sugarcane to the mill, while the Waiākea Mill Company was expected to grind the crop. The company was to retain 40% of the proceeds from the sale of the refined sugar, while the individual growers received the other 60%, less the milling expenses (Kelly et al. 1981). The government was providing mortgages to the Homesteaders for construction and field expenses (Maly 1996b). By the time the first cane crop was harvested in 1920 concerns were being raised about the program by both the Homesteaders and the Waiākea Mill Company, and the Waiākea Homestead Commission (WHC) was established to investigate the matter. The WHC found fault on the part of both parties, stating that while the Waiākea Mill Company failed to fulfill its contractual obligations to the Homesteaders; the ignorance, negligence, and inability of the Homesteaders to properly care for the cane also contributed to poor yields and the loss of revenues. The dispute led to litigation, and in 1922 a settlement was reached between the Government, the Homesteaders, and the Waiākea Mill Company that extended the leases for sixteen years (until 1938) and stipulated that the Homesteaders were to grow cane on their lands until, or unless, they fulfilled the residential and other requirements, and obtained title to their lands (Maly 1996b).

An August 1923 map (H.T.S. Plat 769; Figure 13) of the cane lots shows that the current survey corridor crosses Lot 2 and Lot 3 of the Waiākea Cane Lots between Lanikāula and Mohouli Streets. Lot 2 is described as containing 59.5 acres with 16.39 acres of cane, 41.98 acres of waste, and 1.13 acres retained by the Waiākea Mill Company for a 30-foot railroad right-of-way. Lot 3 is described as containing 24.6 acres with 20.75 acres of cane, 3.8 acres of waste, and 0.05 acres retained by the Waiākea Mill Company for a 30-foot railroad right-of-way. The August, 1923 Hawaiʻi Territory Survey map (H.T.S. Plat 769) of the Waiākea Cane Lots for lease, shows the areas of waste and sugarcane within each lot, along with the railroad right-of ways (see Figure 13).

In 1938 when the Waiākea leases were renegotiated, many of the Homesteaders acquired title to their lands, and the Town of Hilo began to change from a company town centered on sugarcane production to a small city. Jared Smith in a July 2, 1941 article in the *Honolulu Advertiser* entitled "Waiakea Mill Has Had Long, Stormy Career" writes:

> . . . Already, homesteaders who have paid their debts, observed residence requirements and acquired title from the government, are subdividing their properties into city lots. The lower end of the plantation is slightly, looking down on City and Harbor . . . Owners are building streets into their subdivisions. City water is available and gas and electricity.

> Other homesteaders who have acquired titles are raising poultry or pigs, and growing flowers and vegetables instead of cane. The plantation will lose more cane land as Hilo grows. (Maly 1996b:29)

Those Homesteaders that did not acquire title to their lands in 1938 continued to grow sugarcane for the Waiākea Mill Company. No record of a lease was found for either Lot 2 or Lot 3 of the Waiākea Cane lots prior to 1937. It is likely that the cane areas within both lots continued to be cultivated throughout the 1920s and 30s either by the Waiākea Mill Company, or by lessees for which the lease records were not found. On September 10, 1937 Lot 2 of the Waiākea Cane Lots was assigned to Hidekichi Fukunaga as General Lease No. 2618 for the cultivation of sugarcane. In an August 8, 1938 letter, however, Hidekichi Fukunaga expressed his desire to transfer the lease, stating that he was too old to cultivate cane land. General Lease No. 2618 for Lot 2 was then reassigned for a term of 15 years to Kazuo Miyasaki and K. Yoshimoto, who were the proprietors of the Hilo Dairy. Kazuo Miyasaki also obtained General Lease No. 2751 for roughly 500 acres of Waiākea Pasture Land located a short distance above (southwest of) Lot 2. In an October 27, 1939 letter from Frank G. Serrao, Sub-Land Agent, Hawai‘i to the Honorable L. M. Whitehouse, Commissioner of Public Lands, concerning the possibility of withdrawing a portion of Lot 2 from General Lease No. 2618 for the creation of house lots, Mr. Serrao writes:

> Mr. Kazuo Miyasaki is the Manager of the Hilo Dairy and is utilizing the whole area under this lease for dairy purposes. Of the 17.0 acres that had been grown to cane, he is going to raise green feed for his milking cows, while the remaining area has been fenced for pasture. (Letter on file at DLNR-Land Division Hilo Office under General Lease No. 2618)

Mr. Miyasaki initially refused to surrender any land for house lots. Correspondences from 1943 indicate that Mr. Miyasaki and his wife, Kaoru Miyasaki, were not happy about having to pay extra for the cane land on which they were not cultivating cane, simply because the price of raw sugar had risen. A 1945 map of the railroad right-of-ways across Lot 2 shows the areas that had been previously cultivated in cane (Figure 14). Eventually, in 1946, a roughly 200-foot wide section of Lot 2 along Mohouli Street was withdrawn from the Miyasaki lease (Figure 15) for the creation of the Mohouli Heights Subdivision Blocks 64, 65, and 66. The four lots created at the intersection of Mohouli and Kapi‘olani Streets were examined as part of this study (Figure 16).

While Lot 2 of the Waiākea Cane Lots, with its significant amount of waste land, was converted to pasture, no records regarding the use of Lot 3 were obtained. At some point, likely around 1938, a portion of Lot 3, along Lanikāula Street *makai* of the current survey corridor, was divided out of Lot 3, creating Lots 3A and 3B. The divided lot (Lot 3B) was purchased by Orlando H. Lyman and Kathryn L. Bond as Grant No. 12016. Lot 3A may have been purchased by Manuel Ignacio and Florence W. Ignacio (possibly as Grant No. 12101), as indicated by notes of a 1951 survey for a land exchange. If the cultivation of sugarcane continued on Lot 3, it ended in ca. 1946, as contractual and legal problems combined with a declining sugar market and a devastating *tsunami* in 1946 led the Waiākea Mill Company to cease operations in 1947. During the 68 years of its existence, the Waiākea Mill Company was a major force in shaping the economic and social growth of Hilo, and certainly left its mark on both the cultural and physical landscapes of the area.

The Hilo Dairy maintained the leasehold of Lot 2 under General Lease No. 2618 until October of 1954, when the lease expired and a revocable permit was issued to Kazuo Miyasaki for continued use of the property at a rate of ten dollars a month. In 1955 Mr. Miyasaki was approved for a new 21 year lease of Lot 2 which he accepted. In a May 25, 1955 letter regarding the lease and describing the lot, Marguerite K. Ashford wrote to the Board of Public Lands, “the subject lot is now overgrown with guava and shrubs, except for a small area that surrounds a shack once used as a pickle factory” (Letter on file at DLNR-Land Division Hilo Office under General Lease No. 2618). A 1954 aerial photograph of the Hilo area (Figure 17) indicates that several structures were actually present on the property at that time. Given the Hilo Dairy’s lease of the land between 1938 and 1955, the structures are likely associated with the dairy. From the aerial photograph it is evident that an access road leads west to the buildings from the west end of Kamana Street. In January of 1956 Kazuo Miyasaki terminated his lease and gave up his rights to Lot 2 of the Waiākea Cane Lots.

Figure 11. Portion of a 1918 Waiākea Mill Company map showing the current survey corridor.

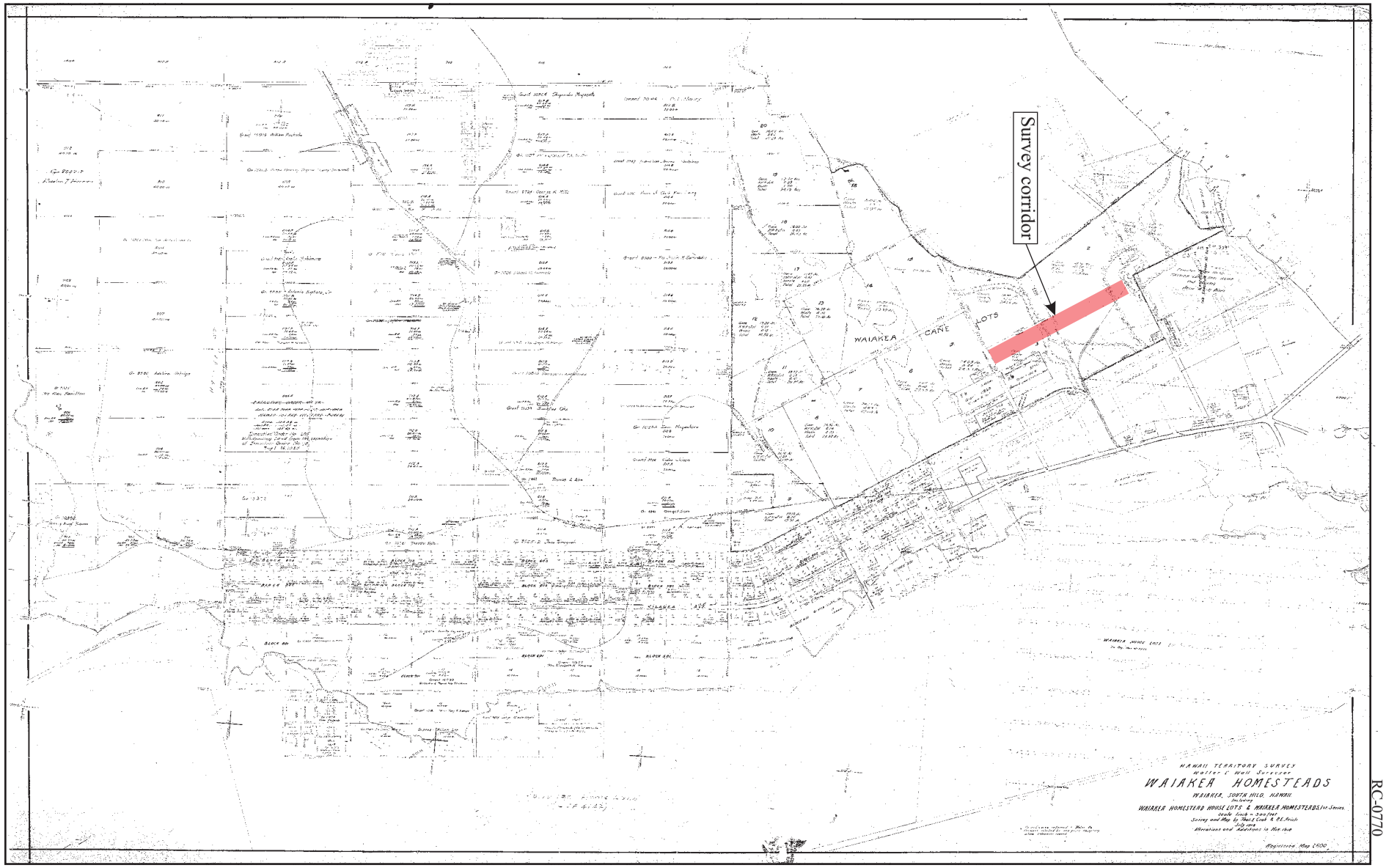


Figure 12. Hawai‘i Registered Map No. 2600 showing the current survey corridor.

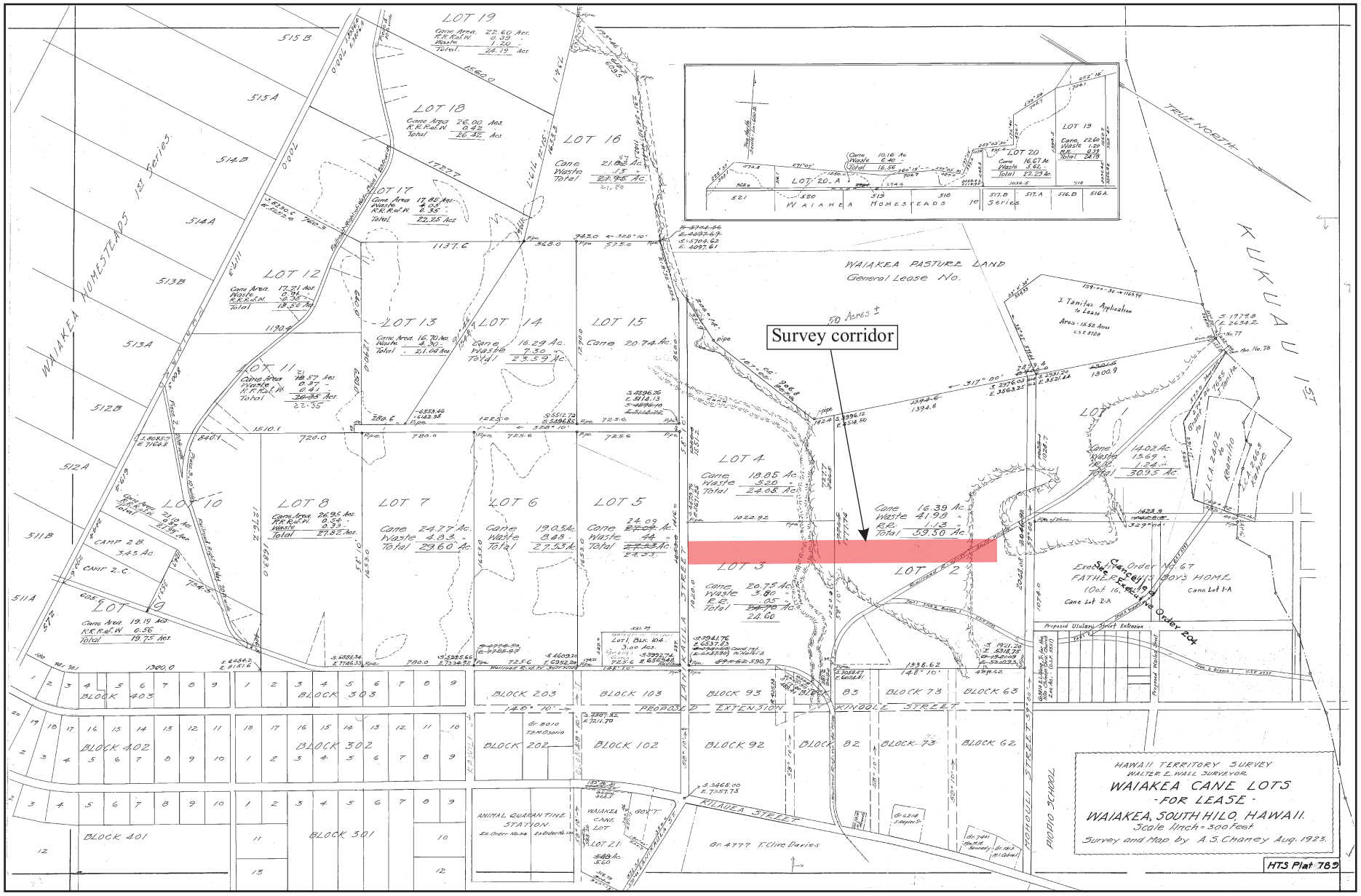


Figure 13. Hawai‘i Territory Survey Plat 789 showing the Waiākea Cane Lots for lease in August 1923 and the current survey corridor.

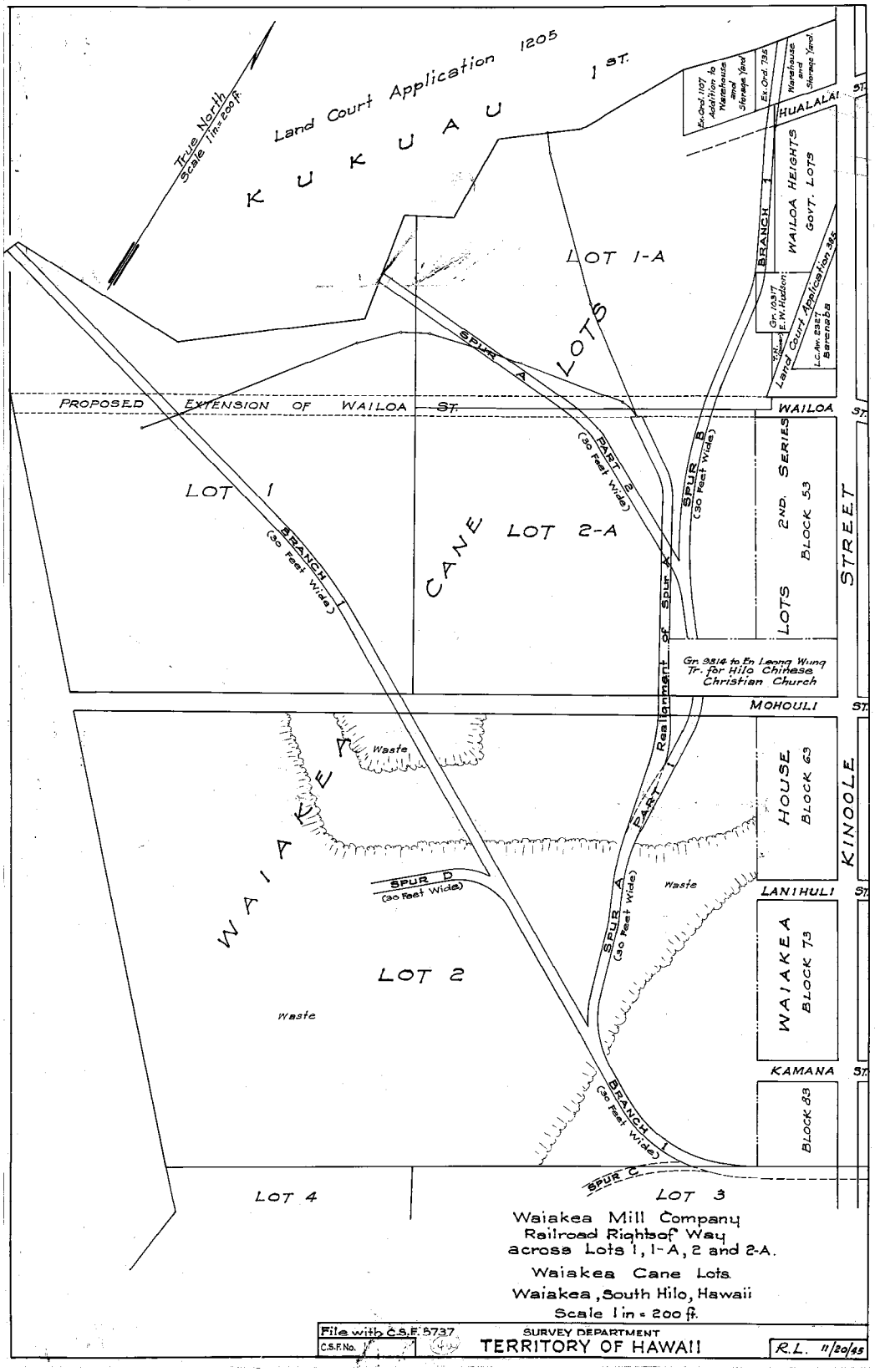


Figure 14.1945 Map of the Waiākea Mill Company Railroad Right of Ways (C.S.F. 5737), showing Lot 2 of the Waiākea Homesteads.

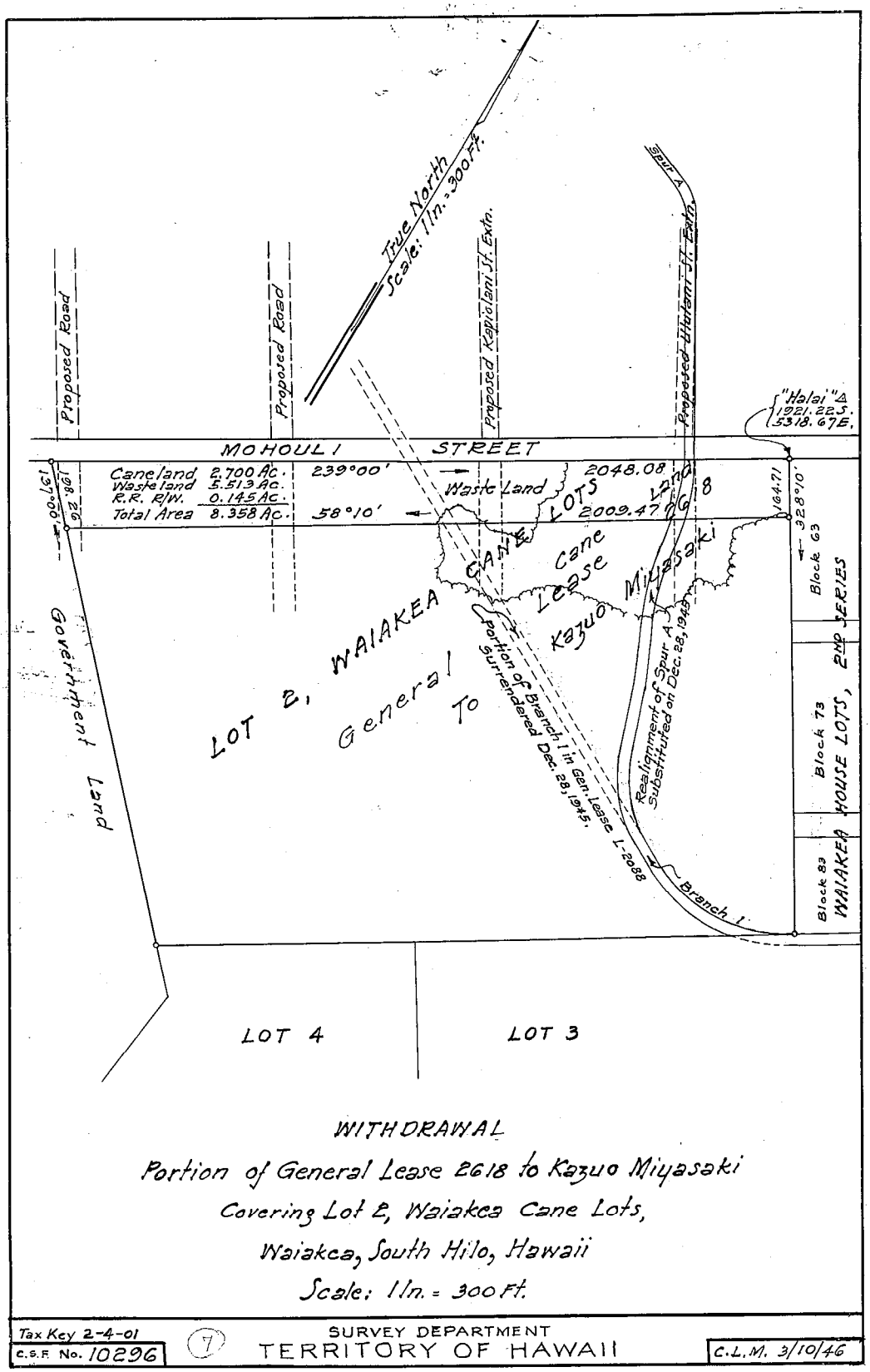


Figure 15.1946 map (C.S.F. 10296) showing the withdrawl of a portion of the General Lease No. 2618 to Kazuo Miyasaki for the Mohouli Heights Subdivision.

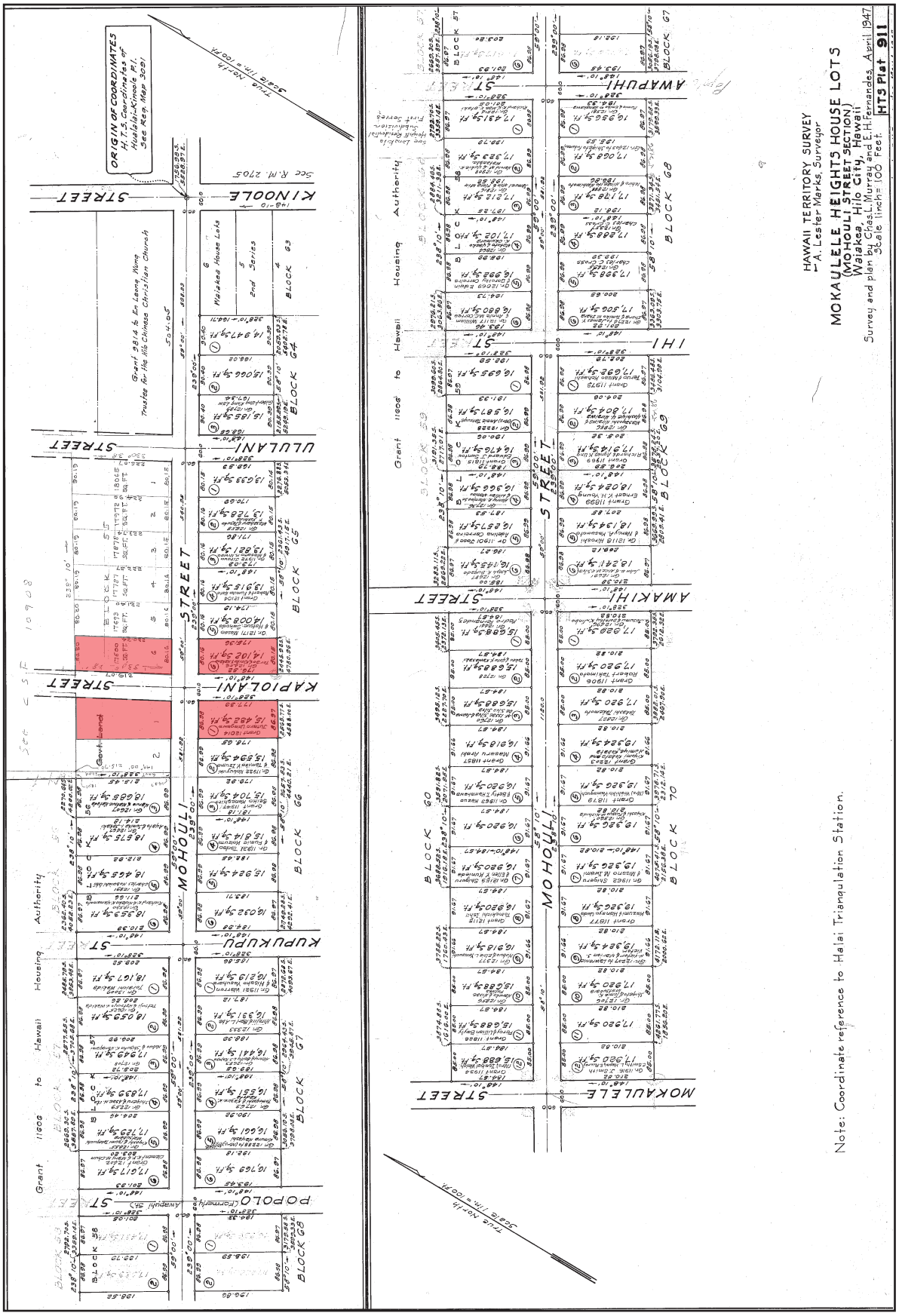


Figure 16. 1947 Hawai'i Territory Survey Plat 911 showing the Mohouli Heights House Lots and highlighting (in red) the four lots examined as part of this study at the intersection of Mohouli and Kapi'olani Streets.

RC-0770

Figure 17. Portion of an October 14, 1954 aerial photograph of Hilo Town showing the centerline of the proposed road corridor.

On October 25, 1956 the lease of Lot 2 of the Waiākea Cane Lots was assigned to George Holowaty for a term of 21 years under General Lease No. 3568 as pasture. In 1957 a 15.4 acre portion of Lot 2 at its eastern end was removed from the Holowaty lease. Notes indicate that as a result of the land withdrawal the rent was lowered from $200 to $140 dollars a year and the fence lines were moved to the new boundary. In December of 1958 Holowaty transferred General Lease No. 3568 to Walter P. Perreira, who continued to use the land for pasture. In 1959 Perreira had the upper portion of the property cleared by a bulldozer, installed new stainless steel boundary and cross fences, and planted grasses.

In 1963 more acreage was removed from General Lease No. 3568, in the southeastern portion of Lot 2, to allow for the construction of a planned flood control ditch that was part of the Wailoa River Flood Control Project. The project was authorized by the Flood Control Act of 3 September 1954, and completed in August 1965 at a cost of $1,044,888 (Federal). The local sponsor was the Hawaiʻi County Department of Public Works. The project was designed to stop flooding from the Waiākea and Kāwila Stream basins that was damaging private properties in the vicinity of Lono Street, *makai* of the current project area (Robert Yanabu Personal Communication 2012). The project included the construction of a 355-foot-long channel and an 88-foot-long levee to divert the Kāwili Stream flows into Waiākea Stream; a 333-foot-long channel and a 350-foot-long levee to divert the combined flows of Waiakea and Kāwila Streams into a long and narrow swale area; a 1,100-foot-long channel and 800-foot-long levee to protect the University of Hawaiʻi Hilo Campus Dormitory; two small diversion levees, one 75 feet long and the other 190 feet long, to divert the flows from the swale area into a new 4,680-foot-long channel that crossed Lot 2 of the Waiākea Cane Lots and diverted the stream flow beneath the intersection of Mohouli and Kinoʻole Streets into Waiākea fish pond and Wailoa River (Figure 18). An earthen levee totaling 6,510 feet in length was built along the channel. A 1965 aerial photograph of the Hilo shows the route of the newly constructed flood channel (Figure 19).

The construction of the flood channel across Lot 2 prevented Mr. Perreira from accessing the upper portion of his lease and made shifting cattle from one pasture to another difficult. In April of 1966, because of these new conditions, and due to the possibility of further withdrawal of land for proposed house lots, Mr. Perreira canceled General Lease No. 3568 and the land reverted to the state. During the late 1950s and 1960s several new parcels were carved out Lot 3A, and Lot 3B was further subdivided, but a 60-foot right-of-way was retained across Lots 2 and 3A for the future extension of Kapiʻolani Street (Figure 20). Since the 1960s several additional parcels adjoining the current project area, mostly *makai* of the survey corridor, have been created and developed on both Lots 2 and 3A of the Waiākea Cane Lots.

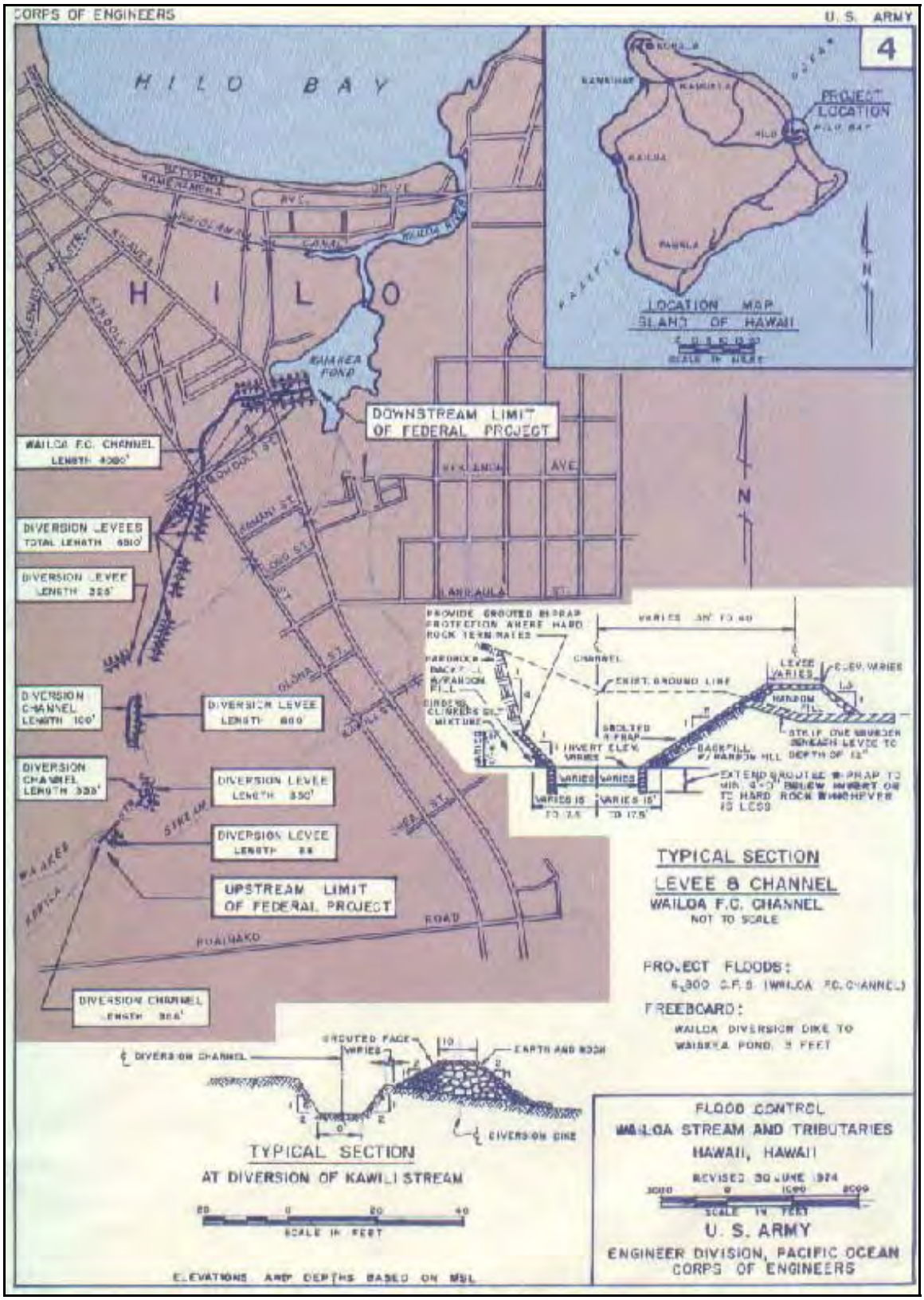


Figure 18. U. S. Army Corps of Engineers map of the "Wailoa Stream & Tributaries Flood Control Project."

Figure 19. Portion of a January 16, 1965 aerial photograph of Hilo Town showing the centerline of the proposed road corridor.

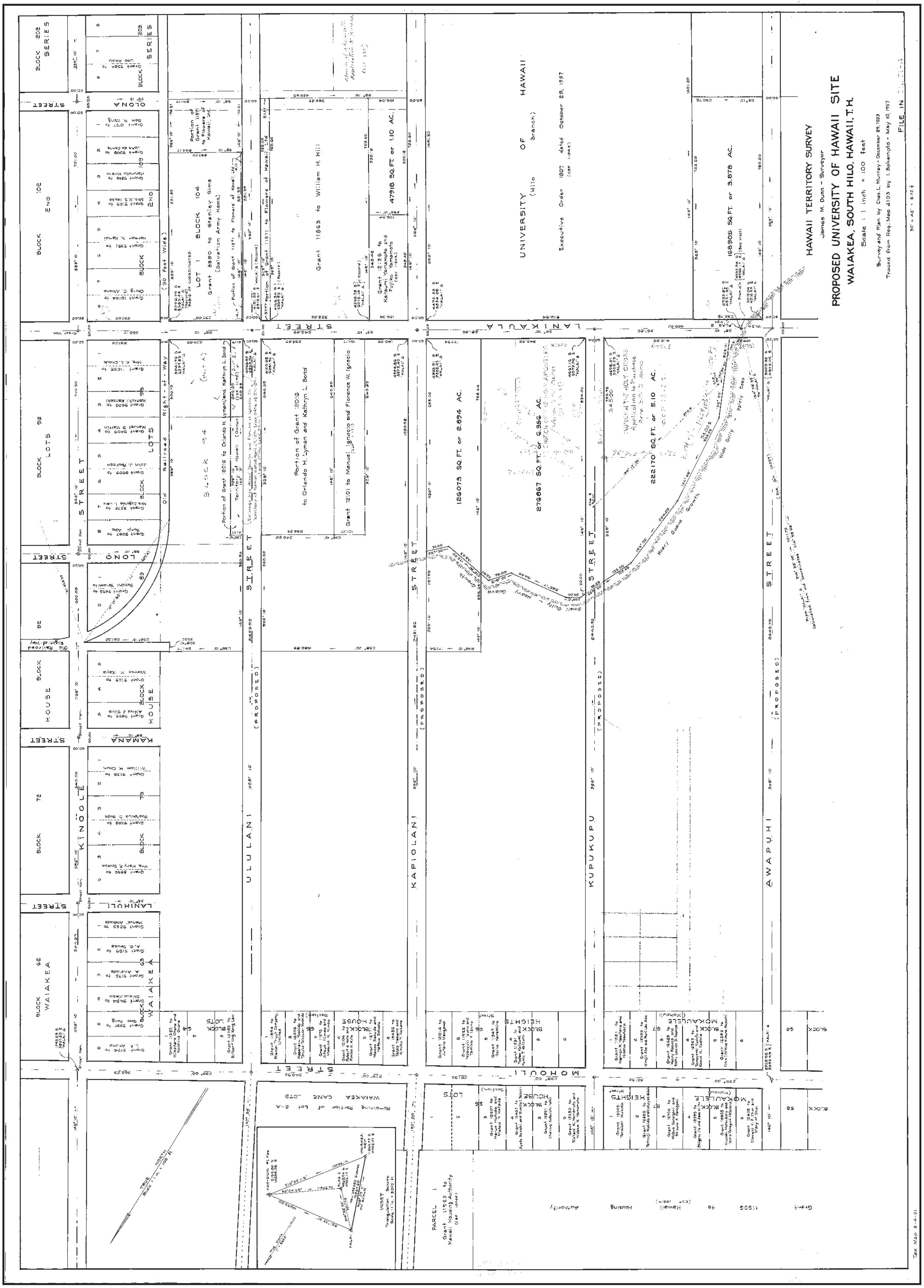


Figure 20. Hawai‘i Registered Map No. 4103 (May 10, 1957) showing the proposed extension of Kapi‘olani Street.

Previous Archaeological Studies

An early archaeological study of East Hawai‘i was conducted by Hudson (1932) for the B. P. Bishop Museum. Hudson noted that, “there was an important village and trading center around Hilo Bay” (1932:20), but related that, “no archaeological remains are to be found within the town of Hilo itself except a few stones which are said to have been taken from heiaus…” (1932:226). Hudson related that one *heiau* was formerly present in Waiākea Ahupua‘a near the route of the present day Kilauea Avenue. He writes:

> There was a heiau named Kapaieie near Honokawailani in Waiakea. Bloxam who passed the site on his way from Hilo to the volcano says that its center was marked by a single coconut tree. At the time of his visit nothing remained but ruined walls choked with weeds. He was told that the priests would lie in wait for passersby and dispatch them with clubs. Thrum [1907:40] states that the site was famed in the Hilo-Puna wars buts its size and class are unknown. No remains of any kind could be found and no Hawaiians with whom I talked had ever heard of it. (Hudson 1932:240)

More recent archaeological studies (Hunt and McDermott 1993; Borthwick et al. 1993; Clark and Rechtman 2006; Maly et al.1994; Spear 1995; Rechtman and Henry 1998; Escott 2004; M. Rosendahl 1988a and 1988b; M. Rosendahl and Talea 1988; Carson 1999, and Devereux et al. 1997) in the *ahupua‘a* have produced negative results or have identified, almost exclusively, Historic Period archaeological remains associated with either U.S. Military activity or the Waiākea Sugar Plantation, which operated in Waiākea Ahupua‘a between 1879 and 1947 (Rechtman and Henry 1998). The most proximate previous study was conducted by Clark and Rechtman (2006) at a five acre parcel located adjacent to the northwestern end of the current survey corridor. The findings of each of the aforementioned studies are summarized below.

Several studies have reported no findings. PHRI conducted three small surveys (M. Rosendahl 1988a; 1988b; M. Rosendahl and Talea 1988) in the lower elevations of Waiākea and found no archaeological resources. Likewise, a study of 176 acres conducted in the Pana‘ewa section of Waiākea (Carson 1999) did not identify any archaeological sites.

Hunt and McDermott (1993) conducted an archaeological inventory survey of the proposed Pū‘āinakō Street extension within Waiākea Ahupua‘a to the south of the current project area. As a result of that survey 11 sites containing 97 features were recorded within their proposed road alignment. All of the recorded sites and features were evaluated as dating to the Historic Period and were determined to be associated with the Waiākea Sugar Plantation. Three volcanic glass flakes recovered from an excavation beneath one of the features suggested Precontact use of the project area, but no surface Precontact remains were present.

Borthwick et al. (1993) conducted an archaeological inventory survey of two small parcels (TMKs:3-2-4-01:040 and 157) located to the southwest of the current project area within Waiākea Ahupua‘a. As a result of that survey four Historic Period sites were recorded that dated to the Waiākea Sugar Plantation’s use of the area.

Maly et al. (1994) conducted an archaeological inventory survey of a 4.5-acre parcel located to the southeast of the current project area (TMK:3-2-4-57:001). Four sites containing a total of 51 features were recorded as a result of that study. The identified features included rock mounds, walls, and an enclosure. It was determined that all of the features dated to the Historic Period and were associated with sugarcane cultivation. Further investigation was recommended at the sites to test for the possibility of subsurface Precontact cultural deposits. Subsequent data recovery work was carried out by Spear (1995). No Precontact cultural deposits were located during the data recovery excavations and it was concluded that all of the sites were constructed during Historic times for sugarcane cultivation.

Devereux et al. (1997) preformed a reconnaissance survey for the Keaukaha Military Reservation, a 503.6-acre parcel located *makai* of the current study area and south of the Hilo International Airport. In addition to Historic-era military structures, they identified the location of a traditional trail and two associated shelter/habitation areas. It was concluded that these latter sites could be of Precontact origin.

Rechtman and Henry (1998) conducted an archaeological inventory survey of roughly 40 acres (TMK:3-2-4-01:005) located within Waiākea Ahupua‘a between Kāwili Street and Pū‘āinakō Street to the south of the current project area. As a result of that survey a single site (SIHP Site 21461) consisting of 117 features was recorded on the subject parcel. The recorded features included seven walls, five sets of parallel walls, three enclosures, and 102 mounds. The features were interpreted as being related to sugarcane cultivation during the

Historic Period. The mounds were all situated on bedrock at the top or bottom edges of slopes and were determined to be clearing piles. The parallel walls represented either irrigation ditches or right-of-ways associated small gauge railroad lines. While the remaining core-filled walls and the enclosures were used for an undetermined Historic function likely related to sugarcane cultivation.

Escott (2004) conducted an archaeological inventory survey of a 258-acre parcel (TMK:3-2-4-01:122) located to the southwest of the current project area within Waiākea Ahupuaʻa. As a result of the survey, Escott (2004) recorded nineteen archaeological sites, all of which were interpreted as dating to the Historic Period and related either to sugarcane cultivation, ranching, or military activities. The recorded sites included two rock alignments, a rock concentration, a rock mound, six sugarcane fields, an enclosed lava blister, a water catchment, three dirt roads, two World War II era U.S. military fighting positions, the old location of the Fair View Dairy where later military activities took place during World War II, and an old fence line marked by three iron fence posts. The six sugarcane field sites all contained multiple features, nearly all of which were rock piles interpreted as field clearing mounds.

Clark and Rechtman (2006) conducted a study of a five acre parcel (TMK:3-2-4-01:179; formerly TMK:3-2-4-01:24 por.) located along the *mauka* edge of Kapiʻolani Street at the northwestern end of the current survey corridor. This parcel is situated within Lot 2 of the Waiākea Cane Lots. As a result of the study a single, rectangular shaped, stacked cobble mound (SIHP Site 25548) was recorded and tested. A horse shoe was recovered from the excavation. Based on the formal surface attributes of the mound, its location within a known former field of the Waiākea Sugar Plantation, and the horse shoe recovered from the test unit, Clark and Rechtman (2006) interpreted Site 25548 as a historic clearing mound associated with sugarcane cultivation and field clearing activities.

CURRENT SURVEY EXPECTATIONS

The current survey corridor is located within Waiākea Ahupuaʻa in the South Hilo District on the Island of Hawaiʻi within the Town of Hilo at an elevation of roughly 80 feet above sea level. During Precontact times this general area, inland of Hilo Bay, would have been the location of scattered huts with adjacent garden plots and stands of economically beneficial tree species (McEldowney 1979). Garden plots would have been situated in areas where soil deposits were present, and the cultivated crops would have been primarily taro and sweet potato. Houses of those who tended the crops would have generally been built nearby the gardens.

This upland agricultural zone was also the most favorable for the cultivation of sugarcane. Historic clearing of fields for sugarcane cultivation would have had a detrimental effect on the earlier (Precontact) archaeological landscape. The first lease for sugarcane cultivation in Waiākea Ahupuaʻa was awarded in 1874. The Waiākea Mill Company, founded in 1879, vastly expanded the area under cultivation in Waiākea Ahupuaʻa throughout the late nineteenth and early twentieth centuries. By 1918 portions of the current survey corridor were included in Field 4 of the Waiākea Mill Company's fields (see Figure 11), and railroad tracks had been laid through the fields to transport harvested cane to the mill. When the Waiākea House Lots, Homesteads, and Cane Lots were created in ca. 1919, the cane fields were divided and leased to individual growers. The current survey corridor crosses portions of Lots 2 and 3 of the former Waiākea Cane Lots between Mohouli and Lanikāula Streets (see Figure 13). Sugarcane may have been continuously cultivated on both lots, in areas suited for it, until the late 1930s. In 1938 the lease of Lot 2 was assigned to the Hilo Dairy, and a dairy farm was established at the northwest end of the survey corridor that lasted until 1955. Since the 1940s, both of these former Waiākea Cane Lots have undergone substantial subdivision and land alteration to accommodate the growing urban needs of the Town of Hilo.

Previous archaeological studies conducted in the vicinity of the current project area (Clark and Rechtman 2006; Maly et al. 1994; Rechtman and Henry 1998; Spear 1995) indicate that Precontact archaeological features in this section of Waiākea Ahupuaʻa are rare, but that Historic features, primarily related the cultivation of sugarcane are plentiful. Historic features of this type may include rock clearing mounds, modified outcrops, enclosures, alignments, rock walls, roadbeds, or railroad beds. Features such as these may be found in the southeastern portion of the current survey corridor where sugarcane was more extensively grown on Lot 3. Historic features related to the Hilo Dairy, which operated on Lot 2 between ca. 1938 and 1955, may be more prevalent in the northwestern portion of the project area. These features could include fence lines, roads, or building remnants.

FIELDWORK

Fieldwork for the current project was conducted on May 8 and 10, 2012 by Matthew R. Clark, J. David Nelson, B.A., and Ashton Dircks, B.A. under the direction of Robert B. Rechtman, Ph. D.

Methods

Fieldwork included a pedestrian survey of the entire 200-foot wide corridor through the undeveloped portions of all parcels located within the project area. Fieldworkers walked transects spaced at 10 meter intervals following the marked centerline of the proposed roadway first along one edge and then along the other, visually inspecting an area more than 30 meters wide on either side of the marked centerline. Vegetation was fairly thick throughout the survey corridor, especially in the central portion where bamboo is the dominant floral species, but ground visibility was adequate for locating all archaeological resources. The developed parcels at the intersections of Kapiʻolani and Mohouli/Lanikāula Streets were visually inspected from the sidewalk for archaeological resources. When archaeological features (or land alterations; e.g. bulldozing, fence lines, etc.) were encountered, they were plotted on a map of the project area using Garmin Vista HCx handheld Global Positioning System (GPS) technology (with sub three-meter accuracy). All recorded sites were cleared of vegetation, mapped in detail using a tape and compass, photographed, and described using standardized recordation forms. No subsurface testing was undertaken as part of this inventory survey.

Findings

As a result of the current inventory survey four archaeological sites dating to the Historic Period were recorded within the survey corridor (Table 1). The sites include a modified drainage (Site 29370) and earthen ditch (Site 29371) seemingly designed to control water flow from the Waiākea Stream basin during times of heavy rain, a piled cobble mound (Site 29372), and the remnants of the old Hilo Dairy buildings (Site 29373) including several concrete foundations, metal roofing material, and a bottle dump. All of the sites are located within the main 200-foot wide survey corridor. No archaeological resources were identified at the intersections of Kapiʻolani and Mohouli/Lanikāula Streets. The locations of the sites relative to the survey corridor and the parcel boundaries are shown in Figure 21. Detailed descriptions of each site follow below.

Table 1. Archaeological sites recorded during the current inventory survey.

*SIHP Site #**	*Formal Type*	*Function*	*Age*	*TMK:*
29370	Modified drainage	Water control	Historic	3-2-4-56:14, 22, 29
29371	Ditch	Water control	Historic	3-2-4-56:22
29372	Mound	Clearing	Historic	3-2-4-56:14
29373	Concrete foundation complex	Hilo Dairy	Historic	3-2-4-01:24, 182, 183

* All SIHP site numbers within the project area are preceded by the state, island, and U.S.G.S. quad prefix 50-10-35.

SIHP SITE 29370

Site 29370 are modification to the natural Waiākea Stream channel that extends from southwest to northeast across the survey corridor (see Figure 21). Waiākea Stream was once a tributary to the Wailoa River prior to the construction of the Wailoa River & Tributaries Flood Control Project drainage ditch in the mid-1960s. That man-made drainage ditch diverts waters from Waiākea Stream *mauka* of the current project area and sends it to the Waiākea fish pond and Wailoa River to the northeast of the natural drainage course. Vegetation at Site 29370 includes bamboo, various palm trees, elephant ear (*Enterolobium cyclocarpum*), *ʻawapuhi* (*Zingiber zerumbet*), *waiāwi* (*Psidium cattleianum*), and several large exotic trees. The drainage channel continues out of the survey corridor to both the northeast and southwest. Additional modification (a wall) was noted along its northwest edge, northeast of the survey corridor, but not recorded as part of this study. Site 29371, an excavated, earthen ditch, extends northwest off the upper edge of the modified drainage channel at the northeastern end of the recorded modification. It is possible that Site 29370 once fed water into Site 29371, but erosion and possible mechanical disturbance in the vicinity of the two sites has made identification of any such former connection extremely difficult. Both sites are interpreted as having been constructed for Historic water control purposes.

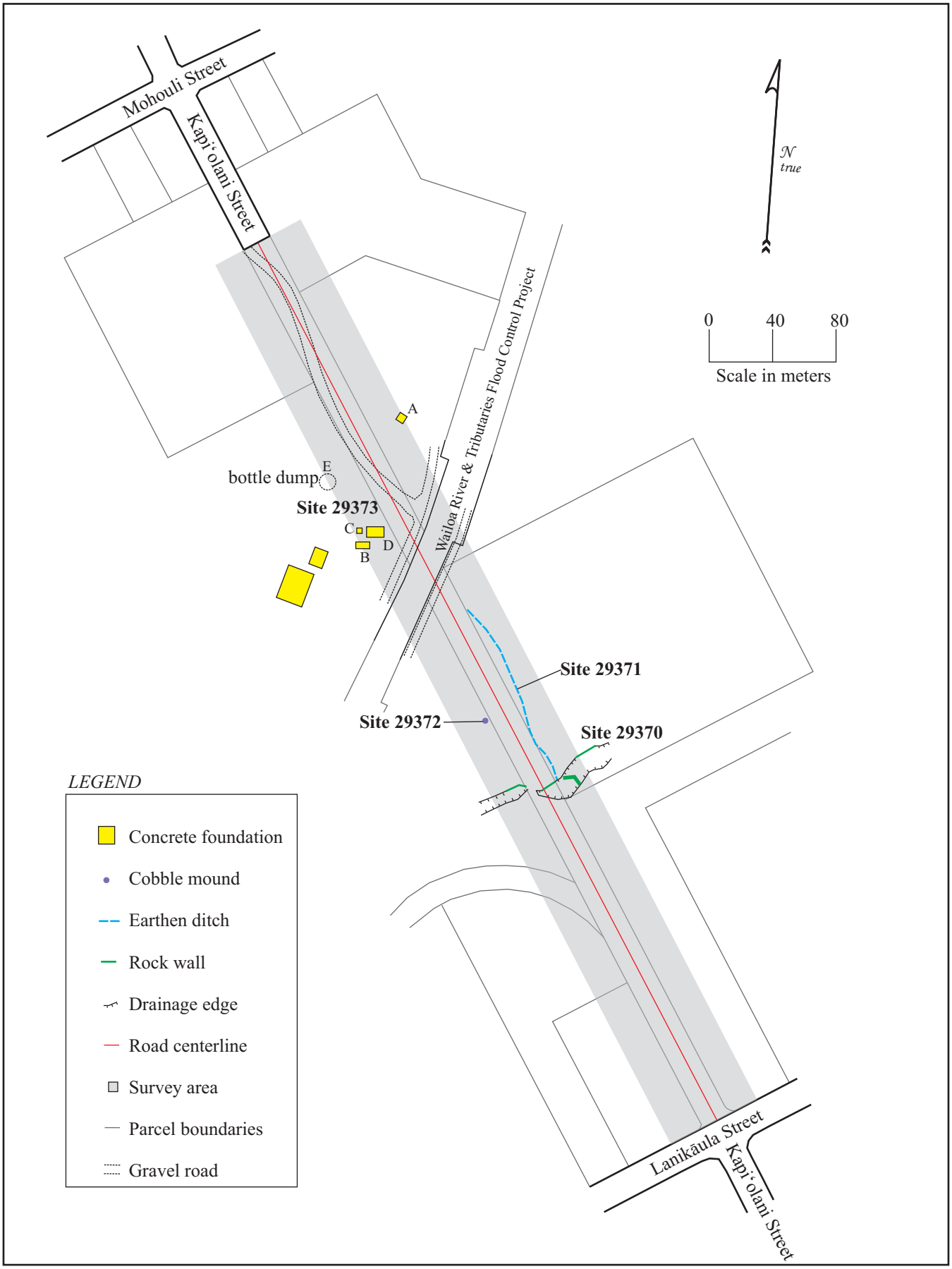


Figure 21. Site location map.

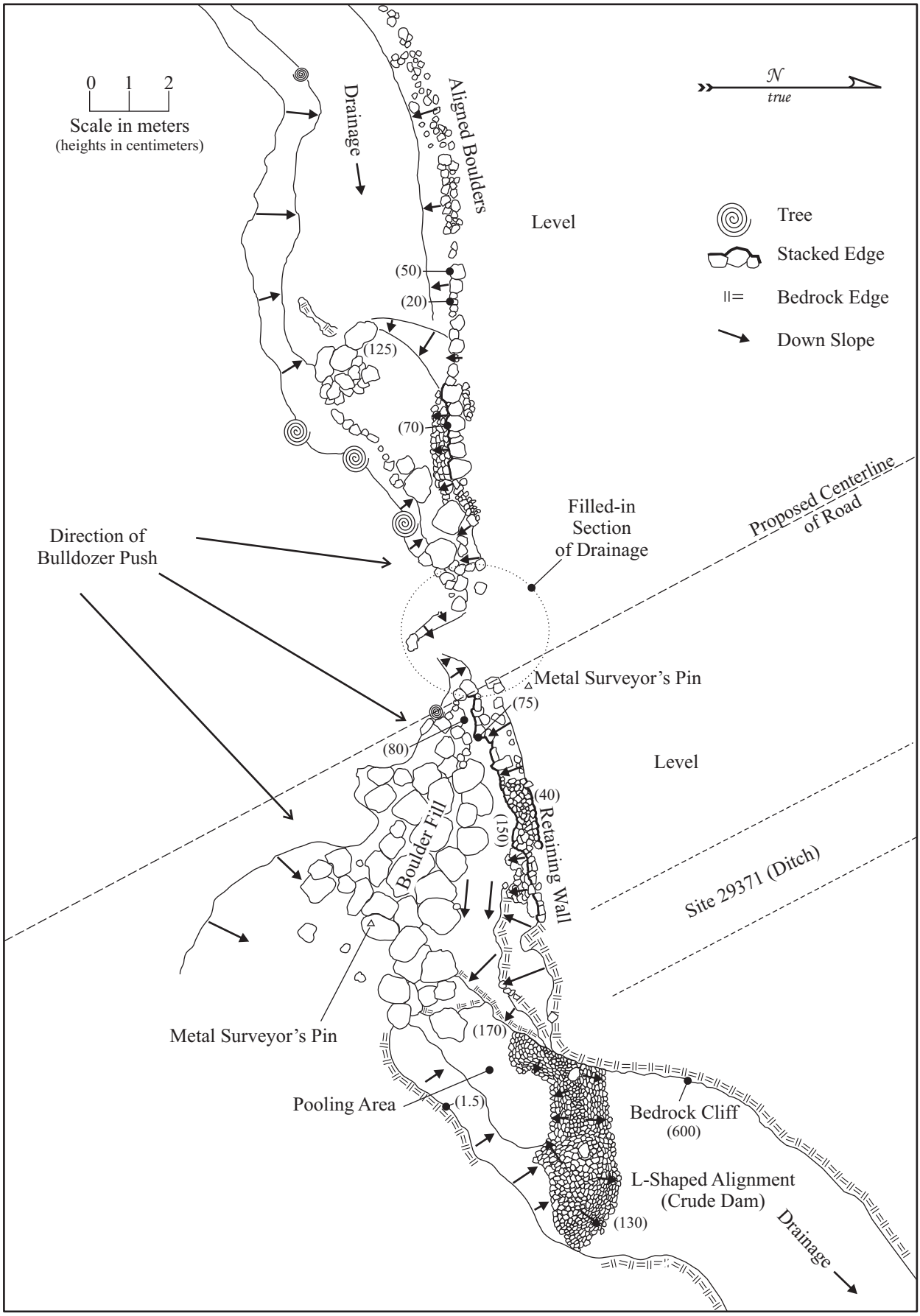


Figure 22. SIHP Site 29370 plan view.

Modification to the channel, which has an average width of 8 meters, includes 1) a 6 meter long segment filled in with soil and boulders just northeast of the proposed road centerline, 2) stacked cobble alignments to the southwest and northeast of the fill along the northwestern edge of the drainage, and 3) an L-shaped alignment of piled cobbles across the base of the drainage channel to the northeast of the fill area (see Figure 22). The material used to fill in the drainage (Figure 23) includes mostly large boulders, up to 2.5 meters in size, that appear to have been pushed in from a cleared, former sugarcane field to the southeast of the drainage. Because of the fill, the drainage is only 2 meters wide along its northwestern edge at this location, but it widens to 9 meters upstream of the fill. The southeast edge of the drainage above the fill consists of a gently sloped soil bank. At one time the fill may have created a road across the drainage, but if so, erosion has made it impassable.

Figure 23. Filled in section of the SIHP Site 29370 modified drainage, view to the northeast.

The upstream portion of Site 29370, southwest of the centerline, consists of a modified bank along the northwest edge of the drainage channel (see Figure 22). The sloped bank of this edge is relatively low and has been reinforced for distance of approximately 25 meters with aligned small boulders and stacked large cobbles (Figure 24) that stand up to 70 centimeters tall (Figure 25). To the northeast this alignment terminates at the fill area, where the drainage channel has been completely filled and actually disappears for a distance of roughly 5 meters, and then reemerges as a 2 meter wide channel for a distance of roughly 8 meters below the fill.

The downstream portion of Site 29370, north of the fill area along the 2 meter wide section of the channel, is also modified along the northwestern edge of the drainage (see Figure 22). At this location the edge is defined for a length of 11 meters by a stacked retaining wall that is 1.5 meters tall along the drainage edge, and rises up to 40 centimeters above the ground surface outside the drainage (Figure 26). The stacking consists of large *pāhoehoe* cobbles (Figure 27). Site 29371 extends northwest from near the northeastern end of this retaining wall. The northwest edge of the gulch, continuing northeast beyond the retaining wall consists of a vertical bedrock face, up to 6 meters in height, which continues out of the survey corridor to the northeast.

Figure 24. SIHP Site 29370, aligned small boulders along the northwest edge of the drainage to the southwest of the proposed road centerline, view to the northeast.

Figure 25. SIHP Site 29370, aligned small boulders along the northwest edge of the drainage, view to the northwest.

Figure 26. SIHP Site 29370, retaining wall along the northwestern gulch edge northeast of the centerline, view to the northeast.

Figure 27. SIHP Site 29370, stacked southeastern edge of the retaining wall, view to the north.

At the base of the vertical bedrock face, to east of the retaining wall below the filled area, is an L-shaped alignment constructed of piled medium to large cobbles that spans the 7 meter width (east/west) of the drainage (see Figure 22). The alignment is 2.5 meters wide at the base, has a maximum height of 1.3 meters (Figure 28), but is lower in the center, likely due to erosion from overflowing water. On the western end, the alignment is built up to the vertical bedrock and actually turns to follow the edge of the bedrock for a short distance, giving it an L-shaped appearance. On the eastern edge, the alignment terminates against the sloping southwestern drainage edge. This cobble alignment appears to have been constructed as a crude dam that creates a pooling area measuring 10 meters long by 5 meters wide along its up slope (southwest) side. The northwest and southeast sides of the pooling area have 1.5 meter tall natural bedrock walls. The southwest edge is defined by the boulder fill, and the L-shaped cobble alignment runs across the northeastern edge. No further modification to the drainage was noted within the survey corridor to the northeast of this alignment.

Figure 28. SIHP Site 29370, L-shaped cobble alignment (crude dam), view to the southwest of the down slope, northeastern edge.

The construction of the Wailoa River & Tributaries Flood Control Project drainage ditch in the mid-1960s, which diverted flow from this modified drainage channel, suggests that the natural drainage basin containing Site 29370 was once subject to severe flooding. It is likely that the modifications to the drainage channel, along with the construction of Site 29371, were an earlier attempt at controlling flood waters. Alternatively, the Waiākea Mill Company had a sugarcane field (Field 4; see Figure 11) along both sides of the drainage channel and the modifications could have been designed to supply water for activities associated with that field. This is unlikely, however, as the company is purported to not have had irrigated its fields (Kelly et al. 1981). Whatever the case, the modifications seem to be Historic in origin, likely dating to the early 1900s when the Waiākea sugar fields and the town of Hilo were rapidly expanding. The modifications appear to be designed to control the movement of water through the drainage channel and prevent overflow along its northwestern edge.

SIHP SITE 29371

Site 29371 is an earthen ditch that extends to the northwest from northwest edge of the drainage channel containing Site 29370, nearly to the Wailoa River & Tributaries Flood Control Project drainage ditch (see Figure 21). The southeast end of the ditch begins 2 meters northwest of the tall, vertical bedrock, northwest edge of the Site 29370 drainage near the northeastern end of the retaining wall (see Figure 22). From the natural drainage the ditch extends northwest for 120 meters in a relatively straight line paralleling the centerline of the proposed roadway, 10 to 15 meters to the northeast. A few meanders are present in its route where it circumvents bedrock outcrops. The ditch is V-shaped in cross-section with mounded earth on both sides (Figure 29). It has an average width of 4 meters at the top, and is 40 to 60 centimeters deep. Ground surface on both sides of the ditch consists mostly of exposed *pāhoehoe* bedrock with only small pockets of soil present. The ditch is covered in a thick growth of bamboo. The slope of the ditch is extremely gradual, and difficult to gauge. The southeastern end (roughly 20 meters in length) slopes to the southeast into the Site 29370 drainage channel. This slope may have been caused by erosion, however, after the ditch ceased to function, as the remainder of the ditch seems to slope away from the drainage to the northwest. The northwest end of the ditch terminates at bulldozing along the southeast edge of the Wailoa River & Tributaries Flood Control Project drainage ditch.

Figure 29. SIHP Site 29371, earthen ditch, view to the northwest near the southeast end.

Given the construction of the Wailoa River & Tributaries Flood Control Project drainage ditch in the 1960s, which redirects waters from the Site 29370 drainage channel (Waiākea Stream basin) *mauka* of the current survey corridor to prevent flooding *makai* of the survey corridor, it seems likely that Site 29371 was constructed as an earlier attempt at that same goal. It is not clear, due to disturbance from floodwaters and possibly bulldozing, if water from Site 29370 was fed into Site 29371, but it is possible. The ditch appears to have been excavated by hand (no signs of mechanical disturbance are immediately evident along its edges), suggesting that it was perhaps constructed during the early part of the twentieth century. Like the Wailoa River & Tributaries Flood Control Project drainage ditch, Site 29371 would have carried water away from the Waiākea Stream channel and away from the Lono Street section of Hilo below the current project area in order to lessen flooding. Site 29370 and Site 29371 could have been constructed as part of a coordinated attempt to

control flood waters, or during successive attempts to accomplish that goal. Alternatively, a sugarcane field (Field 4; see Figure 11) was once present at the southeastern end of the ditch near the modified drainage containing Site 29370, and Site 29371 could have been designed to carry water for activities associated with that field. However, most of the land that the ditch crosses is labeled "wasteland" on maps of the Waiākea Cane Lots (see Figures 12 and 13), and the flow of water would have been directed to the northwest away from Field 4, making this scenario unlikely. All that can be said about Site 29371 with any certainty is that the ditch appears designed to once control the flow of water from the Waiākea Stream basin, directing it to the northwest.

SIHP SITE 29372

Site 29372 is a cobble mound located approximately 12 meters southwest of the proposed road centerline in the central portion of the survey corridor (see Figure 21). Vegetation at the site consists of a thick growth of bamboo with three large octopus trees (*Brassaia actinophylla*) and two *waiāwi* (*Psidium cattleianum*) trees growing out of the top of the mound (Figure 30). The mound is surrounded by an exposed *pāheohoe* bedrock ground surface. Site 29372 has an irregular shape and is composed of small to large *pāhoehoe* cobbles. The mound measures 4 meters long (northeast/southwest) by 3 meters wide (northwest/southeast) (Figure 31). The nearly vertical northern corner of the mound has an 80 centimeter long segment of possible remnant stacking with a maximum height of 73 centimeters. The center of the mound stands approximately 85 centimeters tall, and from this point at the top the cobbles slope moderately downwards to the edges on the south, east, and west sides. The roots of the large trees growing from the mound have likely altered its appearance considerably over the years. A line of cobbles that begins 1.3 meters from the north corner of Site 29372 and runs northwest in a relatively straight line for 5.5 meters, may be the result of a root from one of these trees uplifting the *pāhoehoe* ground surface (Figure 32). This loose collection of cobbles measures approximately 60 centimeters wide by 25 to 30 centimeters tall.

Figure 30. SIHP Site 29372, cobble mound, view to the southwest.

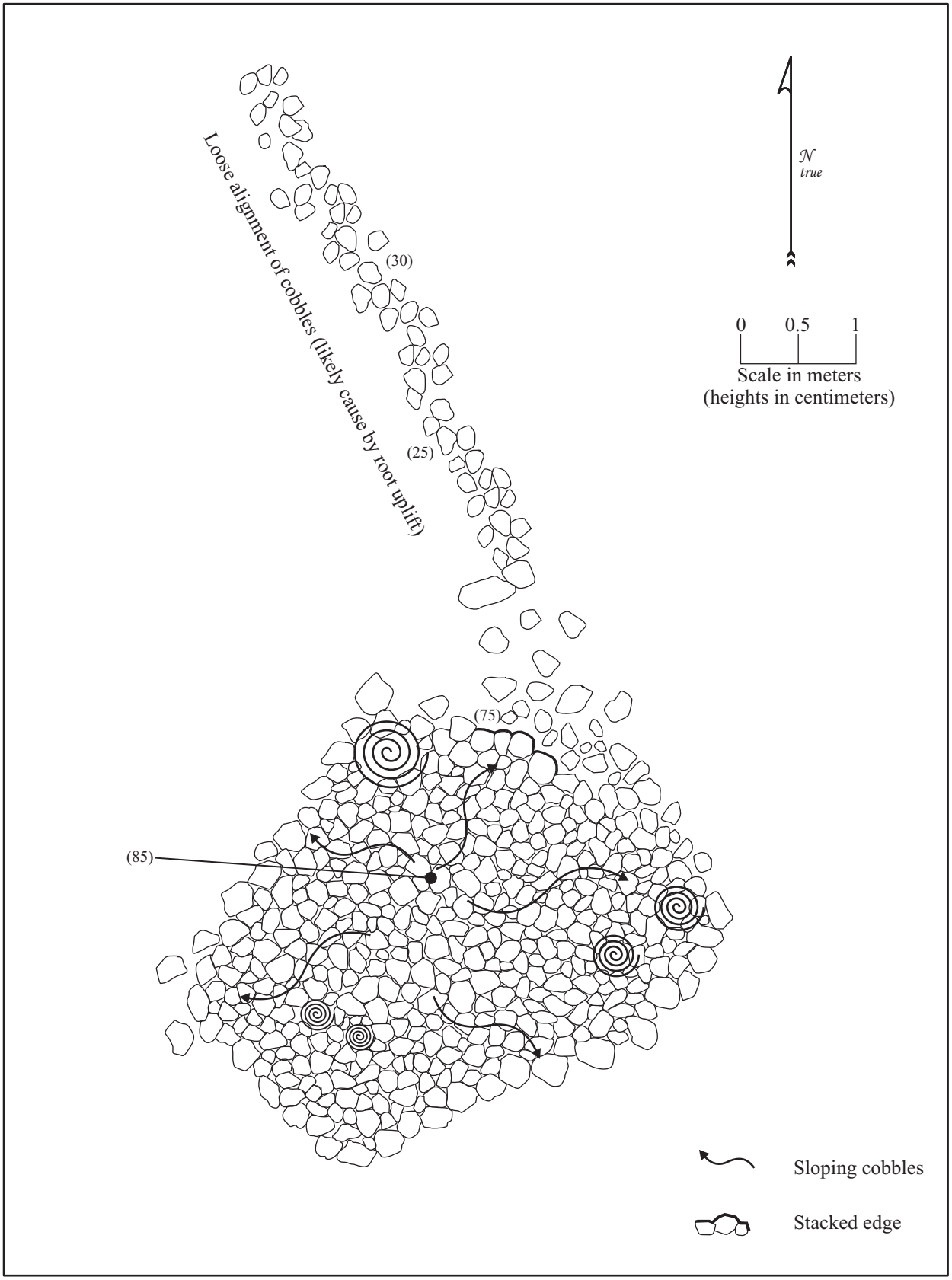


Figure 31. SIHP Site 29371 plan view.

Figure 32. SIHP Site 29372, cobble alignment extending northwest from the north corner of the mound, view to the northwest.

Site 29372 is most likely a clearing mound related to the use of this area for the cultivation of sugarcane during the late nineteenth century and the first half of the twentieth century. The mound is located on a *pāhoehoe* ground surface near the northern edge of the Waiākea Mill Company's former Field 4 (ca. 1879 to ca. 1920), and the northern boundary of Lot 3 of the Waiākea Cane Lots, on which sugarcane may have been privately grown from ca. 1920 to ca. 1947 (see Figures 11 and 13). The rocks that make up Site 29372 were likely taken from the nearby sugarcane field and collected at their current location for clearing purposes. Numerous such clearing mounds have been recorded and test excavated by previous archaeological studies in the Waiākea sugarcane fields (c.f. Clark and Rechtman 2006; Maly et al.1994; Spear 1995; Rechtman and Henry 1998).

SIHP SITE 29373

Site 29373 is a complex of concrete foundations with associated asphalt and gravel paved areas, rusted vehicles and machine parts, areas of corrugated metal roofing, and Historic debris piles (Figure 33). The complex occupies an area in excess of 150 meters (north/south) by 70 meters (east/west) along the northwest edge of the Wailoa River & Tributaries Flood Control Project drainage ditch on TMKs: 3-2-4-01:029, 182, and 183 (Formerly Lot 2 of the Waiākea Cane Lots; see Figure 21). The complex extends out of the current survey corridor to the north and south for an undetermined distance. Five features were recorded within the 200-foot wide survey corridor during the current study. The features include the concrete foundation of a bathroom (Feature A), a cobble and concrete paved loading ramp (Feature B), a small concrete foundation of an unknown structure (Feature C), an area of corrugated metal roofing with an associated concrete slab that appears to be the remains of a wooden post and pier structure (Feature D), and a bottle dump that contains mostly broken, clear glass, milk bottles (Feature E). Feature A is located northeast of the proposed road centerline, while Features B-E are clustered in an area southwest of the road centerline (see Figure 33). Remnant sections of an overgrown concrete walkway were noted near the former buildings represented by Features C and D. Vegetation at the site consists primarily of a secondary growth of weed trees and palms, but planted ornamental species and avocado trees are present in the vicinity of Features B-D. A large amount Historic/Modern trash (including glass and ceramic bottles, ceramic tableware, rusted iron parts from machinery and vehicles, and building materials) litters the ground surface in the vicinity of Features B-D extending southwest out of the survey corridor to two additional, large concrete foundations that are surrounded by an overgrown gravel, concrete, and asphalt paved area. The former buildings once had electricity and indoor plumbing as indicated by the remains of insulated wires and switch boxes and iron drain and water pipes at several of the foundations.

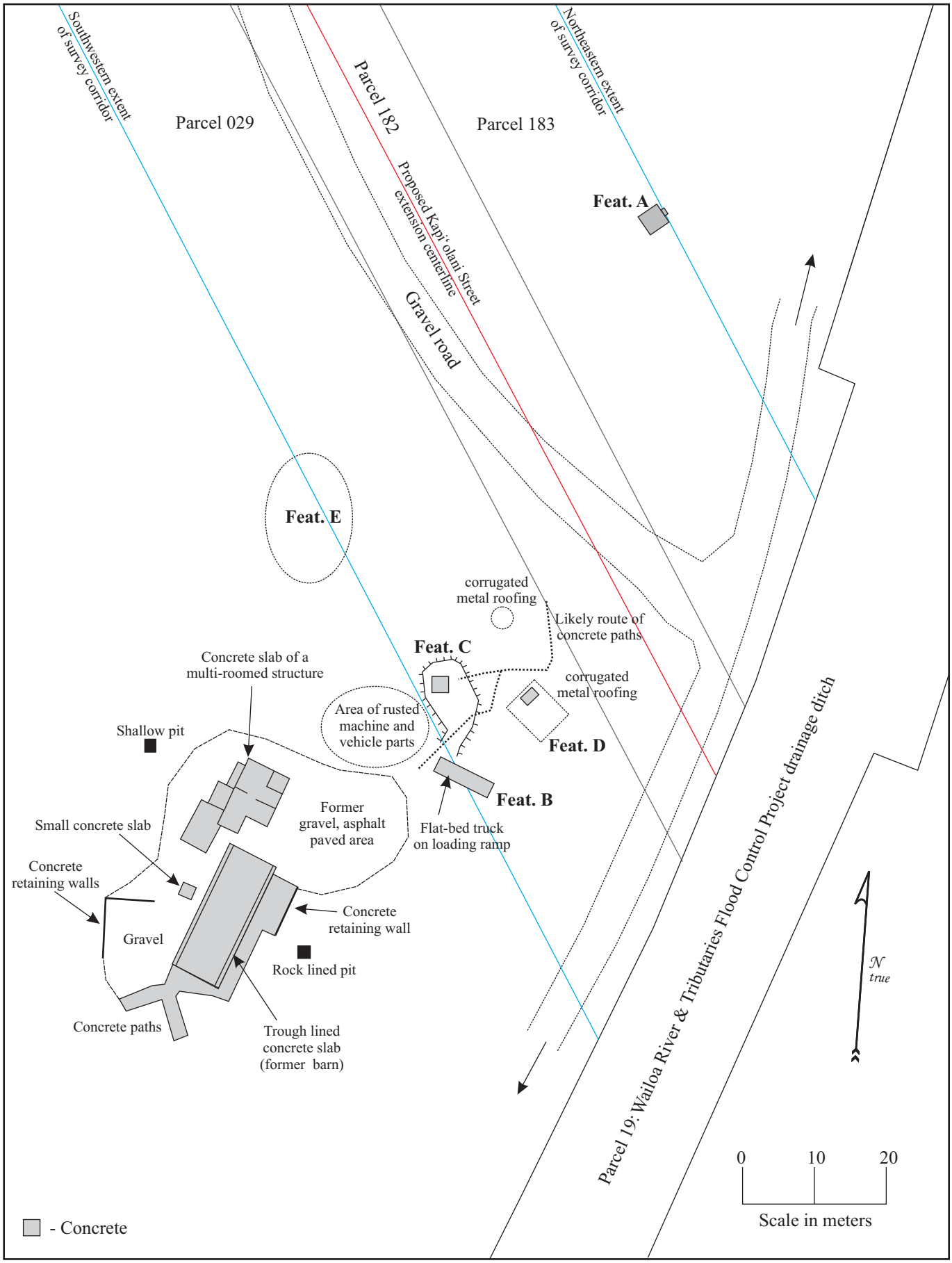


Figure 33. SIHP Site 29372 plan view.

While none of the former buildings appear on any of the cartographic resources examined for the current study, the roofs of several buildings in the vicinity of Site 29373 can be seen in a 1954 aerial photograph of Hilo Town (see Figure 17). These buildings are no longer visible in a 1965 aerial photograph (see Figure 19), after the construction of the Wailoa River & Tributaries Flood Control Project drainage ditch. Construction of the ditch likely completely destroyed at least one of the buildings. In addition to the foundations noted to the southwest of the current survey corridor, the 1954 aerial indicates that one more foundation should be present to the northeast of the survey corridor, *makai* of Feature A. This building was not searched for during the current study.

A review of lease documents on file at the DLNR-Land Division Hilo office indicates that Lot 2 of the Waiākea Cane Lots was leased to Kazuo Miyasaki, manager of the Hilo Dairy, and his partner K. Yoshimoto between 1938 and 1955 as General Lease No. 2618. Mr. Miyasaki also had the lease on 500 acres of pastureland in Waiākea Ahupuaʻa located southwest of Lot 2. It is suggested that the building foundations recorded as Site 29373, based on their apparent age, date to Mr. Miyasaki's lease of the property. While Mr. Myiasaki's stated use of the premises was for pasture, the formal attributes of the buildings and Mr. Miyasaki's association with the Hilo Dairy, along with the presence of the bottle dump (Feature E) containing mostly milk bottles (three different labels were noted on the milk bottles including HILO DAIRY, M. MIYASAKI; HILO DAIRY, HILO, HAWAII; and HILO SUGAR Co. DAIRY, HILO, HAWAII), suggests that Site 29373 represents the former location of buildings associated with the Hilo Dairy.

Feature A is clearly a bathroom structure, and Feature B is clearly a loading ramp; the largest foundation to the southwest of the survey corridor, which has concrete troughs along either long edge, appears to be the milking barn; but the specific use of the other buildings is unknown. With the exception of one brief note written in 1955, which states that Lot 2 is "overgrown . . . except for a small area that surrounds a shack once used as a pickle factory" (lease documents on file at the DLNR-Land Division Hilo office), the lease records are silent about the buildings on Lot 2. This note, however, provides an alternative, though less likely, interpretation of the function of at least one of the former buildings, that it may represent the remains of a pickle factory. Each of the features of Site 29373 recorded within the current survey corridor (Features A-E) are described below and their locations, relative to one another, are shown in Figure 33.

Feature A

Feature A is a concrete bathroom structure located roughly 30 meters northeast of the proposed road centerline at the northeastern edge of the survey corridor (see Figure 33). The structure is oriented lengthwise at 20/200 degrees. It measures 3.05 meters long by 2.65 meters wide, and has 13-centimeter thick concrete walls that stand 2.0 meters tall (Figure 34). Two doorways are present in the southwest and northeast walls of the structure, the northeast doorway measures 1.0 meter wide and the southwest doorway measures 0.6 meters wide. The doors are open at the top where the concrete walls terminate. The concrete walls at Feature A once held a wooden superstructure that framed the doors and supported a corrugated metal roof over the bathroom. Only some rotted lumber and a few rusted metal roofing sheets remain in the vicinity of Feature A at the present time. A 1.7 meter long by 0.67 meter wide by 18 centimeter thick concrete step is present in front of the northeastern doorway.

Within the concrete structure to the southeast of the doorways are a concrete sink basin in the eastern corner and a concrete toilet base in the southern corner. The rectangular sink basin (Figure 35) measures 37 centimeters long by 32 centimeters wide by 13 centimeters thick and 7 centimeters deep. A 1-inch galvanized pipe extends down from the base of the sink. The toilet base (Figure 36) is a U-shaped concrete construction on the floor of the bathroom structure that measures 66 centimeters long by 56 centimeters wide by 46 centimeters tall. The rectangular opening in the top of the toilet base leads to a rectangular opening at the base of the southwestern wall where some loose cobbles are present. The 1954 aerial photograph (see Figure 17) shows that this bathroom was a separate structure near a larger building to the southeast that was likely destroyed by the construction of the Wailoa River & Tributaries Flood Control Project drainage ditch, as no remains of that building were found

Figure 34. SIHP Site 29373 Feature A, bathroom structure, view to the south.

Figure 35. SIHP Site 29373 Feature A, concrete sink basin, view to the east.

Figure 36. SIHP Site 29373 Feature A, concrete toilet base, view to the south.

Feature B

Feature B is a cobble and concrete loading ramp located roughly 30 meters southwest of the proposed road centerline near Features C and D at the southwestern extent of the survey corridor (see Figure 33). The ramp is oriented lengthwise at 293/113 degrees and it measures 4.9 meters long by 2.5 meters wide. The concrete surface of the ramp, which is supported by stacked cobbles along the edges, slopes up from ground surface at its northwestern end to a maximum height of 1.1 meters above ground surface at its southeastern end (Figure 37). The stacked cobble edges slope slightly outwards, and are held together by concrete. The southeastern and northeastern edges are fairly intact, but the southwestern edge is mostly collapsed, and may have been impacted by a bulldozer. The collapsed southwestern edge reveals that the interior of the ramp consists of a fill of small cobbles capped with concrete (Figure 38). The rusted remains of a flat-bed truck oriented with its cab facing northwest are present on the surface of the loading ramp. The orientation of the cab of the truck to the bed of the truck suggests that it may have been pushed by a bulldozer to its current location, perhaps during the same time that the southwestern edge of Feature B was damaged.

The formal attributes of Feature B clearly indicate that it was used as a loading ramp. As shown in the 1954 aerial photograph (see Figure 17) the access road to Site 29373 extended west from the western end of Kamana Street to the vicinity of Feature B. Trucks, such as the flat-bed truck currently rusting on the surface of Feature B, would have backed up to the southeast end of the ramp and easily loaded or unloaded materials and cattle at the site. The roofs in the vicinity of Feature B are difficult to make out in the 1954 aerial, but it appears that Features B, C, and D may have shared a common roof, or that the roofs of those three structures were so close together they can not be differentiated.

Figure 37. SIHP Site 29373 Feature B, loading ramp, view to the west.

Figure 38. SIHP Site 29373 Feature B, collapsed southwestern edge, view to the north.

Feature C

Feature C is a small concrete and cobble foundation (Figure 39) located 10 meters north of Feature B (see Figure 33). The foundation rests on a slightly elevated ground surface of *pāhoehoe* bedrock with some loose cobbles around the edges. Feature C is oriented lengthwise at 90/270 degrees (east/west). It measures 2.14 meters long by 1.87 meters wide and the walls are made of stacked cobbles covered with smooth concrete. The foundation has a 10-centimeter thick concrete lip along its edges that stands 55 centimeter tall along the exterior south edge and the southern portion of the west edge, 10 centimeters tall along the exterior east edge, and 20 centimeters tall along the exterior eastern portion of the north edge. A raised concrete cube, measuring 1.1 meters along each side by 45 centimeters tall along the interior (east and south) edges and 60-80 centimeters tall along the exterior (north and west) edges, with a 6-centimeter lip along all of its edges, is present on the northwestern corner of the foundation (Figure 40). A 25-centimeter wide by 1.1 meter long step that is 20 centimeters tall abuts the concrete cube to the east. The step is obscured by fragments of corrugated roofing material and lumber, indicating that Feature C once supported a roofed superstructure.

Adjacent to the south side of the concrete cube is a 1.1 meters long by 0.65 meter recessed area defined by the concrete lip of the foundation to the south and west, and a flat laid board that stretches from the cube to the lip on the east side (Figure 41). The area, which is 45 centimeters deep, is open along its eastern edge below the board. A 3-inch iron pipe runs diagonally through the western lip of the foundation at the western end of this area, which has stacked cobbles along the interior edge that are not covered with concrete. A 1-inch metal pipe with a T-fitting protrudes from the concrete lip above the 3-inch pipe. To the east of Feature C, at the base of the elevated surface on which the foundation sits, a drain pipe extends to the east in the direction of Feature D, likely coming from beneath the Feature C foundation.

The function of Feature C is unclear. It certainly had water running to and from it, and may have been another bathroom structure associated with Feature D. Features C and D may have shared a common roof (see Figure 17). The remains of an overgrown and highly fragmented concrete walkway were noted leading from the north than east towards Feature C than turning south and running between Features C and D in the direction of Feature B. Only small sections of broken up concrete, forming a roughly 80 centimeters wide path, remain at Site 29373.

Figure 39. SIHP Site 29373 Feature C, concrete foundation, view to the west.

Figure 40. SIHP Site 29373 Feature C, concrete foundation, view to the south.

Figure 41. SIHP Site 29373 Feature C, recessed area in the southwest corner, view to the west.

Feature D

Feature D is an area covered by corrugated metal roofing material 8 meters east of Feature C (see Figure 33). The roofing material covers an area measuring roughly 5.6 meters (north south) by 5 meters (east/west). Debris mixed in with the roofing material such as painted lumber, a beveled wooden door panel, several concrete pier blocks (22 x 22 centimeters), section of 4-inch cast iron pipe, and a rotted wooden beam, indicate that Feature D was likely the location of a former post and pier wooden structure that collapsed. The collapsed roof obscures a 2.1 meter long by 65 centimeter wide by 40 centimeter tall concrete slab located at the western end of the debris field. The slab is oriented lengthwise at 173/353 degrees. All of the debris at Feature D is covered by leaf litter and a mat of organic material.

Figure 42. SIHP Site 29373 Feature D, corrugated metal roofing and concrete slab (to right), view to the south.

Feature E

Feature E is an area of discarded bottles centered roughly 30 meters northwest of Feature C and 30 meters southwest of the proposed road centerline near the southwestern extent of the survey corridor (see Figure 33). The bottles are scattered on ground surface over an area that measures roughly 18 meters (north/south) by 12 meters (east/west). Much of the area is obscured by vegetation and leaf litter. The majority of the bottles at Feature E are clear glass, one pint and one quart, milk bottles. The broken pieces of more than fifty such bottles were noted on the surface of Feature E. Some of the bottles have embossed or etched labels on them naming the dairies they are from. Three different labels were noted on the milk bottles at Feature E. Two were etched into the glass, and one was embossed. Several examples of each bottle were noted at Feature E. The embossed label was on a one pint milk bottle. It reads in a circle pattern “HILO DAIRY” above “M. MIYASAKI”. Embossed on the circular base of this bottle are the initials “MM” in large letters. The etched labels, which are extremely difficult to read unless turned just right to catch the light, appear on identical one quart milk bottles. The first reads in consecutive lines from top to bottom framed within an ornate shield pattern “HILO DAIRY / HILO HAWAII / TEL 3121”. The other reads in a circle pattern surrounding the word “DAIRY”, “HILO SUGAR Co.” above “HILO, HAWAII”.

Figure 43. Hilo Dairy M. Miyasaki milk bottle.

Figure 44. MM on bottom of bottle.

Other bottles and materials noted on the surface of Feature E include a large brown glass sake bottle with "JAPAN" embossed on the bottom, a "HILO SODA WORKS" clear glass bottle, a porcelain rice bowl with a blue floral design, a pour spout ceramic container, a one quart jar, an aqua glass bottle, some fragments of green bottle glass, a "PACIFIC SODA WORKS / HILO HAWAII" clear glass bottle fragment, some rusted iron screen, a metal bucket, a decorative clear glass jar, a cast iron pipe fitting, and the base of a half gallon clear glass jug. The manufacture of all of these items seems to date to the middle part of the twentieth century. While individual specimens of the above mentioned materials are present at Feature C, the sheer number of milk bottles at the dump site strongly suggests that the nearby building foundations of Site 29373 were the former location of the Hilo Dairy which was managed by K. Miyasaki, perhaps a relative of M. Miyasaki who's name appears on one of the bottles.

SUMMARY

As a result of the current inventory survey four archaeological sites dating to the Historic Period were recorded within the 200-foot wide survey corridor. The sites include a modified drainage (Site 29370) and earthen ditch (Site 29371) seemingly designed to control water flow from the Waiākea Stream basin during times of heavy rain, a piled cobble mound (Site 29372) perhaps left over from the clearing of sugarcane fields in the area, and the remnants of the old Hilo Dairy buildings (Site 29373), including several concrete foundations, metal roofing material, and a bottle dump. Additional features of both Sites 29370 and 293771 are present outside the survey corridor, and were not fully documented as part of this study.

The construction of Sites 29370 and 29372 could date to the first lease for sugarcane cultivation in Waiākea Ahupuaʻa, which was awarded in 1874, but most likely date to a period after the Waiākea Mill Company, (founded in 1879) vastly expanded the area under sugarcane cultivation in Waiākea Ahupuaʻa during the late nineteenth and early twentieth centuries. By 1918 portions of the current survey corridor were included in Field 4 of the Waiākea Mill Company's fields (see Figure 11), and railroad tracks (crossing the survey corridor) had been laid through the fields to transport harvested cane to the mill. When the Waiākea House Lots, Homesteads, and Cane Lots were created in ca. 1919, the cane fields were divided and leased to individual growers. The current survey corridor crosses portions of Lots 2 and 3 of the former Waiākea Cane Lots between Mohouli and Lanikāula Streets (see Figure 13). Sugarcane may have been continuously cultivated on both lots, in areas suited for it, until the late 1930s. In 1938 the lease of Lot 2 was assigned to the Hilo Dairy, and a dairy farm (Site 29373) was established at the northwest end of the survey corridor that lasted until 1955.

Flooding from Waiākea Stream drainage, which crosses Lot 3 of the Waiākea Cane Lots, must have occurred occasionally throughout the late nineteenth and twentieth centuries, because in the mid-1960s the Wailoa River & Tributaries Flood Control Project drainage ditch was constructed, which redirects waters from the Waiākea Stream drainage *mauka* of the current survey corridor across Lot 2 into Waiākea fish pond and Wailoa River. This massive ditch and associated levee were designed in part to prevent flooding *makai* of the current survey corridor in the vicinity of Lono Street. Sites 29370 and 29371, which are both water control features constructed along the Waiākea Stream basin may have been earlier attempts at controlling these flood waters. Site 29370 and Site 29371 were most likely constructed during the early to middle twentieth either as part of a coordinated attempt to control flood waters, or during successive attempts to accomplish that goal. The construction of the Wailoa River & Tributaries Flood Control Project drainage ditch impacted portions of Sites 29371 and 23971.

SIGNIFICANCE EVALUATIONS AND TREATMENT RECOMMENDATIONS

The above-described archaeological sites are assessed for their significance based on criteria established and promoted by the DLNR-SHPD and contained in the Hawai‘i Administrative Rules 13§13-284-6. This significance evaluation should be considered as preliminary until DLNR-SHPD provides concurrence. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

A Be associated with events that have made an important contribution to the broad patterns of our history;

B Be associated with the lives of persons important in our past;

C Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

D Have yielded, or is likely to yield, information important for research on prehistory or history;

E Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

The significance and recommended treatment for the four sites recorded are discussed below and presented in Table 2.

Table 2. Site significance and treatment recommendations.

SIHP No.	*Type/function*	*Temporal Association*	*Significance*	*Recommended Treatment*
29370	Modified drainage/flood control	Historic	D	No further work
29371	Ditch/flood control	Historic	D	No further work
29372	Mound/clearing	Historic	D	No further work
29373	Concrete foundation complex/Hilo Dairy	Historic	D	No further work

All of the recorded sites date to the Historic Period (likely the early to middle twentieth century) and are associated with either flood control from the Waiākea Stream basin, the cultivation of sugarcane for the Waiākea Sugar Company, or the former Hilo Dairy. All four are considered significant under Criterion d for information yielded relative to twentieth century land use within the study area. The data collection at and about these sites in the form of archival research, and field recordation and photography is substantial enough to have mitigated any potential impacts to the sites from the proposed construction of the Kapi‘olani Street extension; therefore no further historic preservation work is the recommended treatment.

REFERENCES CITED

Bird, I.
1964 *Six Months in the Sandwich Islands*. Honolulu: University of Hawaii Press. Prepared for Friends of the Library. (1st edition: 1890)

Borthwick D., J. Collins, W. Folk, and H. Hammatt
1993 Archaeological Survey and Testing of Lands Proposed for Research and Technology, Lots at the University of Hawai‘i at Hilo (TMK:2-4-01:40 and 157). Report on file DLNR-SHPD, Kapolei.

Carson, M.
1999 Archaeological Inventory Survey of the 176-Acre Pana‘ewa Campus Site, Waiakea Ahupua‘a, Hilo District, Island of Hawai‘i (TMK:2-1-13:154). Prepared by Scientific Consultant Services (SCS Project Number 168-1). Prepared for PBR Hawaii, Inc.

Clark, M., and R. Rechtman
2006 Request for SHPO Concurrence with a Determination of No Historic Properties Affected Pursuant to the National Environmental Policy Act and in Compliance with Section 106 of the National Historic Preservation Act, Hospice of Hilo Property (TMK:3-2-4-01:024 por.). Waiākea Ahupua‘a, South Hilo District, Island of Hawai‘i. Rechtman Consulting Report RC-0417. Prepared for Geometrician Associates, LLC, Kea‘au, Hawai‘i.

Devereux, T., D. Borthwick, H. Hammatt, and M. Orr
1997 Archaeological Reconnaissance Survey of Keaukaha Military Reservation, South Hilo District, Hawai‘i Island (Hawaii National Guard) 503.6-acre parcel, TMK: 2-1-12:3 and 2-1-13:10. Prepared by Cultural Surveys Hawaii. Prepared for Earth Tech.

Ellis, W.
1963 *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee...* Honolulu: Advertiser Publishing Co., Ltd. (1st edition 1823)

Escott, G.
2004 An Archaeological Inventory Survey on Approximately 258 Acres of Land for the University of Hawai‘i-Hilo *Mauka* lands Development, Waiākea Ahupua‘a, South Hilo District, Island of Hawai‘i, Hawai‘i (TMK; 3-2-4-01:122). Scientific Consultant Services, Inc. Report 361-2. Prepared for PBR Hawaii, Honolulu.

Handy, E.S.C., and E. Handy
1972 Native Planters in Old Hawai‘i. B.P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu. (With M.K. Pukui)

Hudson, A.
1932 *Archaeology of East Hawaii*, Volume I. Honolulu: B.P. Bishop Museum.

Hunt, T, and M. McDermott
1993 Archaeological Inventory Survey, Pu‘ainako Street Extension Project. Lands of Waiakea, Kukuau 1 and 2, and Ponahawai, South Hilo District, Island of Hawai‘i. Prepared for Okahara & Associates, Engineering Consultants, Hilo, Hawai‘i.

Kamakau, S.
1961 *Ruling Chiefs of Hawaii*. Honolulu: The Kamehameha Schools Press.

Kelly, M., B. Nakamura, and D. Barrère
1981 *Hilo Bay: A Chronological History*. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for U.S. Army Engineer District, Pacific Ocean.

Maly, K.
1996a Appendix In: Archaeological Assessment Study Hilo Judiciary Complex Project, Lands of Wainaku, Pōnohawai, Pi‘ihonua, and Waiākea, South Hilo District, Island of Hawai‘i (TMK: 2-6-15:1,2; 2-6-16:2; 2-4-49:18,19; 2-2-15:33; 2-4-1:12). Paul H. Rosendahl, Inc., Hilo. PHRI Report 1721-061496. Prepared for State of Hawai‘i, Honolulu.

1996b Historical Documentary Research and Oral History Interviews: Waiākea Can Lots (12, 13, 17, 18, 19, 20 &20-A), Land of Waiākea, District of South Hilo, Island of Hawai‘i Kumu Pono Associates Report W01-0795 (III). Prepared for UHH Ho‘oikaka Club, Hilo.

Maly, K., A. Walker, and P. Rosendahl
1994 Archaeological Inventory Survey, Waiākea Cane Lots, Portion of Parcel 6, Land of Waiākea, South Hilo District, Island of Hawaii (TMK:2-4-57:01). PHRI Report 1370-122993. Submitted to Roy Takemoto, Hilo.

McEldowney, H.
1979 Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo Hawai‘i. Manuscript on file, Department of Land and Natural Resources-State Historic Preservation Division.

Moniz, J.
n.d. Historical and Archaeological Synthesis of Land Use and Settlement Patterns, Waiākea Ahupua‘a, Hilo, Hawaii. Manuscript on file at DLNR-SHPD Hilo Office (1994).

Rechtman, R., and J. Henry
1998 University of Hawai‘i-Hilo Kāwili Street Development Archaeological Inventory Survey (TMK: 3-2-4-01:5), Waiākea Ahupua‘a, South Hilo District, Island of Hawai‘i. Paul H. Rosendahl, Ph.D., Inc., Report 1877-100998, Hilo, Hawaii. Prepared for Inaba Engineering, Inc., Hilo, Hawaii.

Rosendahl, M.
1988a Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS), Hilo Judiciary Complex Sites, Hilo, District of South Hilo, Island of Hawaii. PHRI Report 356-020588. Prepared for Wilson Okamoto and Associates, Inc.

1988b Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS) Hilo Wastewater Treatment Facility Site, Land of Waiakea, District of South Hilo, Island of Hawaii (TMK:2-1-13:Por.2). PHRI Report 415-050588. Prepared for M & E Pacific, Inc.

Rosendahl, M., and L. Talea
1988 Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS), Proposed Irradiation Plant Site. District of South Hilo, Island of Hawaii. PHRI Report 352-040888. Prepared for Westec Services.

Sato, H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr.
1973 *Soil Survey of the Island of Hawaii, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service and University of Hawaii Agricultural Experiment Station. Government Printing Office: Washington, D.C.

Spear, R.
1995 Data Recovery Excavations for Sites 50-1—35-19431, 19432, 19433, 19434, Lands of Waiakea, South Hilo District, Island of Hawai‘i (TMK:2-4-57:01). Scientific Consultant Services, Inc. Honolulu, HI.

Wolfe E., and J. Morris
1996 *Geologic Map of the Island of Hawai‘i.* Geologic Investigations Series Map 1-2524-A. U.S. Department of the Interior, U.S. Geological Survey.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 5
Traffic Impact Assessment Report

Note: Appendices are not reproduced due to length but are available for review upon request to Department of Public Works (Allan Simeon, 808.961.8327)

[This page intentionally left blank]

FINAL

Kapiolani Street Extension

Hilo, Island of Hawaii, Hawaii

Traffic Impact Analysis Report

October 2012

Prepared for

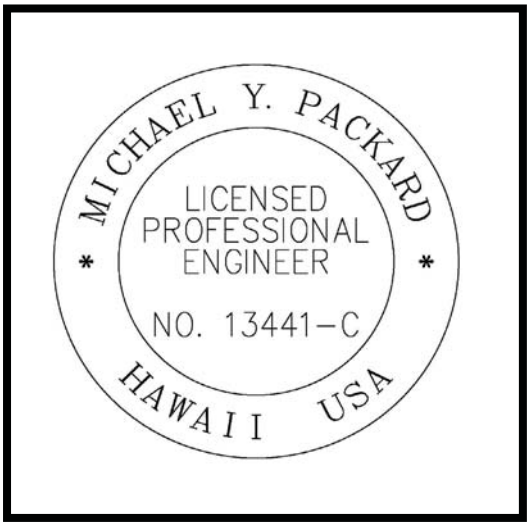
County of Hawaii Department of Public Works

FINAL
Kapiolani Street Extension

Hilo, Island of Hawaii, Hawaii

Traffic Impact Analysis Assessment

October 2012



Expiration Date:
April 30, 2014

This Traffic Impact Analysis Assessment has been conducted and prepared by the undersigned professional engineer licensed in the State of Hawai'i in accordance with the best practices of the industry.

M Packard

Signature
SSFM International, Inc.

10/4/2012

Date

Table of Contents

List of Figures 2
EXECUTIVE SUMMARY 1
I. INTRODUCTION 2
II. EXISTING (2012) CONDITIONS 4
A. Geometric Configuration 4
1. Intersection Configuration 4
2. Roadway Configuration 4
B. Volumes 6
1. Peak Hour Volumes 6
2. 24-Hour Volumes 8
3. Multi-Modal Volumes 8
C. Level of Service 8
1. Methodology 8
2. Intersection Conditions 10
3. Roadway Conditions 11
III. FUTURE CONDITIONS 12
A. Surrounding Area Conditions 12
1. Future Construction 12
2. Future Development 12
B. Kapiolani Street Extension Configuration 14
1. Roadway Configuration 14
2. Intersection Configuration 14
C. Traffic Volumes 14
1. Background Growth 14
2. Project Related Volumes 17
3. Future (2034) Volumes 19
4. Future (2014) Volumes 23
D. Level of Service 25
1. Intersection Conditions 25
2. Roadway Conditions 33
IV. REFERENCES 34

List of Figures

Figure 1: Project Location Map 3
Figure 2: Existing (2012) Lane Configurations 5
Figure 3: Existing (2012) Peak Hour Volumes 7
Figure 4: Draft UH-Hilo LRDP 13
Figure 5: Future (2034) Without Project Lane Configurations 15
Figure 6: Future (2034) Without Project Peak Hour Volumes 16
Figure 7: Project Related Diverted Vehicle Path 20
Figure 8: UH-Hilo Project Related Peak Hour Volumes 21
Figure 9: Future (2034) With Project Peak Hour Volumes 22
Figure 10: Future (2014) With Project Peak Hour Volumes 24
Figure 11: Future (2034) With Project Lane Configurations 27
Figure 12: Future (2014) With Project Lane Configurations 30

List of Tables

Table 1: Existing (2012) Roadway ADT 8
Table 2: LOS Criteria for Unsignalized Intersections 9
Table 3: LOS Criteria for Signalized Intersections 9
Table 4: Existing (2012) Unsignalized Intersection Level of Service 10
Table 5: Existing (2012) Signalized Intersection Level of Service 11
Table 6: Development Trip Generation Rates 17
Table 7: Proposed Development Trip Generation Volumes 18
Table 8: Future (2034) Without Project Unsignalized Intersection Level of Service 25
Table 9: Future (2034) Without Project Signalized Intersection Level of Service 26
Table 10: Future (2034) With Project Signalized Intersection Level of Service 28
Table 11: Future (2034) With Project Signalized Intersection Level of Service (cont.) 29
Table 12: Future (2014) With Project Signalized Intersection Level of Service 31
Table 13: Future (2014) With Project Signalized Intersection Level of Service (cont.) 32
Table 14: Future Roadway Segmental Level of Service 33

List of Appendices

Appendix A – Peak Period and 24-Hour Counts
Appendix B – Analysis Reports Existing (2012) Conditions
Appendix C – Roadway Segmental LOS
Appendix D – Surrounding Developments
Appendix E – COH Standard Details
Appendix F – Analysis Reports Future (2034) Without Project Conditions
Appendix G – Analysis Reports Future (2034) With Project Conditions
Appendix H – Analysis Reports Future (2014) With Project Conditions
Appendix I – Traffic Signal Warrants

Prepared by

SSFM INTERNATIONAL

EXECUTIVE SUMMARY

The County of Hawaii Department of Public Works is proposing to construct an extension of Kapiolani Street from Lanikaula Street to Mohouli Street. An Environmental Assessment (EA) is being completed to determine the impact on the surrounding area as a result of the proposed roadway. The purpose of this traffic impact analysis report is to document the traffic impact on the surrounding area intersections in support of the EA. This information will be used for determination of environmental impact in addition to necessary mitigation for the design and construction of the Kapiolani Street extension. This includes design of the intersections of Kapiolani Street with Lanikaula Street and with Mohouli Street.

The proposed year of construction completion for the Kapiolani Street Extension project is 2014. The roadway is being designed as a collector with sidewalks and bike lanes along both sides of the road and traffic signals and turn lanes at the intersections where needed. With existing right-of-way constraints at the intersections, proposed mitigation was limited to achieve appropriate level-of-service for the 2034 design year, 20 years after anticipated construction.

Existing (2012) level of service is mostly appropriate for the study area. Anticipated increase in traffic volume as a result of surrounding area development and general growth results in some intersection movements having increased delay and poor level of service for Future (2034) Without Project conditions. With signal warrants passing for Future (2034) With Project conditions, the Kapiolani Street intersections with Lanikaula Street and with Mohouli Street were proposed for signalization. Left turn lanes are proposed for all approaches at these intersections, as well as a right turn lane for the eastbound approach of Lanikaula Street, to alleviate delay to through-traveling vehicles. The resulting intersection and individual vehicular movement level-of-service was appropriate for Future (2034) With Project conditions.

I. INTRODUCTION

The County of Hawaii (COH) Department of Public Works (DPW) is proposing to construct an extension of Kapiolani Street from Lanikaula Street to Mohouli Street. The project location (see Figure 1) is located in the District of South Hilo, two miles south of downtown Hilo and two miles west of Hilo International Airport. Contributing to a large amount of vehicle traffic in the immediate surrounding area are the University of Hawaii at Hilo (UH-Hilo) and Waiakea High School. These traffic generators also add significant pedestrian and bike trips.

The purpose and need of the Kapiolani Street Extension project is to:

- Improve traffic flow on Kinoole Street and Kilauea Avenue;
- Provide a bike and pedestrian route towards downtown from the University of Hawaii at Hilo (UH-Hilo);
- Provide access to undeveloped State of Hawaii lands to open the door for economic development with future growth of UH-Hilo and other non-profit users.
- Provide an alternative evacuation route during a tsunami;

Associated with the proposed project is the completion of an Environmental Assessment (EA), engineering plans, and reports. This traffic impact analysis report (TIAR) is being prepared in support of the EA to document the resulting traffic impact associated with the Kapiolani Street extension. This information will be used for determination of environmental impact in addition to the design and construction of Kapiolani Street and adjacent intersections with Lanikaula Street and with Mohouli Street.

The proposed year of construction completion for this project is 2014. The Kapiolani Street extension is being designed as a collector with sidewalks and bike lanes along both sides of the road and traffic signals and turn lanes at the intersections where needed. With existing right-of-way constraints at the intersections, proposed mitigation was limited to achieve appropriate level-of-service for the 2034 design year, 20 years after anticipated construction.

Figure 1: Project Location Map

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

II. EXISTING (2012) CONDITIONS

A. Geometric Configuration

1. Intersection Configuration

The proposed project is along Kapiolani Street from Lanikaula Street to Mohouli Street. Existing (2012) lane configurations are shown in Figure 2 for the following surrounding area study intersections:

1. Kumukoa Street at Mohouli Street
2. Kapiolani Street at Mohouli Street
3. Kinoole Street at Mohouli Street
4. Kapiolani Street at Lanikaula Street
5. Kinoole Street at Lanikaula Street

2. Roadway Configuration

Kapiolani Street is an undivided, two-lane, County collector road, oriented in the north-south direction. The road extends from Waianuenue Avenue in the north to Kawili Street in the south with a break between Mohouli Street and Lanikaula Street. North of Mohouli Street, Kapiolani Street serves a low volume of residential traffic. On school days from 7:15 AM to 8:00 AM, Kapiolani Street functions as a one-way in the northbound direction between Haili Street and Waianuenue Avenue. South of Lanikaula Street, Kapiolani Street provides access to UH-Hilo and Waiakea High School which creates traffic congestion in the peak periods.

Lanikaula Street is an undivided, two-lane, County collector road, generally oriented in the east-west direction. Adjacent to the project area, Lanikaula Street extends from Kalili Street to Kanoelehua Avenue. Northwest of Kilili Street the Lanikaula Street transitions to Kumukoa Street, maintaining similar design criteria, to its intersection with Kukuau Street. Intersections with Kinoole Street and Mohouli Street are signalized with congestion along Lanikaula Street at the intersection with Kinoole Street in the afternoon peak period. In the project area, Lanikaula Street serves residential traffic and UH-Hilo.

Mohouli Street is an undivided, two-lane, County collector road, oriented in the east-west direction. Mohouli Street extends from residential communities west of the project area to Kilauea Avenue in the east. Intersections with Kinoole Street and Kilauea Avenue are signalized with left turn lanes provided on all approaches at the intersection with Kinoole Street.

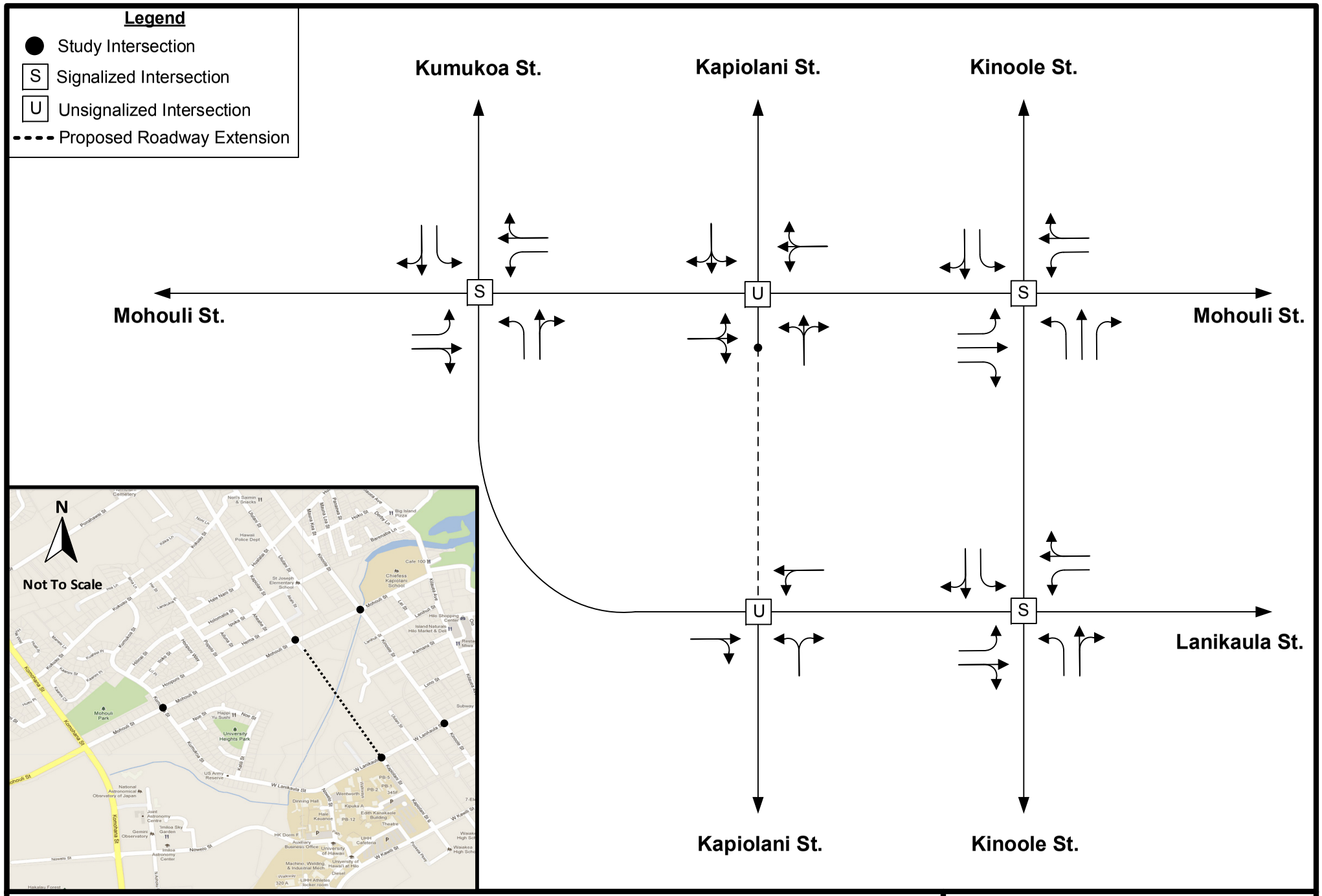


Figure 2: Existing (2012) Lane Configurations

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

In the project area, Kinoole Street is an undivided, two-lane, County collector road, oriented in the north-south direction. Kinoole Street is one of the primary north-south corridors between downtown Hilo and the Waiakea residential neighborhood. The corridor also serves heavy commuter traffic resulting in bottlenecks and delay in the northbound direction in the morning and southbound direction in the afternoon. Additionally, intersecting side streets experience congestion and delay at their intersection with Kinoole Street.

South of the project area, Kawili Street is a two-lane, undivided collector. Kawili Street provides a connection between Puainako Street and Kinoole Street, and areas beyond. Kawili Street is utilized as access for industrial parks, residential subdivisions, and Waiakea High School and UH-Hilo in the project area. Delay exists at the signalized intersection with Kinoole Street partially due to the absence of dedicated left turn lanes for either Kinoole Street approach which delays through-traveling vehicles. In the AM, westbound traffic along Kawili Street also was noted to queue back beyond the intersection with Kilauea Avenue. Due to this queue spillback, vehicles making the northbound left-turn and westbound through movements at Kilauea Avenue and Kawili Street were unable to proceed. As a result, the signalized intersection of Kawili Street and Kilauea Avenue experienced significant delay as well. In the PM, the eastbound approach traffic queues along Kawili Street to the intersection with Kinoole Street, opposite of what is seen in the AM.

B. Volumes

Intersection turning movement and 24-hour classification traffic counts were taken by SSFM on April 10, 2012 at locations as shown on Figure 1. Appendix A includes the detailed traffic count data.

1. Peak Hour Volumes

Turning movement classification counts were taken at the study intersections during the AM and PM peak periods from 6:30–8:30 AM and 3:30–5:30 PM. Average weekday AM and PM peak hours amongst the study intersections were found to be 7:15-8:15 AM and 4:15-5:15 PM. These peak hour traffic volumes are shown in Figure 3.

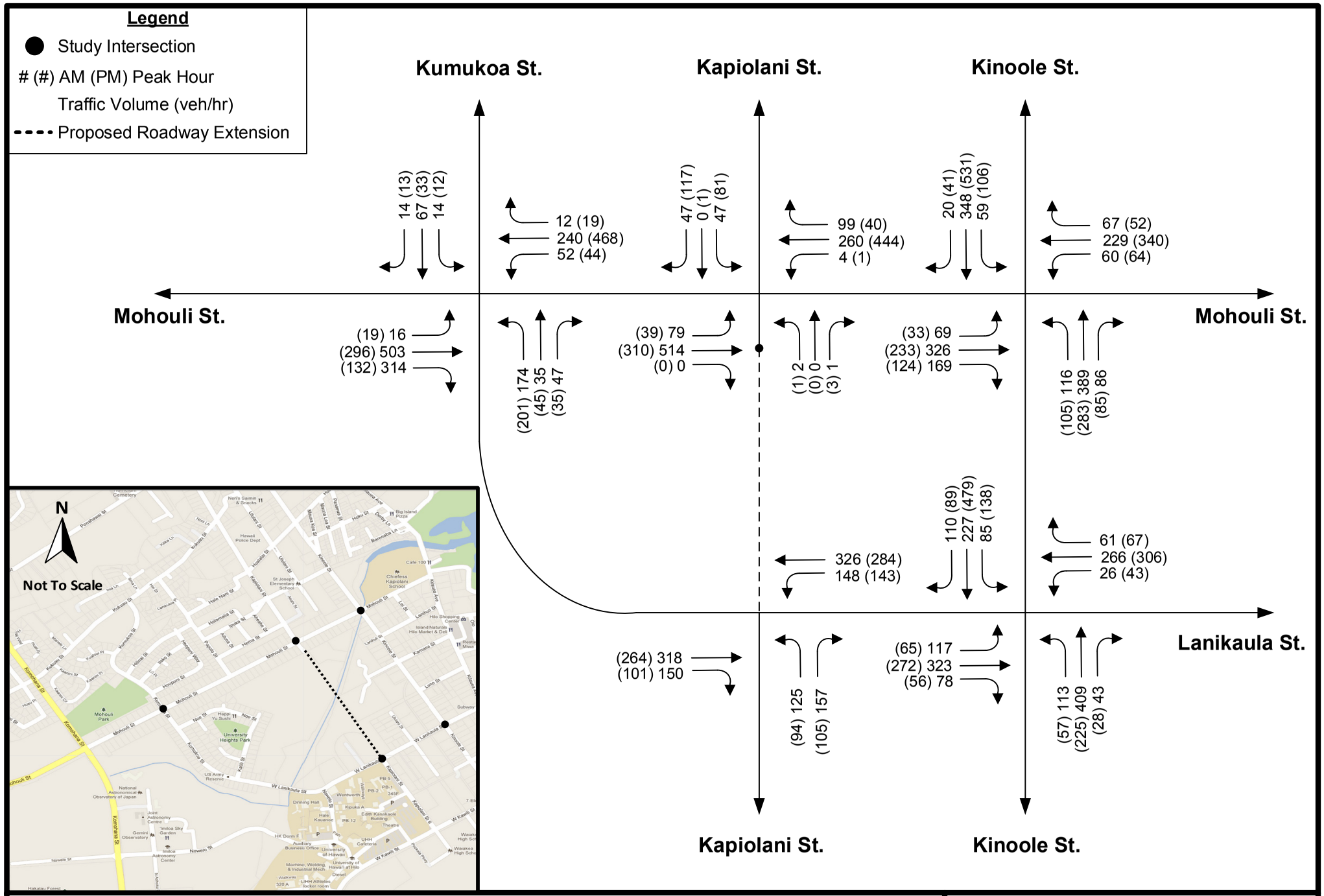


Figure 3: Existing (2012) Peak Hour Volumes

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

2. 24-Hour Volumes

24-hour traffic counts were taken along roadways in the surrounding area. Some of the traffic count locations were similar to those counted in prior years by the Hawaii Department of Transportation (HDOT) as shown in Figure 1 and therefore historical count data exists. Resulting Existing (2012) average daily traffic (ADT) and heavy vehicle percent (HV%) along the study roads are shown in Table 1.

Table 1: Existing (2012) Roadway ADT

Roadway	Location	ADT	HV%
Kinoole Street	Between Mohouli Street and Lanihuli Street*	13,640	16.4
Lanikaula Street	Between Kalili Street and Nowelo Street	5,500	2.2
Lanikaula Street	Between Kapiolani Street and Ululani Street	8,540	3.7
Mohouli Street	Between Kumukoa Street and Popolo Street*	9,680	1.9

* HDOT historical count data exists

3. Multi-Modal Volumes

The COH Mass Transit Agency (MTA) provides public transportation around the island on the Hele-On bus. The Intra-Hilo Waiakea-Uka and Intra-Hilo Kaumana buses run in and around the project area. As noted on the UH-Hilo website, there are 46 busses stopping at the university each weekday and 34 on Saturday. The campus bus stops are located in front of the Old Gym on Kapiolani Street, between Lanikaula Street and Kawili Street.

Some roads in the study area have sidewalks while others have paved shoulders for pedestrian access. South of the project area, bike route signage exists along Kapiolani Street with bike lanes along Kawili Street. Around the project area and UH-Hilo, significant pedestrian and bike activity exists. This is especially true when UH-Hilo is in session.

C. Level of Service

1. Methodology

Level of service (LOS) is an operational analysis rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines from state that an appropriate LOS for an urban collector, which is the classification of Kapiolani Street, is LOS D.

As stated in the *Highway Capacity Manual* (*HCM*) (TRB, 2010), LOS for a two-way stop controlled (TWSC) intersection is determined by the measured control delay (see Table 2) and is defined for each minor movement, not for the intersection as a whole. Vehicles traveling along

the major, free-flow road, of a TWSC intersection, proceed through with minimal delay. Those vehicles approaching the intersection along the minor movement are controlled by a stop sign and thus experience delay attributable to the volume of vehicles passing along the free-flow road and the gaps available.

Table 2: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

Source: *HCM* (TRB, 2010)

The LOS analysis for signalized intersections is based on average total vehicle delay based on the methodologies of the *HCM* (TRB, 2010), as shown in Table 3. High numbers of vehicles passing the intersection, long cycle lengths, inappropriate signal phasing, or a poor signal progression can result in long delays, and consequently poor LOS.

Table 3: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤20	B	F
>20 and ≤35	C	F
>35 and ≤55	D	F
>55 and ≤80	E	F
>80	F	F

Source: *HCM* (TRB, 2010)

Another measure of intersection delay is the volume to capacity (v/c) ratio. This is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. A v/c ratio under 0.85 means the intersection is operating under capacity and excessive delays are not experienced. An intersection is operating near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. Any v/c ratio greater than or equal to 1.0

indicates that the intersection is operating at or above capacity which results in a LOS F. A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but have to wait a long time to make the movement. This is common for low volume protected turn movements or side streets that have to wait through a long cycle length for their split to come up.

2. Intersection Conditions

Existing (2012) intersection LOS and delay was determined for the AM and PM peak hours using *Synchro 7* traffic analysis software (see Table 4 and 5). Detailed analysis reports for these intersections during Existing (2012) conditions are provided in Appendix B.

Table 4: Existing (2012) Unsignalized Intersection Level of Service

Unsignalized Intersection	Approach	Movement	AM			PM		
			Delay	v/c	LOS	Delay	v/c	LOS
Kapiolani Street at Mohouli Street	Eastbound	LTR	1.9	0.08	A	1.4	0.04	A
	Westbound	LTR	0.2	0.01	A	0.0	0.00	A
	Northbound	LTR	24.9	0.03	C	15.3	0.02	C
	Southbound	LTR	27.5	0.42	D	30.0	0.63	D
Kapiolani Street at Lanikaula Street	Westbound	LT	4.7	0.20	A	3.9	0.14	A
	Northbound	LR	267.5	**1.46**	**F**	34.5	0.67	D

Table 5: Existing (2012) Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kumukoa Street at Mohouli Street		26.2	0.74	C	20.5	0.48	C
Eastbound	L	9.0	0.03	A	15.7	0.06	B
	TR	25.3	0.82	C	21.3	0.49	C
Westbound	L	17.4	0.31	B	7.5	0.12	A
	TR	9.1	0.26	A	10.8	0.57	B
Northbound	L	42.3	0.64	D	32.7	0.44	C
	TR	33.1	0.15	C	33.1	0.12	C
Southbound	L	46.8	0.09	D	45.7	0.08	D
	TR	54.1	0.38	D	48.0	0.19	D
Kinoole Street at Mohouli Street		22.5	0.54	C	29.3	0.71	C
Eastbound	L	15.4	0.26	B	26.6	0.24	C
	T	21.9	0.52	C	25.0	0.41	C
	R	18.0	0.11	B	9.9	0.08	A
Westbound	L	27.1	0.25	C	27.0	0.23	C
	TR	35.9	0.59	D	43.5	0.76	D
Northbound	L	12.5	0.37	B	23.2	0.44	C
	T	14.0	0.50	B	21.4	0.37	C
	R	2.2	0.06	A	27.6	0.06	C
Southbound	L	22.5	0.21	C	18.3	0.23	B
	TR	29.3	0.55	C	32.0	0.72	C
Kinoole Street at Lanikaula Street		29.7	0.65	C	28.2	0.69	C
Eastbound	L	22.7	0.46	C	35.1	0.33	D
	TR	29.7	0.67	C	41.9	0.62	D
Westbound	L	28.6	0.15	C	30.3	0.20	C
	TR	39.6	0.65	D	41.6	0.68	D
Northbound	L	23.1	0.36	C	23.6	0.27	C
	TR	34.1	0.67	C	23.3	0.34	C
Southbound	L	15.2	0.36	B	10.7	0.30	B
	TR	22.4	0.55	C	16.3	0.72	B

3. Roadway Conditions

LOS of roadway segments was determined using the peak hour bidirectional (both directions of traffic) volumes and the methodologies of the *Quality/Level of Service Handbook* (FDOT, 2009) (see Appendix C), which is based on the guidelines as stated in the *HCM* (TRB, 2000) and accepted traffic engineering practice. Based on the *2010 U.S. Census* (USCB, June 2012), Hilo has a total population of 43,300. The surrounding project area is considered non-urbanized area with a population greater than 5,000 and therefore Kapiolani Street is classified as a Class I "other signalized roadway." Resulting Existing (2012) roadway segmental analysis is LOS B.

III. FUTURE CONDITIONS

Completion of construction of the Kapiolani Street extension is planned for 2014. Following HDOT standards for study of the environmental impacts, the future build year for analysis is 2034, 20 years from the completed construction date. Roadway changes and additional traffic as a result of surrounding area development and construction anticipated to be completed by 2034 is included in the Future (2034) Without Project conditions analysis.

Traffic and roadway geometric changes as a result of the Kapiolani Street Extension project are included in Future (2034) With Project conditions. This includes planned UH-Hilo development (see Figure 4), some of which will become accessible as a result of the roadway construction.

A. Surrounding Area Conditions

1. Future Construction

Plans to widen Mohouli Street are currently delayed although for this analysis construction is considered to be complete by 2034. Therefore, this project is being included and considered for Future (2034) Without Project conditions. The only impact on the Kapiolani Street analysis is the inclusion of left turn lanes along Mohouli Street at the intersection with Kapiolani Street. Therefore, even if the Mohouli Street widening is not completed by 2034, it is likely that left-turn lanes would be warranted for the Kapiolani Street Extension project.

2. Future Development

Planned UH-Hilo development considered to be completed by 2034 are included in the draft Long Range Development Plan (LRDP) as shown in Figure 4. Those developments bordered by Mohouli Street, Kinoole Street, and Lanikaula Street that are not yet constructed were considered only accessible following the construction of the Kapiolani Street extension and therefore will only be included for Future (2034) With Project conditions. These UH-Hilo developments are hereinafter referred to as those which are Kapiolani Street-accessible.

Additional surrounding area developments found on the OEQC website includes UH-Hilo student housing and facilities, senior housing, fire administration support complex, and a family entertainment center. Status of these developments were researched and coordinated with COH planning staff and details included in Appendix D. Those developments that had no additional information were noted as having “unknown” status.

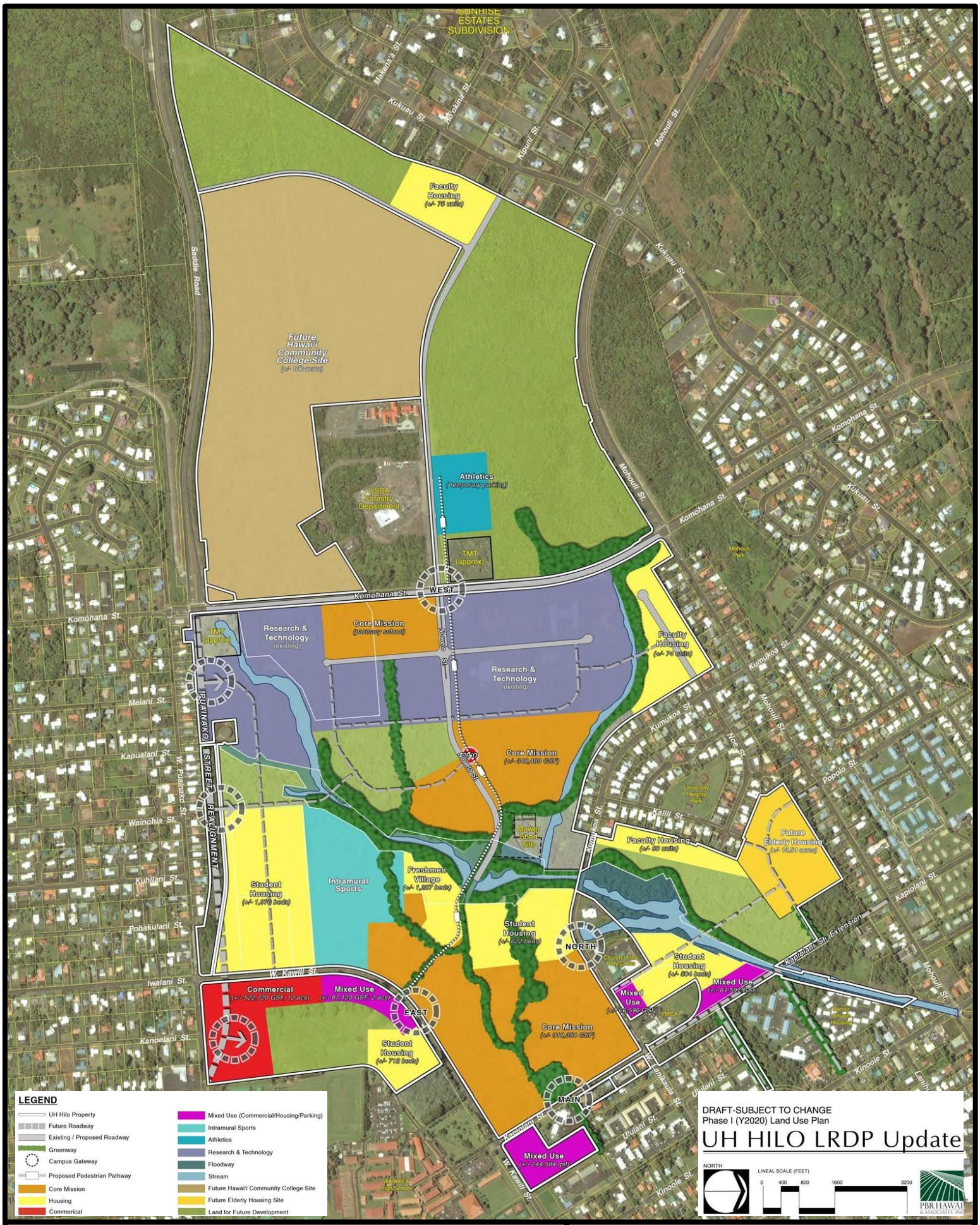


Figure 4: Draft UH Hilo LRDP

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

B. Kapiolani Street Extension Configuration

1. Roadway Configuration

The proposed Kapiolani Street extension is being proposed as a business, industrial collector as noted in the COH Standard Details (see Appendix E) with 66-foot right-of-way (ROW) including eight-foot shoulders, five-foot bike lanes, and 12-foot travel lanes in either direction with a 12-foot turning lane where needed. Proposed speed along the corridor is being increased to 35mph with the existing 25mph posted speed limit being retained at the approaches to the intersections.

2. Intersection Configuration

Intersection lane configuration changes as a result of the Mohouli Street widening include dedicated left-turn lanes added along Mohouli Street for both approaches at the intersection with Kapiolani Street. No known construction projects were noted for Lanikaula Street. These changes were considered for Future (2034) Without Project conditions as shown in Figure 5.

C. Traffic Volumes

1. Background Growth

Comparing historical HDOT traffic counts to current 24-hour counts taken along study roadways, it was noted that traffic volumes have slightly increased. In addition to the anticipated increase in traffic as a result of proposed UH-Hilo development, UH-Hilo is also projected to increase enrollment between 2011-2015 by 2.6% annually.

Considering annual traffic growth over the past 10 years as well as projected surrounding area development and growth by UH-Hilo (not including the Kapiolani Street-accessible development), it was anticipated that future volumes would continue to increase through 2034. Therefore, for future traffic conditions through-volumes along Mohouli Street, Lanikaula Street, and Kinoole Street were increased 0.5% per year from Existing (2012). Additionally, other traffic movements directly related to accessing UH-Hilo were increased 0.5% per year to account for UH-Hilo development and growth. With these increases in volume, Future (2034) Without Project Volumes are shown in Figure 6.

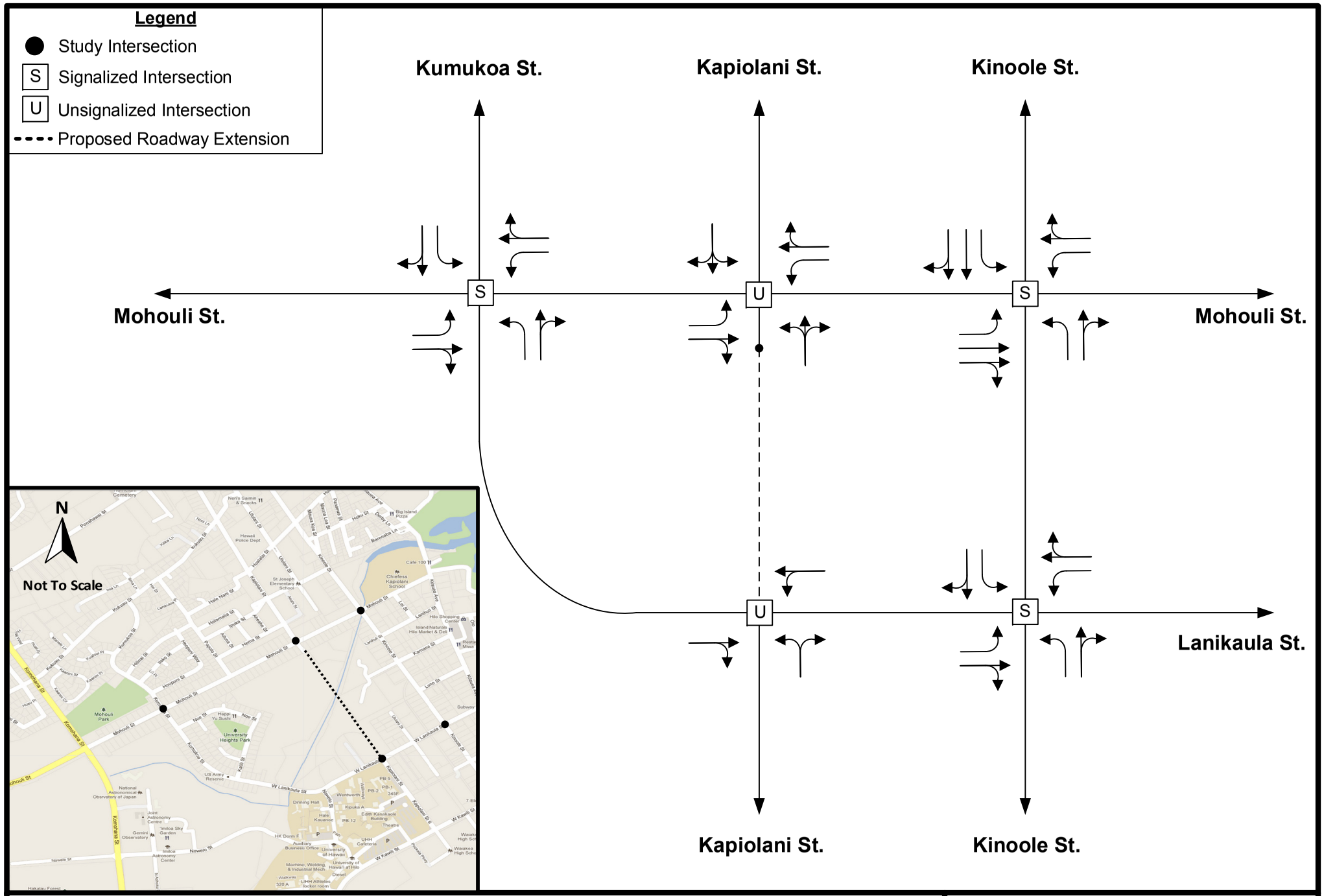


Figure 5: Future (2034) Without Project Lane Configurations

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

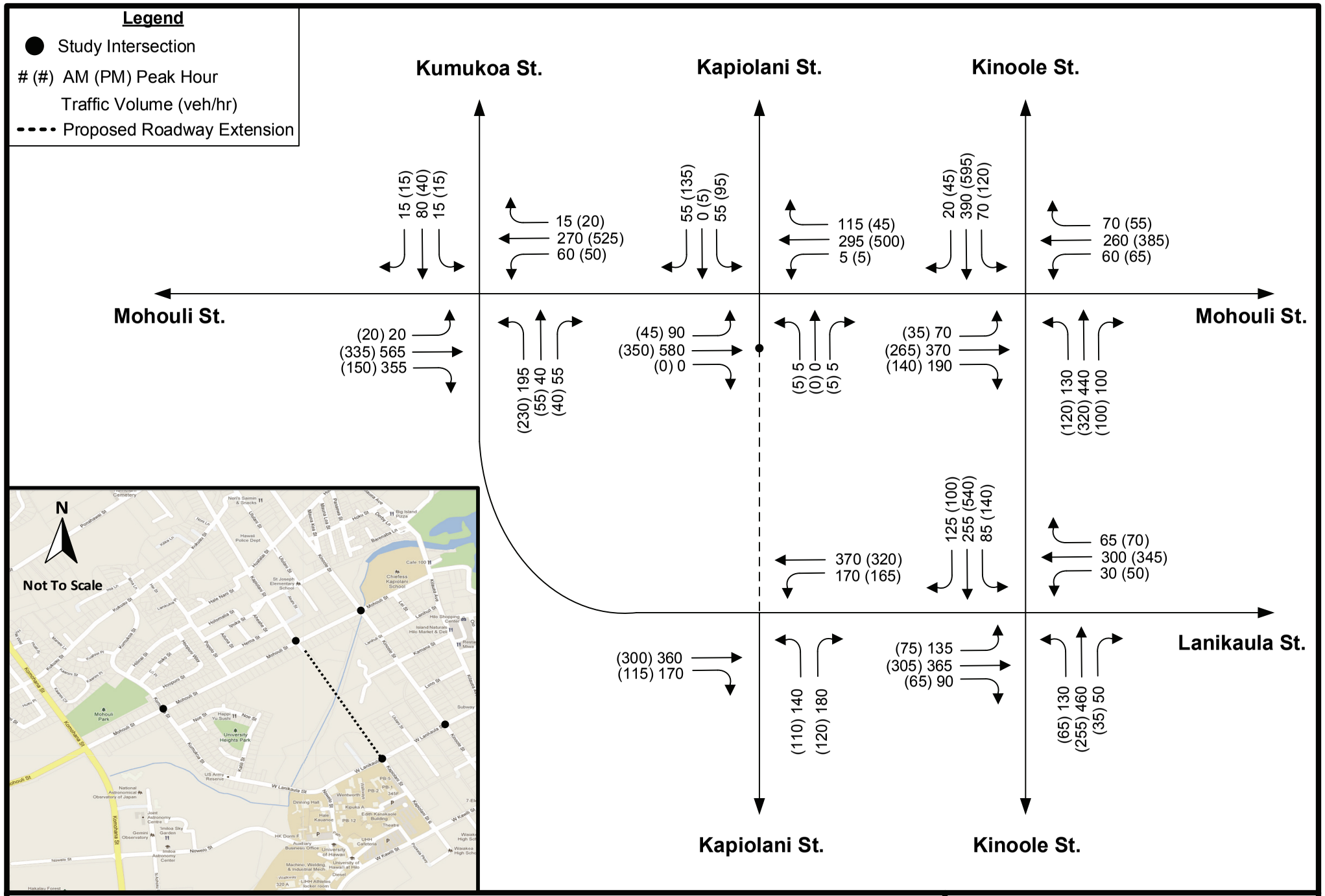


Figure 6: Future (2034) Without Project Peak Hour Volumes

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

2. Project Related Volumes

Vehicular traffic anticipated to use the Kapiolani Street extension includes:

- Vehicles traveling to/from Kapiolani Street-accessible UH-Hilo developments;
- Vehicles that can shorten the distance of their existing trip through use of Kapiolani Street;
- Vehicles that shorten the length of time of their existing trip through use of Kapiolani Street.

The volume of vehicles along the proposed Kapiolani Street extension were calculated using the four step trip generation methodology: trip generation, trip distribution, modal choice, route assignment.

a) *Trip Generation*

It was noted that a primary purpose of the Kapiolani Street extension construction is to make land otherwise not accessible, available for additional UH-Hilo development. These Kapiolani Street-accessible UH-Hilo project related volumes were calculated for the peak hours using *Trip Generation 8th Edition* (ITE, 2008) rates provided in Table 6 which are based on projected land use and size of the development. These rates are determined through numerous studies conducted to record the number of vehicles proceeding to and from the different types of land use developments. The resulting project related trips during the AM and PM peak hours are shown in Table 7.

Table 6: Development Trip Generation Rates

Land Use	Qty	Units	Land Use Code	Rate	
				AM	PM
Faculty Housing	80	Units	220 - Apartment	0.51	0.62
Student Housing	252	Units	*	0.18	1.03
Elderly Housing	140	Units	252 - Senior Adult Housing Attached	0.13	0.16
Mixed Use	61,597	GSF	820 - Shopping Center	1.00	3.73

* Source: *Traffic Impact Analysis Report for Honpa Hongwanji Hilo Betsuin Student Housing Project* (M&E Pacific Inc., 2008)

Table 7: Proposed Development Trip Generation Volumes

Land Use	AM						PM					
	Rate	**In**	**Out**	**Total**	**In**	**Out**	**Rate**	**In**	**Out**	**Total**	**In**	**Out**
Faculty Housing	0.51	20%	80%	41	8	33	0.62	65%	35%	49	32	17
Student Housing	0.18	43%	57%	45	19	26	1.03	56%	44%	260	146	114
Elderly Housing	0.13	36%	64%	18	6	12	0.16	60%	40%	22	13	9
Mixed Use	1.00	61%	39%	31	19	12	3.73	49%	51%	115	56	59
TOTAL				**135**	**53**	**82**				**446**	**247**	**199**

b) *Trip Distribution*

Existing and future tripmakers' origin and destination were considered when evaluating future vehicle travel in the area. Primary travel is in the direction of downtown Hilo in the morning and in the opposite direction in the evening. South of downtown Hilo, this is due to motorists primarily traveling from home to work northbound in the morning and returning home in the afternoon. In the immediate area this differed slightly with higher volumes in the direction of UH-Hilo in the morning.

Following construction, Kapiolani Street will extend from Waianuenue Avenue in the north to Kawili Street and Waiakea High School in the south. With Kinoole Street and Kilauea Street extending much further south, it is envisioned that these roads will continue to be used by vehicles traveling between downtown Hilo and residences south of Puainako Street. Kapiolani Street extension provides a more direct access to UH-Hilo and Waiakea High School for vehicles in the immediate area of Kapiolani Street north of the project. Additional roads are shown on the UH-Hilo LRDP for future construction although without further information on their likelihood for completion, they were not considered in our study. Therefore all new traffic accessing the adjacent Kapiolani Street-accessible UH-Hilo development was considered to come off of the Kapiolani Street extension.

c) *Modal Choice*

Much of the development in the surrounding area is associated with UH-Hilo and thus it is envisioned that many student and other trips will be conducted on foot, by bike, or through use of transit. This would lead to a reduction of total trips generated associated with the additional developments in the area. However, to be conservative reductions were not applied to the generated trips or future anticipated growth.

d) *Route Assignment*

With construction of the Kapiolani Street extension for Future (2034) With Project conditions, assumptions used in estimating diverted vehicle paths in the surrounding area are as follows and shown in Figure 7:

- Traffic previously using Kinoole Street may now use Kapiolani Street due to its parallel access, potential for lower traffic delay, and ability to provide direct access to UH-Hilo. As a result of this, we assumed 20% of Future (2034) Without Project through-volumes along Kinoole Street would utilize Kapiolani Street for Future (2034) With Project conditions.
- Despite future Kapiolani Street having the same functional classification of Kinoole Street it is assumed that Kapiolani Street will not carry the same magnitude of traffic volume as Kinoole Street due to it not providing the same connectivity.
- Where considered beneficial, traffic previously accessing existing UH-Hilo through the intersection of Lanikaula Street at Kapiolani Street may now complete their trips utilizing the Kapiolani Street extension. As a result of this, we assumed a 25% reduction in Future (2034) Without Project traffic volume for movements accessing UH-Hilo and resulting volume distribution to other movements and surrounding intersections.
- Considering residential and commercial zones, motorist origin-destination paths were evaluated to optimize travel distance/time. As a result of this, traffic movements at intersections in the surrounding study area were adjusted.

Project related trips associated with the future UH-Hilo development made available as a result of construction of the Kapiolani Street extension were distributed along the adjacent roadways during the AM and PM peak hours (see Figure 8).

3. Future (2034) Volumes

a) *Future (2034) Peak Hour Volumes*

Vehicle traffic was rerouted and Kapiolani Street-accessible UH-Hilo project related volumes were added to the Future (2034) Without Project traffic volumes for the resulting Future (2034) With Project traffic volumes as shown in Figure 9.

b) *Future (2034) 24-Hour Volumes*

Considering the anticipated growth and developments in the area, Future (2034) With Project ADT along the Kapiolani Street extension is projected to be 5,200.

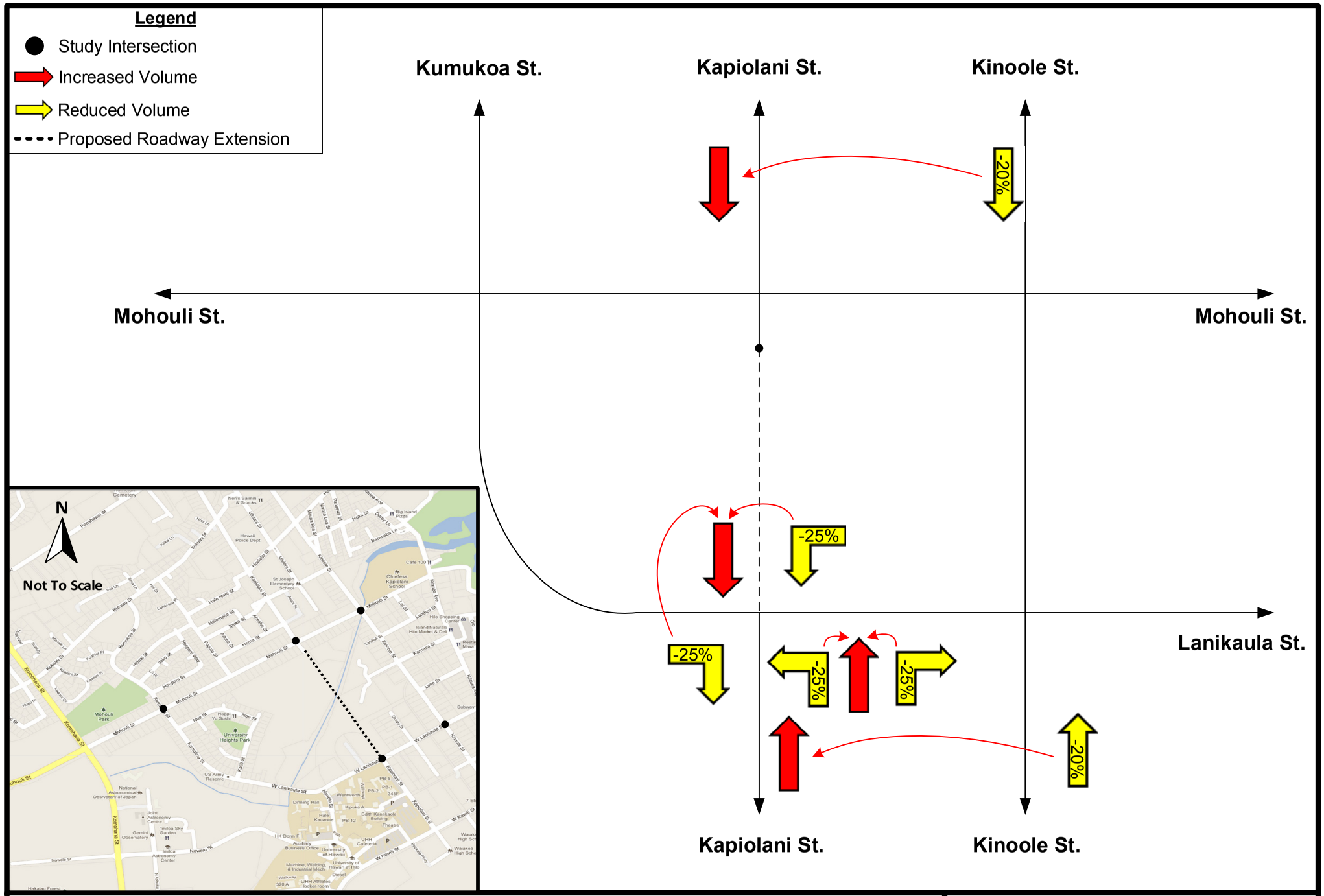


Figure 7: Project Related Diverted Vehicle Path

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

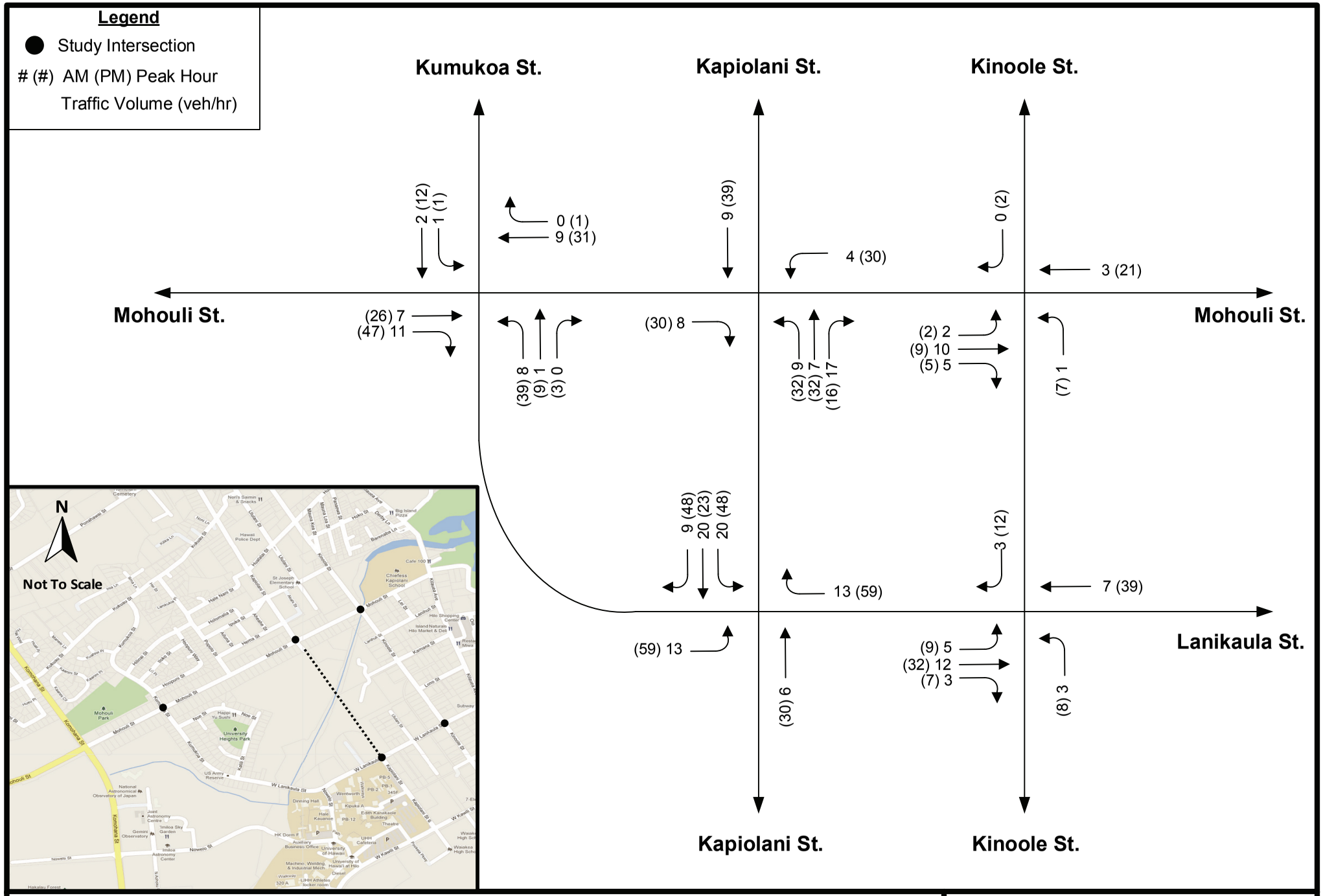


Figure 8: UH-Hilo Project Related Peak Hour Volumes

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

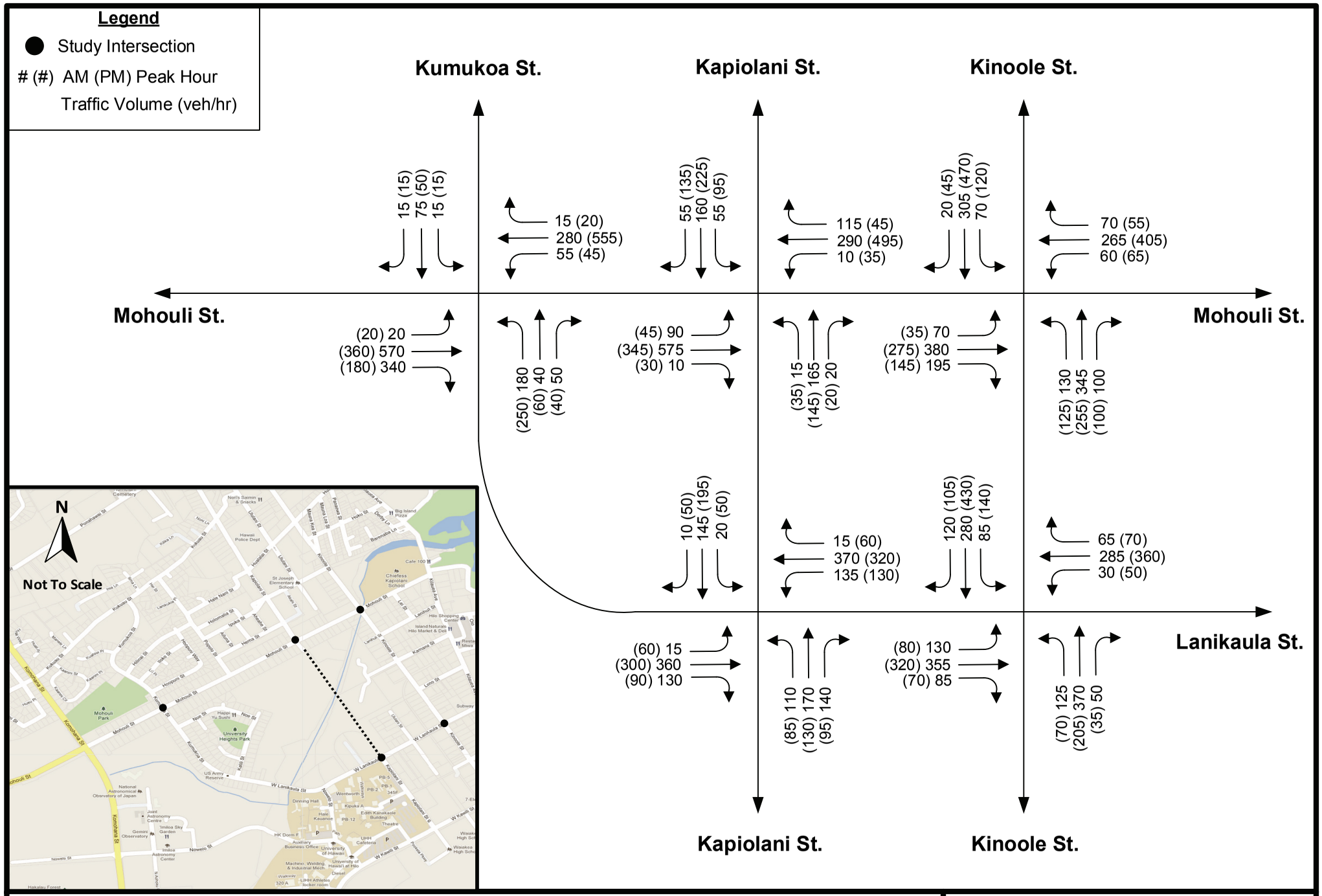


Figure 9: Future (2034) With Project Peak Hour Volumes

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

4. Future (2014) Volumes

a) *Future (2014) Peak Hour Volumes*

For consideration of the study area "with project" at the year of construction, Future (2014) With Project conditions were also analyzed. These conditions differed from Future (2034) With Project conditions in that it was assumed that the proposed internal Kapiolani Street-accessible UH-Hilo development would not be completed and thus associated trip generated volumes not added. Assumptions used in estimating Future (2014) With vehicle paths in the surrounding area are as follows:

- Traffic previously using Kinoole Street may now use Kapiolani Street due to its parallel access, potential for lower traffic delay, and ability to provide direct access to UH-Hilo. As a result of this, we assumed 10% of Future (2014) Without Project through-volumes along Kinoole Street would utilize Kapiolani Street for Future (2014) With Project conditions.
- Where considered beneficial, traffic previously accessing existing UH-Hilo through the intersection of Lanikaula Street at Kapiolani Street may now complete their trips utilizing the Kapiolani Street extension. As a result of this, we assumed a 25% reduction in Future (2014) Without Project traffic volume for movements accessing UH-Hilo and resulting volume distribution to other movements and surrounding intersections.
- Considering residential and commercial zones, motorist origin-destination paths were evaluated to optimize travel distance/time. As a result of this, traffic movements at intersections in the surrounding study area were adjusted,

Vehicle traffic was rerouted and surrounding area volumes increased for the resulting Future (2014) With Project traffic volumes as shown in Figure 10.

b) *Future (2014) 24-Hour Volumes*

Considering the anticipated growth in the area, anticipated Future (2014) average daily traffic (ADT) along Kapiolani Street extension in 2014 is 2,300.

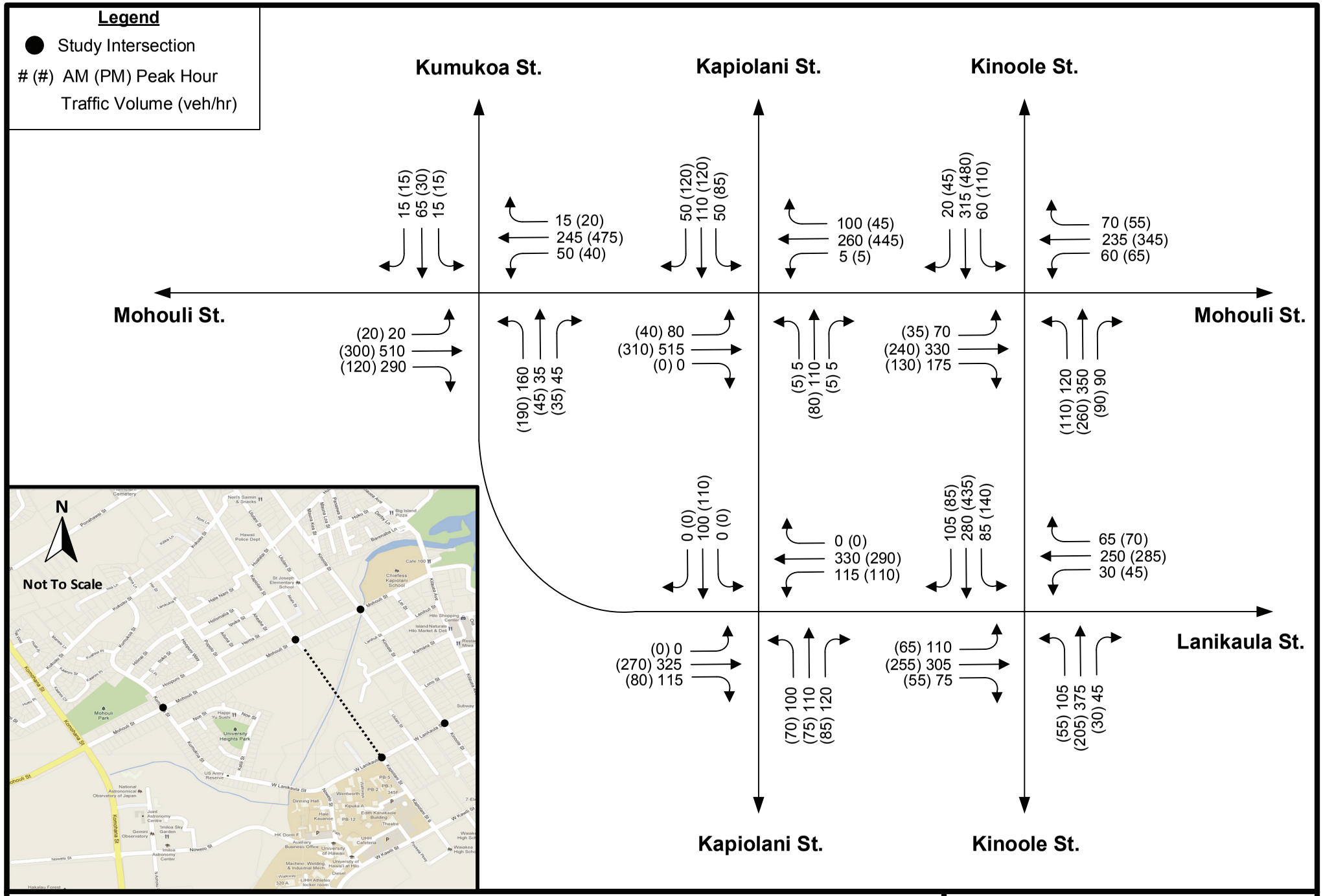


Figure 10: Future (2014) With Project Peak Hour Volumes

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

D. Level of Service

1. Intersection Conditions

a) *Future (2034) Without Project*

The Future (2034) Without Project conditions reflect the anticipated growth in the surrounding area (see Tables 8 and 9) with resulting poor LOS for some movements. Detailed analysis reports for these intersections during Future (2034) Without Project conditions are provided in Appendix F.

Table 8: Future (2034) Without Project Unsignalized Intersection Level of Service

Unsignalized Intersection	Approach	Movement	AM			PM		
			Delay	v/c	LOS	Delay	v/c	LOS
Kapiolani Street at Mohouli Street	Eastbound	L	8.7	0.09	A	9.1	0.05	A
	Westbound	L	9.3	0.01	A	8.0	0.00	A
	Northbound	LTR	26.7	0.11	D	28.9	0.12	D
	Southbound	LTR	50.1	0.65	**F**	76.0	0.93	**F**
Kapiolani Street at Lanikaula Street	Westbound	LT	5.6	0.24	A	4.4	0.17	A
	Northbound	LR	610.3	**2.22**	**F**	87.7	0.97	**F**

Table 9: Future (2034) Without Project Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kumukoa Street at Mohouli Street		31.8	0.84	C	23.80	0.57	C
Eastbound	L	7.1	0.04	A	20.0	0.16	B
	TR	31.5	0.93	C	25.0	0.70	C
Westbound	L	39.2	0.57	D	13.2	0.27	B
	TR	11.8	0.31	B	26.6	0.79	C
Northbound	L	58.0	0.88	**E**	18.3	0.44	B
	TR	28.2	0.18	C	19.9	0.11	B
Southbound	L	38.0	0.12	D	24.1	0.05	C
	TR	45.0	0.47	D	24.9	0.12	C
Kinoole Street at Mohouli Street		19.4	0.70	B	23.3	0.67	C
Eastbound	L	16.2	0.39	B	16.8	0.33	B
	TTR	14.9	0.49	B	15.8	0.32	B
Westbound	L	26.2	0.35	C	19.3	0.26	B
	TR	35.8	0.73	D	38.2	0.85	D
Northbound	L	7.6	0.34	A	13.2	0.41	B
	TR	14.8	0.71	B	21.9	0.60	C
Southbound	L	21.9	0.36	C	16.9	0.40	B
	TTR	18.6	0.32	B	20.9	0.47	C
Kinoole Street at Lanikaula Street		30.4	0.71	C	25.3	0.83	C
Eastbound	L	30.6	0.64	C	24.1	0.60	C
	TR	33.4	0.79	C	32.1	0.80	C
Westbound	L	26.4	0.24	C	28.4	0.44	C
	TR	38.5	0.78	D	43.9	0.86	D
Northbound	L	24.1	0.51	C	17.0	0.36	B
	TR	31.8	0.77	C	18.0	0.38	B
Southbound	L	26.8	0.51	C	7.2	0.31	A
	TR	20.2	0.63	C	16.9	0.77	B

b) *Future (2034) With Project*

With some resulting poor LOS operations for Future (2034) Without Project conditions, the intersections of Kapiolani Street at Mohouli Street and Kapiolani Street at Lanikaula Street were evaluated as signalized intersections. Left turn lanes were included along all approaches with protected-permitted signal timing used. A right turn lane was also included along the eastbound approach of Lanikaula Street at the intersection with Kapiolani Street to better mitigate delay resulting from the high right-turn volumes for vehicles accessing UH-Hilo and Waiakea High School. Future (2034) With Project lane configurations are as shown in Figure 11.

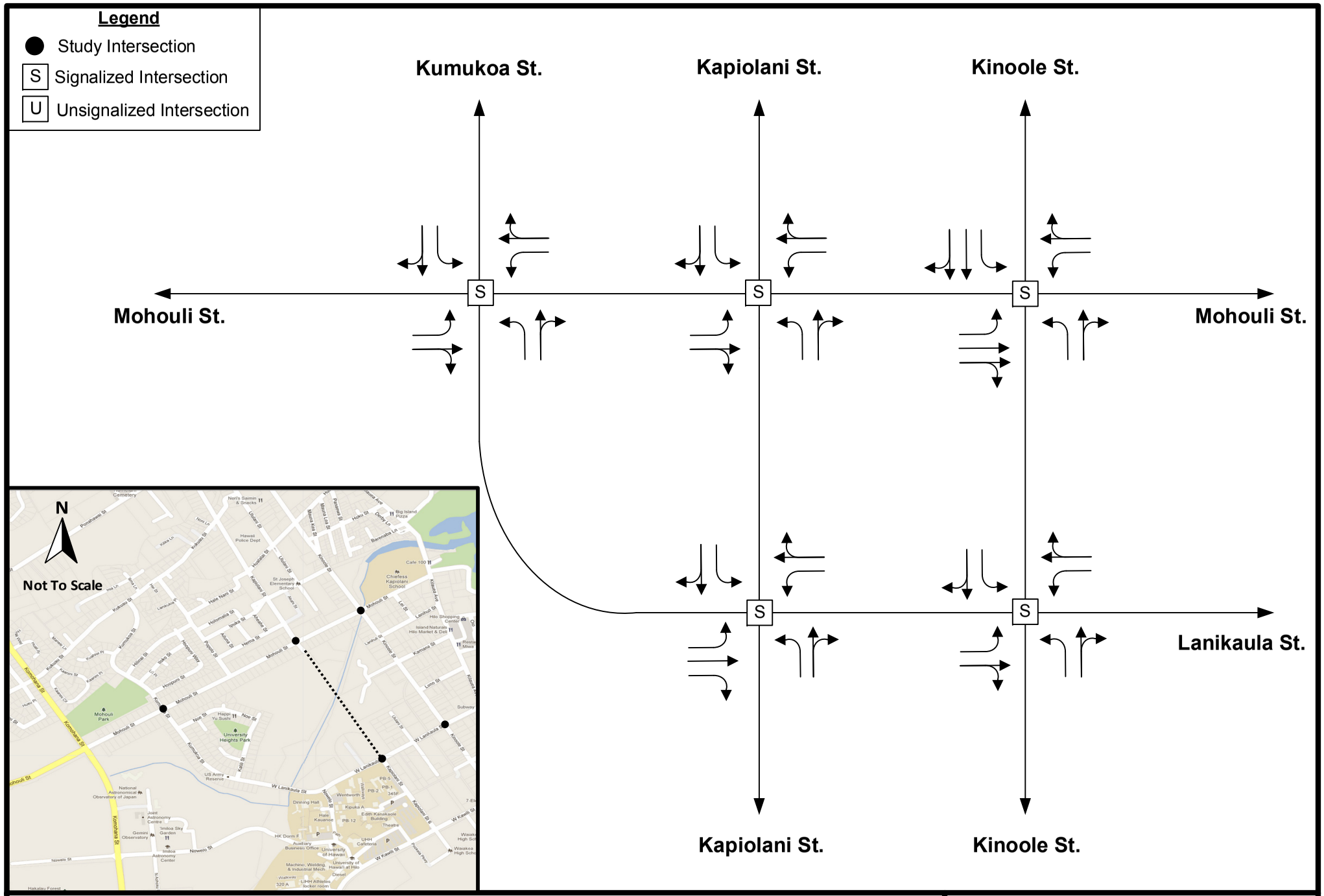


Figure 11: Future (2034) With Project Lane Configurations

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

Due to the ROW constraints at the Kapiolani Street intersections with Mohouli Street and with Lanikaula Street, roundabouts were not considered due to the large footprints required to provide sufficient turning area for large design vehicles, including buses, associated with collector roads.

The Future (2034) With Project LOS for the study intersections are shown in Table 10 and 11. All study intersections operated with appropriate LOS with only one poorly operating turn movement. Appropriate LOS was seen for all movements at the Kapiolani Street intersections with Mohouli Street and with Lanikaula Street as a result of the proposed mitigation. Detailed analysis reports for these intersections during Future (2034) With Project conditions are provided in Appendix G.

Table 10: Future (2034) With Project Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kumukoa Street at Mohouli Street		29.5	0.81	C	20.3	0.61	C
Eastbound	L	6.8	0.04	A	19.6	0.17	B
	TR	27.8	0.91	C	25.7	0.75	C
Westbound	L	48.3	0.52	D	10.5	0.28	B
	TR	4.3	0.31	A	15.9	0.81	B
Northbound	L	58.0	0.84	**E**	18.6	0.49	B
	TR	47.6	0.18	D	20.6	0.13	C
Southbound	L	39.1	0.13	D	26.0	0.06	C
	TR	46.7	0.48	D	27.2	0.16	C
Kinoole Street at Mohouli Street		18.4	0.57	B	23.3	0.63	C
Eastbound	L	9.1	0.35	A	15.3	0.33	B
	TTR	10.5	0.49	B	16.5	0.32	B
Westbound	L	23.3	0.32	C	18.3	0.25	B
	TR	32.5	0.69	C	36.4	0.85	D
Northbound	L	10.5	0.32	B	14.7	0.38	B
	TR	17.7	0.60	B	22.8	0.53	C
Southbound	L	22.8	0.31	C	16.8	0.36	B
	TTR	19.3	0.27	B	20.3	0.38	C
Kinoole Street at Lanikaula Street		24.8	0.72	C	24.8	0.73	C
Eastbound	L	23.0	0.60	C	25.7	0.64	C
	TR	19.4	0.77	B	28.6	0.81	C
Westbound	L	25.1	0.22	C	27.6	0.44	C
	TR	34.6	0.72	C	41.3	0.85	D
Northbound	L	24.7	0.52	C	16.4	0.30	B
	TR	25.4	0.62	C	18.4	0.33	B
Southbound	L	19.1	0.38	B	8.5	0.29	A
	TR	23.3	0.66	C	16.3	0.66	B

Table 11: Future (2034) With Project Signalized Intersection Level of Service (cont.)

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kapiolani Street at Mohouli Street		24.3	0.68	C	27.0	0.69	C
Eastbound	L	7.3	0.30	A	10.2	0.25	B
	TR	19.2	0.82	B	11.6	0.54	B
Westbound	L	13.9	0.08	B	9.1	0.11	A
	TR	29.1	0.67	C	32.9	0.84	C
Northbound	L	16.0	0.09	B	22.8	0.31	C
	TR	27.3	0.70	C	28.8	0.60	C
Southbound	L	25.5	0.29	C	24.0	0.37	C
	TR	30.8	0.50	C	36.6	0.73	D
Kapiolani Street at Lanikaula Street		23.4	0.62	C	20.0	0.49	C
Eastbound	L	17.7	0.06	B	13.9	0.21	B
	T	26.2	0.69	C	19.6	0.53	B
	R	18.8	0.10	B	9.0	0.07	A
Westbound	L	16.1	0.52	B	15.7	0.38	B
	TR	24.3	0.69	C	25.6	0.61	C
Northbound	L	22.1	0.30	C	21.2	0.27	C
	TR	33.7	0.63	C	26.7	0.40	C
Southbound	L	6.1	0.09	A	9.3	0.15	A
	TR	7.4	0.34	A	15.5	0.47	B

c) *Future (2014) With Project*

Lane configuration for Future (2014) With Project conditions were evaluated using lane configurations as shown in Figure 12 which include intersection improvements as a result of the Kapiolani Street Extension project but not those from the Mohouli Street widening. The Future (2014) With Project LOS for the study intersections are shown in Table 12 and 13. All study intersections operated with appropriate LOS. Detailed analysis reports for these intersections during Future (2014) With Project conditions are provided in Appendix H.

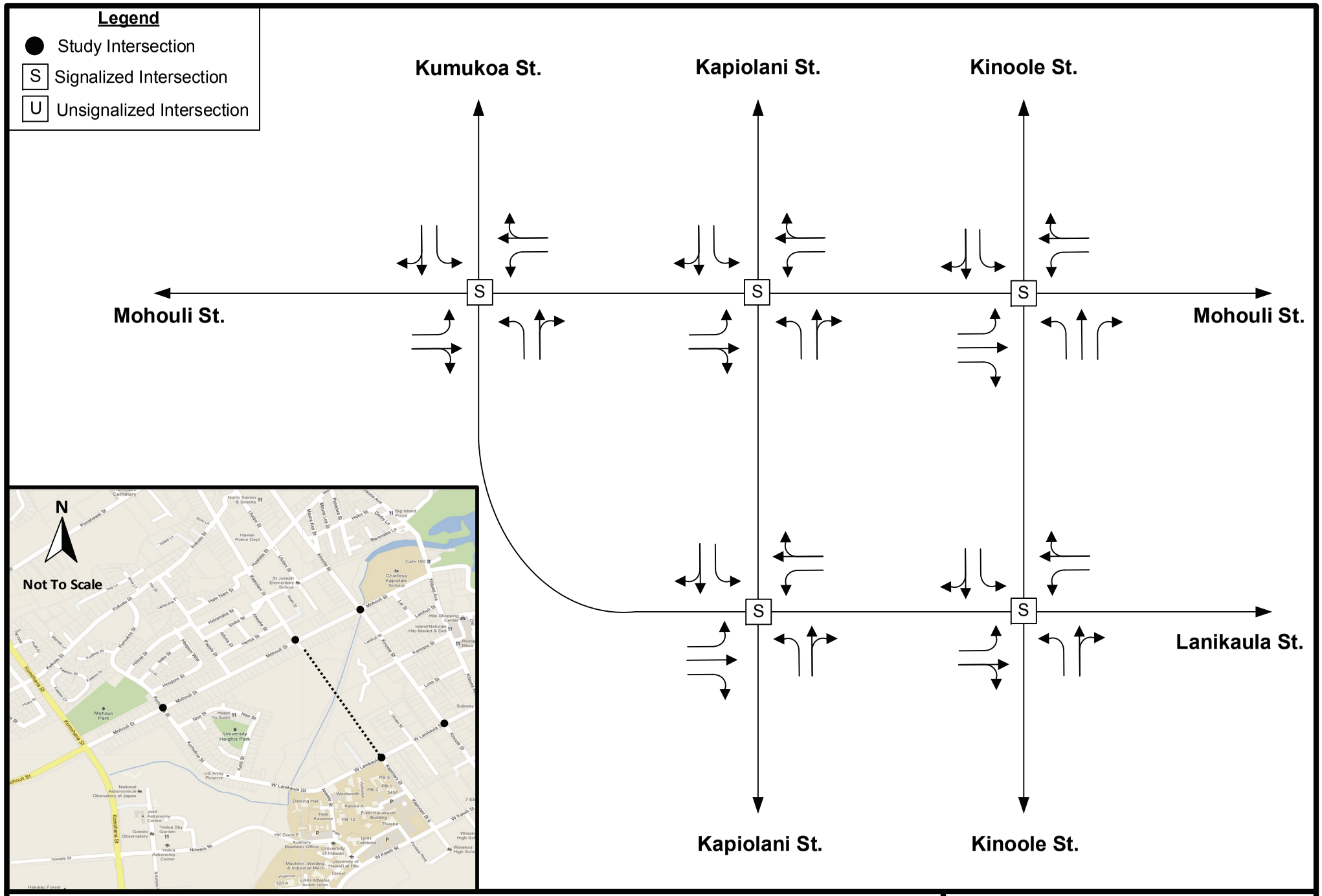


Figure 12: Future (2014) With Project Lane Configurations

Kapiolani Street Extension – Hilo, Hawaii

SSFM INTERNATIONAL

Table 12: Future (2014) With Project Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kumukoa Street at Mohouli Street		22.3	0.70	C	20.0	0.50	C
Eastbound	L	7.9	0.04	A	20.9	0.16	C
	TR	23.6	0.84	C	24.6	0.64	C
Westbound	L	13.2	0.35	B	8.8	0.20	A
	TR	4.5	0.29	A	13.7	0.78	B
Northbound	L	34.3	0.62	C	24.4	0.34	C
	TR	35.8	0.14	D	31.6	0.09	C
Southbound	L	35.7	0.10	D	21.0	0.04	C
	TR	38.7	0.32	D	21.7	0.08	C
Kinoole Street at Mohouli Street		21.3	0.57	C	24.7	0.64	C
Eastbound	L	6.9	0.27	A	17.3	0.33	B
	T	15.9	0.56	B	20.9	0.44	C
	R	26.1	0.12	C	38.6	0.08	D
Westbound	L	21.3	0.25	C	23.0	0.27	C
	TR	30.6	0.63	C	39.7	0.85	D
Northbound	L	13.8	0.38	B	12.4	0.43	B
	T	15.1	0.50	B	14.9	0.35	B
	R	7.0	0.06	A	10.6	0.06	B
Southbound	L	21.3	0.22	C	13.0	0.23	B
	TR	29.6	0.62	C	23.3	0.66	C
Kinoole Street at Lanikaula Street		21.8	0.61	C	20.1	0.64	C
Eastbound	L	14.8	0.49	B	19.8	0.52	B
	TR	17.2	0.68	B	26.0	0.71	C
Westbound	L	23.0	0.18	C	29.3	0.32	C
	TR	30.2	0.63	C	36.9	0.76	D
Northbound	L	20.9	0.41	C	13.8	0.19	B
	TR	24.2	0.60	C	15.7	0.29	B
Southbound	L	18.4	0.36	B	3.2	0.27	A
	TR	19.8	0.60	B	11.1	0.59	B

Table 13: Future (2014) With Project Signalized Intersection Level of Service (cont.)

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Kapiolani Street at Mohouli Street		19.3	0.54	B	21.9	0.55	C
Eastbound	L	5.5	0.21	A	6.3	0.14	A
	TR	13.5	0.65	B	6.8	0.39	A
Westbound	L	9.6	0.02	A	8.1	0.01	A
	TR	20.6	0.51	C	26.7	0.67	C
Northbound	L	19.5	0.03	B	17.5	0.03	B
	TR	25.6	0.47	C	23.0	0.33	C
Southbound	L	23.6	0.19	C	23.5	0.25	C
	TR	30.2	0.39	C	31.9	0.51	C
Kapiolani Street at Lanikaula Street		18.9	0.47	B	15.7	0.35	B
Eastbound	L	0.0	0.00	A	0.0	0.00	A
	T	18.5	0.58	B	18.3	0.48	B
	R	8.5	0.09	A	9.6	0.06	A
Westbound	L	12.8	0.37	B	8.8	0.28	A
	TR	20.8	0.56	C	15.6	0.45	B
Northbound	L	21.9	0.25	C	17.6	0.16	B
	TR	28.7	0.43	C	23.4	0.24	C
Southbound	L	0.0	0.00	A	0.0	0.00	A
	TR	7.4	0.20	A	8.1	0.21	A

d) *Traffic Signal Warrant*

Per standard traffic engineering practice, prior to signalization of an intersection, an engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic signal is justified. The *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)* (FHWA, 2009) lists eight warrants for consideration of providing a traffic signal at an intersection. When being used for future planning purposes, vehicular volumes are the primary warrants considered. With the traffic volume data available, four-hour, eight-hour, and peak hour traffic signal warrants were considered where applicable.

Traffic volume warrants were analyzed for Existing (2012), Future (2034) Without Project, and Future (2034) With Project conditions at the Kapiolani Street intersections with Mohouli Street and with Lanikaula Street. Traffic signal warrants passed for Future (2034) With Project conditions. Detailed traffic signal warrant analysis can be found in Appendix I.

2. Roadway Conditions

a) *Future Without and With Project*

The anticipated increase in traffic for Future (2034) Without Project Conditions resulted in no change in roadway segment LOS as shown in Table 14. However, with the increase in number of traffic signals over the one-mile stretch of road for Future (2034) With Project and Future (2014) With Project conditions, Kapiolani Street changes classification to a Class II "other signalized roadway" according to the *Quality/LOS Handbook* (FDOT, 2009). With this change in classification and redistribution of traffic resulting from construction of the Kapiolani Street extension, roadway segment LOS slightly worsens but remains appropriate for Future (2034) With Project and Future (2014) With Project conditions as shown in Table 14. Detailed analysis can be seen in Appendix C.

Table 14: Future Roadway Segmental Level of Service

Roadway Segment	Level of Service			
	Existing (2012)	Future (2034) Without	Future (2034) With	Future (2014) With
Kapiolani Street	B	B	C	C

IV. REFERENCES

1. American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, 2011.
2. Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 Edition.
3. Institute of Transportation Engineers, *Trip Generation 8th Edition*, 2008.
4. M&E Pacific, Inc., *Traffic Impact Analysis Report for Honpa Hongwanji Hilo Betsuin Student Housing Project*, June 2008.
5. State of Florida, Department of Transportation, *Quality/Level of Service Handbook*, 2009.
6. State of Hawaii, Department of Transportation, *Historical Traffic Station Maps*, CD-ROM.
7. State of Hawaii, Office of Environmental Quality Control, *Map-Based Library of EA's and EIS's.*
8. Transportation Research Board, National Research Council, *Highway Capacity Manual*, Washington, D.C., 2000 Edition.
9. Transportation Research Board, National Research Council, *Highway Capacity Manual*, Washington, D.C., 2010 Edition.
10. United States Census Bureau, http://2010.census.gov/2010census/, accessed June 13, 2012.

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 6
Air Quality Report

[This page intentionally left blank]

Draft

AIR QUALITY STUDY

FOR THE PROPOSED

KAPIOLANI STREET EXTENSION PROJECT

HILO, HAWAII

Prepared for:

The Geometrician

June 13, 2012

B.D. NEAL & ASSOCIATES

Applied Meteorology * Air Quality * Computer Science

P.O. BOX 1808 * KAILUA-KONA, HAWAII 96745 * TELEPHONE (808) 329-1627 * FAX (808) 331-8428

EMAIL: bdneal@kona.net

CONTENTS

Section		Page
1.0	Summary	1
2.0	Introduction	4
3.0	Ambient Air Quality Standards	4
4.0	Regional and Local Climatology	6
5.0	Present Air Quality	9
6.0	Short-Term Impacts of Project	12
7.0	Long-Term Impacts of Project	15
8.0	Conclusions and Recommendations	24
References		26

FIGURES

Figure

1 Project Location Map

TABLES

Table

1 Summary of State of Hawaii and National Ambient Air Quality Standards

2 Air Pollution Emissions Inventory for Island of Hawaii, 1993

3 Annual Summaries of Ambient Air Quality Measurements for Monitoring Stations Nearest Kapiolani Street Extension Project

4 Estimated Worst-Case 1-Hour Carbon Monoxide Concentrations Along Roadways Near Kapiolani Street Extension Project

TABLES(cont.)

Table

5 Estimated Worst-Case 8-Hour Carbon Monoxide Concentrations Along Roadways Near Kapiolani Street Extension Project

1.0 SUMMARY

The County of Hawaii, Department of Public Works, is proposing the Kapiolani Street Extension Project in Hilo on the island of Hawaii. The proposed project will extend Kapiolani Street between Mohouli Street and Lanikaula Street. This study examines the potential short- and long-term air quality impacts that could occur as a result of construction and use of the proposed roadway improvements and suggests mitigation measures to reduce any potential air quality impacts where possible and appropriate.

Both federal and state standards have been established to maintain ambient air quality. At the present time, seven parameters are regulated including: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone and lead. Hawaii air quality standards are comparable to the national standards except those for nitrogen dioxide and carbon monoxide which are more stringent than the national standards.

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the project area is very much affected by its near coastal situation and by nearby mountains. Winds are predominantly light and variable, although storms generate occasional strong winds from the south or southwest during winter. Temperatures in the project area are generally very consistent and moderate with average daily temperatures ranging from about 65°F to 85°F. The extreme minimum temperature recorded at nearby Hilo Airport is 53°F, while the extreme maximum temperature is 94°F. Average annual rainfall in the area amounts to about 129 inches.

Except for periodic impacts from volcanic emissions (vog) and possibly occasional localized impacts from traffic congestion, the present air quality of the project area is believed to be relatively good. The limited air quality data that are available for the area from the Department of Health indicate that (despite the occasional vog) concentrations are mostly within state and national air quality standards.

If the proposed project is given the necessary approvals to proceed, there may be some short- and/or long-term impacts on air quality that may occur either directly or indirectly as a consequence of project construction and use. Short-term impacts from fugitive dust could occur during the project construction phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the minor disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulations require that there be no visible fugitive dust emissions at the property line. Hence, an effective dust control plan must be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering of open-bodied trucks. Other dust control measures to consider include limiting the area that is disturbed at any given time and/or mulching or chemically stabilizing inactive areas that have been worked. Paving and landscaping of project areas early in the construction schedule will also reduce dust emissions. Monitoring dust at the project boundary during the period of construction could be considered as a means to evaluate the effectiveness of the project dust control

program. Exhaust emissions can be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

To assess the potential long-term impact of emissions from project-related motor vehicle traffic operating on roadways in the project area after construction is completed, a computerized air quality modeling study was undertaken. The air quality modeling study estimated current worst-case concentrations of carbon monoxide at intersections in the project vicinity and predicted future levels both with and without the proposed project. During worst-case conditions, model results indicated that present 1-hour and 8-hour worst-case carbon monoxide concentrations are well within both the state and the national ambient air quality standards. In the year 2034 without the project, worst-case carbon monoxide concentrations in the project area were predicted to decrease (improve) or remain nearly unchanged, and concentrations would remain well within standards. This is because, although traffic volumes are expected to increase over time, the increased traffic volumes would be more than offset by cleaner vehicles on the roadways. With the project in the year 2034, estimated worst-case carbon monoxide concentrations indicated a small positive impact at most locations studied compared to the without project case except at the intersection of Mohouli Street and Kapiolani Street where carbon monoxide concentrations would likely increase somewhat but still remain relatively low and within standards. The improved traffic flow afforded by the project will also result in improved air quality at most locations. With or without the project, carbon monoxide concentrations in the year 2034 would likely remain at or below (better) than existing concentrations. Implementing mitigation

measures for long-term traffic-related air quality impacts is unnecessary and unwarranted.

2.0 INTRODUCTION

The County of Hawaii, Department of Public Works, is proposing to extend Kapiolani Street to provide a two-lane road connection between Lanikaula Street and Mohouli Street in Hilo on the island of Hawaii (see Figure 1 for project location). The project is planned to include the construction of concrete curbs, gutters and sidewalks, a concrete bridge across Waiakea Stream, drainage improvements, utility installation and relocation, intersection channelization and improvements, traffic signal systems, street lighting, retaining wall construction, property and driveway tie-ins, and other related improvements. Project construction would begin in 2013 and be completed by 2015.

The purpose of this study is to describe existing air quality in the project area and to assess the potential short- and long-term direct and indirect air quality impacts that could result from construction and use of the proposed facilities as planned. Measures to mitigate project impacts are suggested where possible and appropriate.

3.0 AMBIENT AIR QUALITY STANDARDS

Ambient concentrations of air pollution are regulated by both national and state ambient air quality standards (AAQS). National AAQS are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR), while State of Hawaii AAQS are defined

in Chapter 11-59 of the Hawaii Administrative Rules. Table 1 summarizes both the national and the state AAQS that are specified in the cited documents. As indicated in the table, national and state AAQS have been established for particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. The state has also set a standard for hydrogen sulfide. National AAQS are stated in terms of both primary and secondary standards for most of the regulated air pollutants. National primary standards are designed to protect the public health with an "adequate margin of safety". National secondary standards, on the other hand, define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant". Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or man-made environment, e.g., soiling of materials, damage to vegetation or other economic damage. In contrast to the national AAQS, Hawaii State AAQS are given in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality".

Each of the regulated air pollutants has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time. The AAQS specify a maximum allowable concentration for a given air pollutant for one or more averaging times to prevent harmful effects. Averaging times vary from one hour to one year depending on the pollutant and type of exposure necessary to cause adverse effects. In the case of the short-term (i.e., 1- to 24-hour) AAQS, both national and state standards allow a specified number of exceedances each year.

The Hawaii AAQS are in some cases considerably more stringent than the comparable national AAQS. In particular, the Hawaii 1-hour AAQS for carbon monoxide is four times more stringent than the comparable national limit.

The national AAQS are reviewed periodically, and multiple revisions have occurred over the past 30 years. In general, the national AAQS have become more stringent with the passage of time and as more information and evidence become available concerning the detrimental effects of air pollution. Changes to the Hawaii AAQS over the past several years have tended to follow revisions to the national AAQS, making several of the Hawaii AAQS the same as the national AAQS.

4.0 REGIONAL AND LOCAL CLIMATOLOGY

Regional and local climatology significantly affect the air quality of a given location. Wind, temperature, atmospheric turbulence, mixing height and rainfall all influence air quality. Although the climate of Hawaii is relatively moderate throughout most of the state, significant differences in these parameters may occur from one location to another. Most differences in regional and local climates within the state are caused by the mountainous topography.

The entire state of Hawaii lies well within the belt of northeasterly trade winds generated by the semi-permanent Pacific high pressure cell to the north and east of the islands. Areas

along the eastern coasts of the islands are particularly affected by the trade winds and are usually well-ventilated nearly year round. Although the project site is situated along the eastern coast of Hawaii Island, the high mountains of Mauna Loa and Mauna Kea significantly modify the trade wind influence. The nearest long-term wind data available for the project area are collected at the Hilo Airport located about 1 mile to the northeast. These data are probably representative of the project corridor. Mean annual wind speed at the airport is about 8 mph, which is lower than many windward locations in the state, and wind directions are bimodal showing either a northeast or southwest preference [1]. Northeast trade winds typically occur during the daytime, while winds from the southwest typically occur during the nighttime due to cold air drainage from the mountains. Winds from the south or southwest also occur occasionally in association with winter storms.

Air pollution emissions from motor vehicles, the formation of photochemical smog and smoke plume rise all depend in part on air temperature. Colder temperatures tend to result in higher emissions of contaminants from automobiles but lower concentrations of photochemical smog and ground-level concentrations of air pollution from stack sources. In Hawaii, the annual and daily variation of temperature depends to a large degree on elevation above sea level, distance inland and exposure to the trade winds. Average temperatures at locations near sea level generally are warmer than those at higher elevations. Areas exposed to the trade winds tend to have the least temperature variation, while inland and leeward areas often have the most. At Hilo Airport, average annual daily minimum and maximum temperatures are 66°F and 82°F, respectively. The extreme

minimum temperature on record is 53°F, and the extreme maximum is 94°F [2].

Small scale, random motions in the atmosphere (turbulence) cause air pollutants to be dispersed as a function of distance or time from the point of emission. Turbulence is caused by both mechanical and thermal forces in the atmosphere. It is often measured and described in terms of Pasquill-Gifford stability class. Stability class 1 is the most turbulent and class 6 the least. Thus, air pollution dissipates the best during stability class 1 conditions and the worst when stability class 6 prevails. In the Hilo area, stability classes 5 or 6 occasionally occur, developing during clear, calm nighttime or early morning hours when temperature inversions form due to radiational cooling or to drainage flow from the mountainous interior of the island. Stability classes 1 through 4 occur during the daytime, depending mainly on the amount of cloud cover and incoming solar radiation and the onset and extent of the sea breeze.

Mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs. Low mixing heights can result in high ground-level air pollution concentrations because contaminants emitted from or near the surface can become trapped within the mixing layer. In Hawaii, minimum mixing heights tend to be high because of mechanical mixing caused by the trade winds and because of the temperature moderating effect of the surrounding ocean. Low mixing heights may sometimes occur, however, at inland locations and even at times along coastal areas early in the morning following a clear, cool, windless night. Coastal areas also may experience low

mixing levels during sea breeze conditions when cooler ocean air rushes in over warmer land. Mixing heights in Hawaii typically are above 3000 feet (1000 meters).

Rainfall can have a beneficial effect on the air quality of an area in that it helps to suppress fugitive dust emissions, and it also may "washout" gaseous contaminants that are water soluble. Rainfall in Hawaii is highly variable depending on elevation and on location with respect to the trade wind. The project area has a wet climate. Normal annual rainfall for Hilo Airport is about 129 inches [2]. This is distributed fairly evenly throughout the year, although the summer months are slightly drier.

5.0 PRESENT AIR QUALITY

Present air quality in the project area is mostly affected by air pollutants from vehicular, industrial, natural and/or agricultural sources. Table 2 presents an air pollutant emission summary for the island of Hawaii for calendar year 1993. These are the most recent data available. The emissions rates shown in the table pertain to manmade emissions only, i.e., emissions from natural sources are not included. As suggested in the table, much of the manmade particulate emissions on Hawaii originate from area sources, such as the mineral products industry and agriculture. Manmade sulfur oxides are emitted almost exclusively by point sources, such as power plants and other fuel-burning industries. Nitrogen oxides emissions emanate predominantly from area sources (mostly motor vehicle traffic), although industrial point sources contribute a significant share. The majority of carbon monoxide emissions occur from area sources (motor vehicle traffic), while hydrocarbons are emitted mainly from point sources. Based on

previous emission inventories that have been reported for Hawaii, emissions of particulate and nitrogen oxides may have increased during the last several years, while emissions of sulfur oxides, carbon monoxide and hydrocarbons probably have declined.

It should be noted that Hawaii Island is unique from the other islands in the state in terms of the natural volcanic air pollution emissions that occur. Volcanic emissions periodically plague the project area. This is especially so since the latest eruption phase of the Kilauea Volcano began in 1983. Air pollution emissions from the Hawaiian volcanoes consist primarily of sulfur dioxide. After entering the atmosphere, these sulfur dioxide emissions are carried away by the wind and either washed out as acid rain or gradually transformed into particulate sulfates or acid aerosols. Emissions from Kilauea are vented to the atmosphere relatively close by (about 25 miles southwest of the project site), but the prevailing wind patterns carry the emissions away from the project area much of the time. On occasions when the winds are from the west or south, relatively high concentrations of sulfur dioxide may occur at the project site and volcanic haze (vog) can impact the area.

The nearest major industrial sources of air pollution in the project vicinity are Hawaii Electric Light Company power plants located in Keaau and Hilo. Air pollution emissions from these sources consist mostly of sulfur dioxide, oxides of nitrogen and particulate matter.

The State Department of Health operates a network of air quality monitoring stations at various locations around the state.

Unfortunately, very limited data are available for Hawaii Island. Sulfur dioxide and fine particulate matter less than 2.5 microns diameter (PM2.5) are monitored at a station located in Hilo about 1 mile north of the project area. Table 3 summarizes the data from the Hilo monitoring station for the five-year period from 2006 to 2010. Measurements of sulfur dioxide concentrations at Hilo during the 2006-2010 monitoring period were consistently low in terms of the annual average concentrations which ranged from 0.003 to 0.007 parts per million (ppm). This represents about 10 to 20 percent of the state standard. The highest annual second-highest 3-hour and 24-hour concentrations (which are most relevant to the standards) for these five years were 0.715 and 0.144 ppm, respectively; these concentrations exceed the applicable standards. The higher short-term concentrations reflect periodic episodes of vog in the Hilo area. The 3-hour standard was exceeded once during 2008 and three times during 2010, while the 24-hour standard was exceeded once during 2010.

The Department of Health began monitoring particulate (as PM2.5) at the Hilo monitoring station during 2008. Annual average particulate concentrations (as PM2.5) in Hilo for 2008-2010 ranged from 5 to 6 $\mu g/m^3$, which equates to about 30 to 40 percent of the national standard. The annual 98th percentile 24-hour concentration of PM2.5 for this period, which is most relevant to the national standard, ranged from 24 to 26 $\mu g/m^3$. This is about 70 percent of the national standard. One 24-hour period during 2009 exceeded the concentration limit set by the national standard. Again, the higher PM2.5 concentrations measured at the Hilo monitoring station are probably volcanic related.

At this time, there are no reported measurements of lead, ozone, nitrogen dioxide or carbon monoxide in the project vicinity. These are primarily motor vehicle related air pollutants. Lead, ozone and nitrogen dioxide typically are regional scale problems. Concentrations of lead and nitrogen dioxide generally have not been found to exceed AAQS elsewhere in the state. Ozone concentrations, on the other hand, have been found to exceed the state standard at times at Sand Island on Oahu. Carbon monoxide air pollution typically is a microscale problem caused by congested motor vehicular traffic. In traffic congested areas such as urban Honolulu, carbon monoxide concentrations have been found to occasionally exceed the state AAQS. Concentrations of carbon monoxide in the project area are estimated later in this study based on computer modeling of project-related motor vehicle emissions.

6.0 SHORT-TERM IMPACTS OF PROJECT

Short-term direct and indirect impacts on air quality could potentially occur due to project construction. For a project of this nature, there are two potential types of air pollution emissions that could directly result in short-term air quality impacts during project construction: (1) fugitive dust from vehicle movement, soil excavation and demolition activities; and (2) exhaust emissions from on-site construction equipment. Indirectly, there also could be short-term impacts from slow-moving construction equipment traveling to and from the project site, from a temporary increase in local traffic caused by commuting construction workers, and from the disruption of normal traffic flow caused by roadway lane closures.

Fugitive dust emissions may arise from the grading and dirt-moving activities associated with site clearing and preparation work. The emission rate for fugitive dust emissions from construction activities is difficult to estimate accurately. This is because of its elusive nature of emission and because the potential for its generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The EPA [3] has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions at the project site could be somewhere near that level, depending on the amount of rainfall that occurs. In any case, State of Hawaii Air Pollution Control Regulations [4] prohibit visible emissions of fugitive dust from construction activities at the property line. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust. In dust-prone or dust-sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, mulching and/or using wind screens may be necessary. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials that could be blown away. Haul trucks tracking dirt onto paved streets from unpaved areas is often a significant source of dust in construction areas. Some means to alleviate this problem, such as road cleaning or

tire washing, may be appropriate. Paving of parking areas and/or establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions. Monitoring dust at the project boundaries could be considered to quantify and document the effectiveness of dust control measures.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the annual standard for nitrogen dioxide is not likely to be violated by short-term construction equipment emissions. Also, the new short-term (1-hour) standard for nitrogen dioxide is based on a three-year average; thus it is unlikely that relatively short-term construction emissions would exceed the standard. Carbon monoxide emissions from diesel engines are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Project construction activities could obstruct the normal flow of traffic for short periods of times such that overall vehicular emissions in the project area could temporarily increase. The only means to alleviate this problem will be to attempt to keep roadways open during peak traffic hours and to move heavy construction equipment and workers to and from construction areas during periods of low traffic volume. Thus, most potential short-term air quality impacts from project construction can be mitigated.

7.0 LONG-TERM IMPACTS OF PROJECT

After construction is completed, use of the proposed roadway improvements by motor vehicle traffic could potentially cause long-term impacts on ambient air quality in the project area. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide. They also emit nitrogen oxides and other contaminates.

Federal air pollution control regulations require that new motor vehicles be equipped with emission control devices that reduce emissions significantly compared to a few years ago. In 1990, the President signed into law the Clean Air Act Amendments. This legislation required further emission reductions, which have been phased in since 1994. More recently, additional restrictions were signed into law during the Clinton administration, and these began to take effect during the next decade. The added restrictions on emissions from new motor vehicles will lower average emissions each year as more and more older vehicles leave the state's roadways. It is estimated that carbon monoxide emissions, for example, will go down by an average of about 30 percent per vehicle during the next 20 years due to the replacement of older vehicles with newer models.

To evaluate the potential long-term ambient air quality impact of motor vehicle traffic using the proposed new roadway facilities, computerized emission and atmospheric dispersion models can be used to estimate ambient carbon monoxide concentrations along roadways within the project area. Carbon monoxide is selected for modeling because it is both the most stable and the most abundant of the pollutants generated by motor vehicles. Furthermore,

carbon monoxide air pollution is generally considered to be a microscale problem that can be addressed locally to some extent, whereas nitrogen oxides air pollution most often is a regional issue that cannot be addressed by a single project.

For this project, three scenarios were selected for the carbon monoxide modeling study: (1) year 2012 with present conditions, (2) year 2034 without the project, and (3) year 2034 with the project. To begin the modeling study of the three scenarios, critical receptor areas in the vicinity of the project were identified for analysis. Generally speaking, roadway intersections are the primary concern because of traffic congestion and because of the increase in vehicular emissions associated with traffic queuing. For this study, the five key intersections identified in the traffic study were also selected for air quality analysis. These included the following intersections:

- Mohouli Street at Kumukoa Street
- Mohouli Street at Kapiolani Street
- Mohouli Street at Kinoole Street
- Lanikaula Street at Kapiolani Street
- Lanikaula Street at Kinoole Street.

The traffic impact report for the project [5] describes the existing and projected future traffic conditions and laneage configurations of the study intersections in detail. In performing the air quality impact analysis, it was assumed that all recommended traffic mitigation measures would be implemented.

The main objective of the modeling study was to estimate maximum 1-hour average carbon monoxide concentrations for each of the three scenarios studied. To evaluate the significance of the estimated concentrations, a comparison of the predicted values for each scenario can be made. Comparison of the estimated values to the national and state AAQS was also used to provide another measure of significance.

Maximum carbon monoxide concentrations typically coincide with peak traffic periods. The traffic impact assessment report evaluated morning and afternoon peak traffic periods. These same periods were evaluated in the air quality impact assessment.

The EPA computer model MOBILE6.2 [6] was used to calculate vehicular carbon monoxide emissions for each year studied. One of the key inputs to MOBILE6.2 is vehicle mix. Unless very detailed information is available, national average values are typically assumed, which is what was used for the present study. Based on national average vehicle mix figures, the present vehicle mix in the project area was estimated to be 33.2% light-duty gasoline-powered automobiles, 53.9% light-duty gasoline-powered trucks and vans, 3.6% heavy-duty gasoline-powered vehicles, 0.2% light-duty diesel-powered vehicles, 8.6% heavy-duty diesel-powered trucks and buses, and 0.5% motorcycles. For the future scenarios studied, the vehicle mix was estimated to change slightly with fewer light-duty gasoline-powered automobiles and more light-duty gasoline-powered trucks and vans.

Ambient temperatures of 59 and 68 degrees F were used for morning and afternoon peak-hour emission computations, respectively.

These are conservative assumptions since morning/afternoon ambient temperatures will generally be warmer than this, and carbon monoxide emission estimates given by MOBILE6.2 generally have an inverse relationship to the ambient temperature.

After computing vehicular carbon monoxide emissions through the use of MOBILE6.2, these data were then input to an atmospheric dispersion model. EPA air quality modeling guidelines [7] currently recommend that the computer model CAL3QHC [8] be used to assess carbon monoxide concentrations at roadway intersections, or in areas where its use has previously been established, CALINE4 [9] may be used. Until a few years ago, CALINE4 was used extensively in Hawaii to assess air quality impacts at roadway intersections. In December 1997, the California Department of Transportation recommended that the intersection mode of CALINE4 no longer be used because it was thought the model had become outdated. Studies have shown that CALINE4 may tend to over-predict maximum concentrations in some situations. Therefore, CAL3QHC was used for the subject analysis.

CAL3QHC was developed for the U.S. EPA to simulate vehicular movement, vehicle queuing and atmospheric dispersion of vehicular emissions near roadway intersections. It is designed to predict 1-hour average pollutant concentrations near roadway intersections based on input traffic and emission data, roadway/receptor geometry and meteorological conditions.

Input peak-hour traffic data were obtained from the traffic study cited previously. This included vehicle approach volumes,

saturation capacity estimates, intersection laneage and signal timings. All emission factors that were input to CAL3QHC for free-flow traffic on roadways were obtained from MOBILE6.2 based on assumed free-flow vehicle speeds corresponding to the posted or design speed limits.

Model roadways were set up to reflect roadway geometry, physical dimensions and operating characteristics. Concentrations predicted by air quality models generally are not considered valid within the roadway-mixing zone. The roadway-mixing zone is usually taken to include 3 meters on either side of the traveled portion of the roadway and the turbulent area within 10 meters of a cross street. Model receptor sites were thus located at the edges of the mixing zones near all intersections that were studied for all three scenarios. This acknowledges that pedestrian walkwasy already exist in these locations. All receptor heights were placed at 1.8 meters above ground to simulate levels within the normal human breathing zone.

Input meteorological conditions for this study were defined to provide "worst-case" results. One of the key meteorological inputs is atmospheric stability category. For these analyses, atmospheric stability category 6 was assumed for the morning cases, while atmospheric stability category 4 was assumed for the afternoon cases. These are the most conservative stability categories that are generally used for estimating worst-case pollutant dispersion within urban areas for these periods. A surface roughness length of 100 cm and a mixing height of 1000 meters were used in all cases. Worst-case wind conditions were defined as a wind speed of 1 meter per second with a wind direction resulting in the highest predicted concentration.

Concentration estimates were calculated at wind directions of every 5 degrees.

Existing background concentrations of carbon monoxide in the project vicinity are believed to be at low levels. Thus, background contributions of carbon monoxide from sources or roadways not directly considered in the analysis were accounted for by adding a background concentration of 0.5 ppm to all predicted concentrations for 2012. Although increased traffic is expected to occur within the project area within the next several years with or without the project, background carbon monoxide concentrations may not change significantly since individual emissions from motor vehicles are forecast to decrease with time. Hence, a background value of 0.5 ppm was assumed to persist for the future scenarios studied.

Predicted Worst-Case 1-Hour Concentrations

Table 4 summarizes the final results of the modeling study in the form of the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide concentrations. These results can be compared directly to the state and the national AAQS. Estimated worst-case carbon monoxide concentrations are presented in the table for three scenarios: year 2012 with existing traffic, year 2034 without the project and year 2034 with the project. The locations of these estimated worst-case 1-hour concentrations all occurred at or very near the indicated intersections.

As indicated in the table, the highest estimated 1-hour concentration within the project vicinity for the present (2012) case was

4.4 ppm. This was projected to occur during the morning peak traffic hour near the intersection of Lanikaula Street at Kapiolani Street. Concentrations at other locations and times studied were 3.3 ppm or lower. Predicted worst-case 1-hour concentrations at all locations studied for the 2012 scenario were well within both the national AAQS of 35 ppm and the state standard of 9 ppm.

In the year 2034 without the proposed project, the highest worst-case 1-hour concentration was predicted to continue to occur during the morning at the intersection of Lanikaula Street and Kapiolani Street. A value of 3.5 ppm was predicted to occur at this location and time. Peak-hour worst-case values at the other locations and times studied for the 2034 without project scenario ranged between 1.3 and 3.0 ppm. Compared to the existing case, predicted concentrations in the project area for the year 2034 without the project generally decreased (improved) slightly or remained about the same, and worst-case concentrations remained well within the state and national standards.

Predicted 1-hour worst-case concentrations for the 2034 with project scenario decreased (improved) somewhat at most locations studied in the project area compared to without the project. This is due to the improved traffic flow afforded by the project. For the 2034 with project scenario, a maximum worst-case concentration of 2.9 ppm was predicted to occur during the morning at the intersection of Mohouli Street at Kumukoa Street. Concentrations for other locations and times ranged between 1.6 and 2.8 ppm. Although the morning and afternoon worst-case concentrations at the intersection of Mohouli Street and Kapiolani Street were predicted to increase by about 20 to 30 percent compared to the

without project scenario, worst-case concentrations at all locations studied remained well within the state and federal standards.

Predicted Worst-Case 8-Hour Concentrations

Worst-case 8-hour carbon monoxide concentrations were estimated by multiplying the worst-case 1-hour values by a persistence factor of 0.5. This accounts for two factors: (1) traffic volumes averaged over eight hours are lower than peak 1-hour values, and (2) meteorological conditions are more variable (and hence more favorable for dispersion) over an 8-hour period than they are for a single hour. Based on monitoring data, 1-hour to 8-hour persistence factors for most locations generally vary from 0.4 to 0.8 with 0.6 being the most typical. One study based on modeling [10] concluded that 1-hour to 8-hour persistence factors could typically be expected to range from 0.4 to 0.5. EPA guidelines [11] recommend using a value of 0.7 unless a locally derived persistence factor is available. Recent monitoring data for locations on Oahu reported by the Department of Health [12] suggest that this factor may range between about 0.2 and 0.6 depending on location and traffic variability. Considering the location of the project and the traffic pattern for the area, a 1-hour to 8-hour persistence factor of 0.5 will likely yield reasonable estimates of worst-case 8-hour concentrations.

The resulting estimated worst-case 8-hour concentrations are indicated in Table 5. For the 2012 scenario, the estimated worst-case 8-hour carbon monoxide concentrations for the five locations studied ranged from 1.0 to 2.2 ppm, with the highest concentration occurring at the intersection of Lanikaula Street and Kapioani

Street. The estimated worst-case concentrations for the existing case were well within both the state standard of 4.4 ppm and the national limit of 9 ppm.

For the year 2034 without project scenario, worst-case concentrations ranged between 1.0 and 1.8 ppm, with the highest concentration occurring at the intersection of Lanikaula Street and Kapiolani Street. All predicted concentrations were within the standards.

For the 2034 with project scenario, worst-case concentrations generally decreased (improved) somewhat compared to the without project case except at the intersection of Mohouli Street and Kapiolani Street where the concentration would likely increase but still remain relatively low. The predicted concentrations for this scenario for the five locations studied ranged from 1.3 to 1.4 ppm. All predicted 8-hour concentrations for this scenario were well within both the national and the state AAQS.

Conservativeness of Estimates

The results of this study reflect several assumptions that were made concerning both traffic movement and worst-case meteorological conditions. One such assumption concerning worst-case meteorological conditions is that a wind speed of 1 meter per second with a steady direction for 1 hour will occur. A steady wind of 1 meter per second blowing from a single direction for an hour is extremely unlikely and may occur only once a year or less. With wind speeds of 2 meters per second, for example, computed carbon monoxide concentrations would be only about half the values

given above. The 8-hour estimates are also conservative in that it is unlikely that anyone would occupy the assumed receptor sites (within 3 m of the roadways) for a period of 8 hours.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Air quality data for the project area is limited, but it appears that the existing air quality conditions are relatively good except for occasional impacts from volcanic emissions.

The major potential short-term air quality impact of the project could occur from the emission of fugitive dust during construction. Uncontrolled fugitive dust emissions from construction activities could amount to about 1.2 tons per acre per month, depending on rainfall. To control dust, active work areas and any temporary unpaved work roads should be watered at least twice daily on days without rainfall. Use of wind screens and/or limiting the area that is disturbed at any given time will also help to contain fugitive dust emissions. Wind erosion of inactive areas of the site that have been disturbed could be controlled by mulching or by the use of chemical soil stabilizers. Dirt-hauling trucks should be covered when traveling on roadways to prevent windage. A routine road cleaning and/or tire washing program will also help to reduce fugitive dust emissions that may occur as a result of trucks tracking dirt onto paved roadways in the project area. Establishment of landscaping early in the construction schedule will also help to control dust. Monitoring dust at the project boundary during the period of construction could be considered as a means to evaluate the effectiveness of the project dust control program and to adjust the program if necessary.

During construction phases, emissions from engine exhausts (primarily consisting of carbon monoxide and nitrogen oxides) will also occur both from on-site construction equipment and from vehicles used by construction workers and from trucks traveling to and from the project. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving equipment and personnel to the site during off-peak traffic hours.

After the proposed project is completed, carbon monoxide concentrations will likely decrease (improve) somewhat at most locations within the project area. Carbon monoxide concentrations would likely increase at the intersection of Mohouli Street and Kapiolani Street but still remain relatively low. Worst-case concentrations of carbon monoxide should remain well within both the state and the national ambient air quality standards through the year 2034 with or without the project. The improved traffic flow afforded by the project will likely result in an overall small positive impact for air quality. Implementing any air quality mitigation measures for long-term project-related impacts is unnecessary and unwarranted.

REFERENCES

1. Atlas of Hawaii, Second Edition, Department of Geography, University of Hawaii, University of Hawaii Press, Honolulu, 1983.

2. "Local Climatological Data, Annual Summary With Comparative Data, Hilo, Hawaii, 1993", U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, National Climatic Center, Asheville, NC.

3. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, AP-42, U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1995.

4. State of Hawaii. Hawaii Administrative Rules, Chapter 11-60, Air Pollution Control.

5. SSFM International, Inc., Traffic Impact Analysis Report, Kapiolani Street Extension Project, draft, June 2012.

6. User's Guide to MOBILE6.2, Mobile Source Emission Factor Model, U.S. Environmental Protection Agency, Office of Transportation and Air Quality, Assessment and Standards Division, Ann Arbor, Michigan, January 2002.

7. Guideline on Air Quality Models (Revised), Including Supplements A and B, EPA-450/2-78-027R, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1986.

8. User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections, U.S. Environmental Protection Agency, November 1992.

9. CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways, FHWA/CA/TL-84/15, California State Department of Transportation, November 1984 with June 1989 Revisions.

10. "Persistence Factors for Mobile Source (Roadway) Carbon Monoxide Modeling", C. David Cooper, Journal of the Air & Waste Management Association, Volume 39, Number 5, May 1989.

11. Guideline for Modeling Carbon Monoxide from Roadway Intersections, U.S. Environmental Protection Agency, EPA-454/R-92-005, November 1992.

12. Annual Summaries, Hawaii Air Quality Data, 2006-2010, State of Hawaii Department of Health.

Figure 1 - Project Location

Table 1

SUMMARY OF STATE OF HAWAII AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Units	Averaging Time	Maximum Allowable Concentration		
			National Primary	National Secondary	State of Hawaii
Particulate Matter (<10 microns)	$\mu g/m^3$	Annual	-	-	50
		24 Hours	150[a]	150[a]	150[b]
Particulate Matter (<2.5 microns)	$\mu g/m^3$	Annual	15[c]	15[c]	-
		24 Hours	35[d]	35[d]	-
Sulfur Dioxide	ppm	Annual	-	-	0.03
		24 Hours	-	-	0.14[b]
		3 Hours	-	0.5[b]	0.5[b]
		1 Hour	0.075[e]	-	-
Nitrogen Dioxide	ppm	Annual	0.053	0.053	0.04
		1 Hour	0.100[f]	-	-
Carbon Monoxide	ppm	8 Hours	9[b]	-	4.4[b]
		1 Hour	35[b]	-	9[b]
Ozone	ppm	8 Hours	0.075[g]	0.075[g]	0.08[g]
Lead	$\mu g/m^3$	3 Months	0.15[h]	0.15[h]	-
		Quarter	1.5[i]	1.5[i]	1.5[i]
Hydrogen Sulfide	ppm	1 Hour	-	-	0.025[b]

[a] Not to be exceeded more than once per year on average over three years.
[b] Not to be exceeded more than once per year.
[c] Three-year average of the weighted annual arithmetic mean.
[d] 98th percentile value of the 24-hour concentrations averaged over three years.
[e] Three-year average of annual fourth-highest daily 1-hour maximum.
[f] 98th percentile value of the daily 1-hour maximum averaged over three years.
[g] Three-year average of annual fourth-highest daily 8-hour maximum.
[h] Rolling 3-month average.
[i] Quarterly average.

Table 2

AIR POLLUTION EMISSIONS INVENTORY FOR ISLAND OF HAWAII, 1993

Air Pollutant	Point Sources (tons/year)	Area Sources (tons/year)	Total (tons/year)
Particulate	30,311	9,157	39,468
Sulfur Oxides	9,345	nil	9,345
Nitrogen Oxides	4,054	8,858	12,912
Carbon Monoxide	3,357	23,934	27,291
Hydrocarbons	1,477	203	1,680

Source: Final Report, “Review, Revise and Update of the Hawaii Emissions Inventory Systems for the State of Hawaii”, prepared for Hawaii Department of Health by J.L. Shoemaker & Associates, Inc., 1996

Table 3

ANNUAL SUMMARIES OF AIR QUALITY MEASUREMENTS FOR MONITORING STATIONS NEAREST KAPIOLANI STREET EXTENSION PROJECT

Parameter / Location	2006	2007	2008	2009	2010
Sulfur Dioxide / Hilo					
Period of Sampling (months)	12	12	12	12	12
3-Hour Averaging Period:					
No. of Samples	2630	2597	2450	2449	2540
Highest Concentration (ppm)	0.173	0.210	0.740	0.364	0.742
2nd Highest Concentration (ppm)	0.156	0.173	0.455	0.329	0.715
No. of State AAQS Exceedances	0	0	1	0	3
24-Hour Averaging Period:					
No. of Samples	331	347	359	358	340
Highest Concentration (ppm)	0.062	0.064	0.144	0.102	0.212
2nd Highest Concentration (ppm)	0.037	0.062	0.080	0.085	0.144
No. of State AAQS Exceedances	0	0	0	0	1
Annual Average Concentration (ppm)	0.003	0.004	0.005	0.005	0.007
Particulate (PM-2.5) / Hilo					
Period of Sampling (months)	-	-	6	12	12
24-Hour Averaging Period:					
No. of Samples	-	-	245	356	324
Highest Concentration ($\mu g/m^3$)	-	-	35	36	35
98th Percentile Concentration ($\mu g/m^3$)	-	-	24	26	25
No. of Exceedances > 35 $\mu g/m^3$	-	-	0	1	0
Annual Average Concentration ($\mu g/m^3$)	-	-	5	6	5

Source: State of Hawaii Department of Health, "Annual Summaries, Hawaii Air Quality Data, 2006 - 2010"

Table 4

ESTIMATED WORST-CASE 1-HOUR CARBON MONOXIDE CONCENTRATIONS ALONG ROADWAYS NEAR KAPIOLANI STREET EXTENSION PROJECT (parts per million)

Roadway Intersection	Year/Scenario					
	2012/Present		2034/Without Project		2034/With Project	
	AM	PM	AM	PM	AM	PM
Mohouli Street at Kumukoa Street	3.3	2.0	3.0	1.6	2.9	1.6
Mohouli Street at Kapiolani Street	2.0	1.4	2.1	1.3	2.6	1.7
Mohouli Street at Kinoole Street	3.0	2.0	3.0	2.1	2.8	2.0
Lanikaula Street at Kapiolani Street	4.4	1.9	3.5	1.9	2.6	1.6
Lanikaula Street at Kinoole Street	3.2	2.1	3.0	1.9	2.8	1.8

Hawaii State AAQS: 9
National AAQS: 35

Table 5

ESTIMATED WORST-CASE 8-HOUR CARBON MONOXIDE CONCENTRATIONS ALONG ROADWAYS NEAR KAPIOLANI STREET EXTENSION PROJECT (parts per million)

Roadway Intersection	Year/Scenario		
	2012/Present	2034/Without Project	2034/With Project
Mohouli Street at Kumukoa Street	1.6	1.5	1.4
Mohouli Street at Kapiolani Street	1.0	1.0	1.3
Mohouli Street at Kinoole Street	1.5	1.5	1.4
Lanikaula Street at Kapiolani Street	2.2	1.8	1.3
Lanikaula Street at Kinoole Street	1.6	1.5	1.4

Hawaii State AAQS: 4.4
National AAQS: 9

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 7
Acoustic Study

[This page intentionally left blank]

ACOUSTIC STUDY FOR THE KAPIOLANI STREET EXTENSION PROJECT HILO, HAWAII, HAWAII

Prepared for:

GEOMETRICIAN ASSOCIATES LLC

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

JULY 2012

TABLE OF CONTENTS

CHAPTER	CHAPTER TITLE	PAGE NO.
	List of Figures	ii
	List of Tables	iii
I	SUMMARY	1
II	GENERAL STUDY METHODOLOGY	3
	Noise Measurements	3
	Traffic Noise Predictions	3
	Impact Assessments and Mitigation	7
III	EXISTING ACOUSTICAL ENVIRONMENT	11
IV	DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS	14
V	FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES	20
VI	CONSTRUCTION NOISE IMPACTS	28
APPENDICES		
A	REFERENCES	31
B	EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE	32
C	SUMMARY OF BASE YEAR AND FUTURE YEAR (2034) TRAFFIC VOLUMES ALONG ROADWAYS IN PROJECT ENVIRONS	35

LIST OF FIGURES

NUMBER	FIGURE TITLE	PAGE NO.
1	PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS	4
2	PROPOSED END ALIGNMENTS OF THE KAPIOLANI STREET EXTENSION AND NOISE SENSITIVE RECEPTOR LOCATIONS	8
3	LOCATION OF SOUND ATTENUATING WALLS ALONG KAPIOLANI STREET EXTENSION CORRIDOR	21
4	REQUIRED WALL HEIGHTS TO MEET MINIMUM 5 DB ATTENUATION CRITERIA	23
5	REQUIRED WALL HEIGHTS TO MEET MINIMUM 7 DB ATTENUATION CRITERIA	26
6	ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE	29
7	AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE	30

LIST OF TABLES

NUMBER	TABLE TITLE	PAGE NO.
1	TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS	5
2	FHWA & HDOT NOISE ABATEMENT CRITERIA	10
3	EXISTING (CY 2012) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (AM OR PM PEAK HOUR)	12
4	YEAR 2012 AND 2034 DISTANCES TO 66 AND 71 LEQ CONTOURS (AM OR PM PEAK HOUR, WITH PROJECT)	13
5	FUTURE (CY 2034) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (WITH PROJECT; AM OR PM PEAK HOUR)	15
6	CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2034) (BUILD ALTERNATIVE)	16
7	EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT NOISE SENSITIVE RECEPTOR LOCATIONS (4.92 FT HIGH RECEPTOR)	17

CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Kapiolani Street Extension Project in Hilo on the island of Hawaii were studied to evaluate potential noise impacts associated with the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated.

Existing traffic noise levels in the project area currently do not exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria along the Kapiolani Street Extension project. Future (CY 2034) traffic noise levels are not expected to exceed the "71 Leq" HDOT noise abatement criteria for industrial or commercial uses along the Kapiolani Street Extension under the Build or No-Build Alternatives. The "66 Leq" noise abatement criteria for noise sensitive properties will be exceeded at 2 single family dwelling units, a public use facility (YMCA), and at a multifamily apartment building (University Palms).

Traffic noise mitigation measures in the form of reducing the posted speed limit from 35 to 25 miles per hour (mph) should be considered along the entire Kapiolani Street Extension under the Build Alternative. The use of sound attenuating walls at the noise impacted properties could not be justified using the existing HDOT noise abatement policy because of the presence of driveways at the multifamily apartment building which negated the effectiveness of sound attenuating walls at those receptor locations. Because of this, the addition of sound attenuating walls would not adequately mitigate future traffic noise impacts at the required minimum number of impacted receptors.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2034 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure. Maximum increases in traffic noise levels in the project area should not exceed 10.6 dB as a result of growth in traffic volumes and the construction of the project.

- Along the existing sections of Kapiolani Street, 5 single family and 1 multifamily residential buildings, a student center, a church, a hospice, and a YMCA facility are located. Future traffic noise levels are anticipated to increase by 0.9 to 4.4 dB without the project, and by an additional 1.0 to 11.0 dB under the Build Alternative. Future traffic noise levels at 2 single family residences, at the 1 multifamily residence, and at the YMCA are predicted to exceed the "66 Leq" noise abatement criteria with the project. Because these noise sensitive receptors are located within the limits of project construction, noise mitigation

measures at these receptors were evaluated in accordance with the existing HDOT noise abatement policy.

- Current HDOT noise abatement policy requires that a minimum number (75 percent) of noise impacted receptors benefit from at least 7 dB of sound attenuation if sound attenuation walls are to be included in a roadway project. While other requirements (cost, opinions of affected property owners and tenants, and ability to design and construct the sound walls) must also be met, the inability to meet the 7 dB attenuation requirement at a minimum of 75 percent of the benefiting front row receptors eliminated the use of sound attenuating walls as a noise abatement measure on this project.

- While three public use structures (a church, hospice, and YMCA facility) are located along the project corridor, the HDOT "66 Leq" noise abatement criteria was exceeded only at the YMCA facility. A reduction in the posted speed limit from 35 to 25 mph along the entire Kapiolani Street Extension would benefit the YMCA facility, by reducing the Kapiolani Street Extension traffic noise component to be below the HDOT "66 Leq" criteria.

- No parks are located within the limits of project construction; therefore, none should be affected by the proposed project or require noise mitigation measures under the Build Alternative..

Potential short term construction noise impacts are possible during the project construction period primarily in the developed areas of Kapiolani Street and in the elderly housing areas makai of the Kapiolani Street Extension. However, minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.

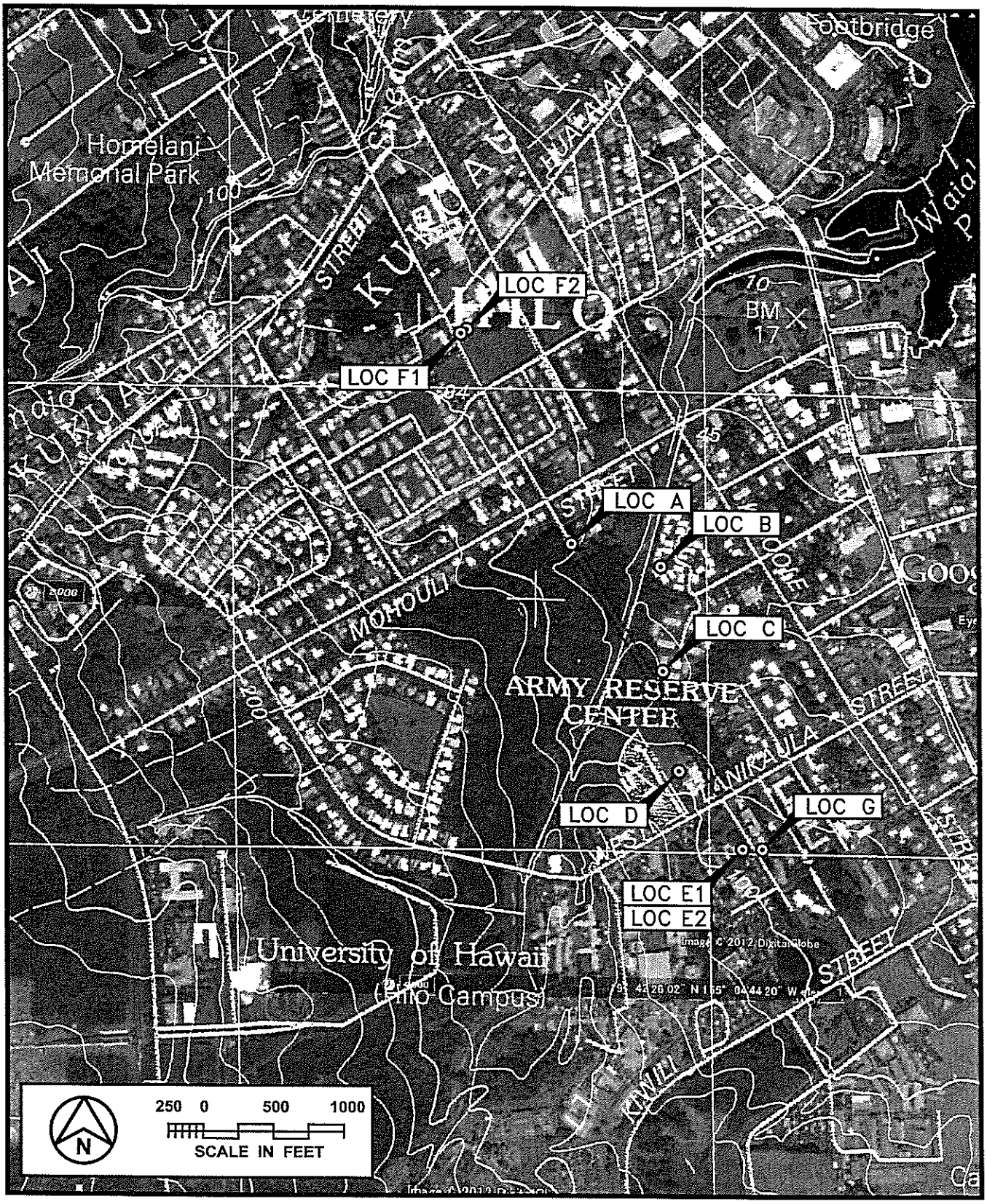
CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at nine locations in the project area were measured in April 2012. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the Base Year (CY 2012) and future (CY 2034) traffic noise levels under the No Build and Build Alternatives. The background ambient noise measurements were used to define existing noise levels at receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these receptors, and therefore exceed FHWA and HDOT noise standards and noise abatement criteria (see Reference 4).

The noise measurement locations ("A," "B," "C," "D," "E1," "E2," "F1," "F2," and "G") are shown in Figure 1. The results of the traffic and background noise measurements are summarized in Table 1. In the tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 2.5 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. At all traffic noise measurement locations, the measured noise levels were compared with TNM model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 1, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. The average vehicle speeds entered into the TNM were typically higher than posted speeds so as to achieve better agreement between measured noise levels and those calculated by the TNM. In addition, the TNM predictions were 2.5 to 3.5 dBA lower than actual measured traffic noise levels, and were scaled upward to achieve better agreement between measured and predicted results. With these input speed and TNM output scaling adjustments, the agreement between measured and predicted traffic noise levels was considered to be good and sufficiently accurate to formulate the Base Year and future year traffic noise levels.

Base Year traffic noise levels were then calculated in the project environs using Base Year (2012) traffic volume data for the AM and PM peak hours from Reference 2. These traffic volumes are summarized in Appendix C. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadways were derived from observations during the noise monitoring periods. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the AM and PM peak hour traffic volumes from Reference 2 and the noise



PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

TABLE 1
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A	In front of Christ Lutheran Church (4/21/12)	0952 TO 1016	N/A	N/A	N/A	N/A	53.0	N/A
B	At southwest corner of Hale Olaloa Homes (4/21/12)	1027 TO 1050	N/A	N/A	N/A	N/A	51.5	N/A
C	At southeast corner of Kamana Elderly Homes (4/21/12)	1055 TO 1123	N/A	N/A	N/A	N/A	52.2	N/A
D	At north end of YMCA parking area. (4/21/12)	1151 TO 1212	N/A	N/A	N/A	N/A	51.8	N/A
E1	72 FT from centerline of Kapiolani St. (4/21/12)	1221 TO 1321	35	133	0	1	57.6	57.6
E2	72 FT from centerline of Kapiolani St. (4/21/12)	1503 TO 1603	35	114	2	2	57.6	58.0

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
F1 50 FT from centerline of Kapiolani St. (4/22/12)	0854 TO 0954	31	136	0	0	56.0	55.4
F2 100 FT from centerline of Kapiolani St. (4/22/12)	0854 TO 0954	31	136	0	0	49.2	49.9
E2 72 FT from centerline of Kapiolani St. (4/23/12)	0700 TO 0800	35	500	3	3	N/A	63.3
F1 50 FT from centerline of Kapiolani St. (4/23/12)	0807 TO 0907	31	220	1	0	N/A	57.5
F2 100 FT from centerline of Kapiolani St. (4/23/12)	0807 TO 0907	31	220	1	0	N/A	52.2
G 48 FT from centerline of Kapiolani St. (4/23/12)	1354 TO 1420	35	388	2	5	63.5	63.4

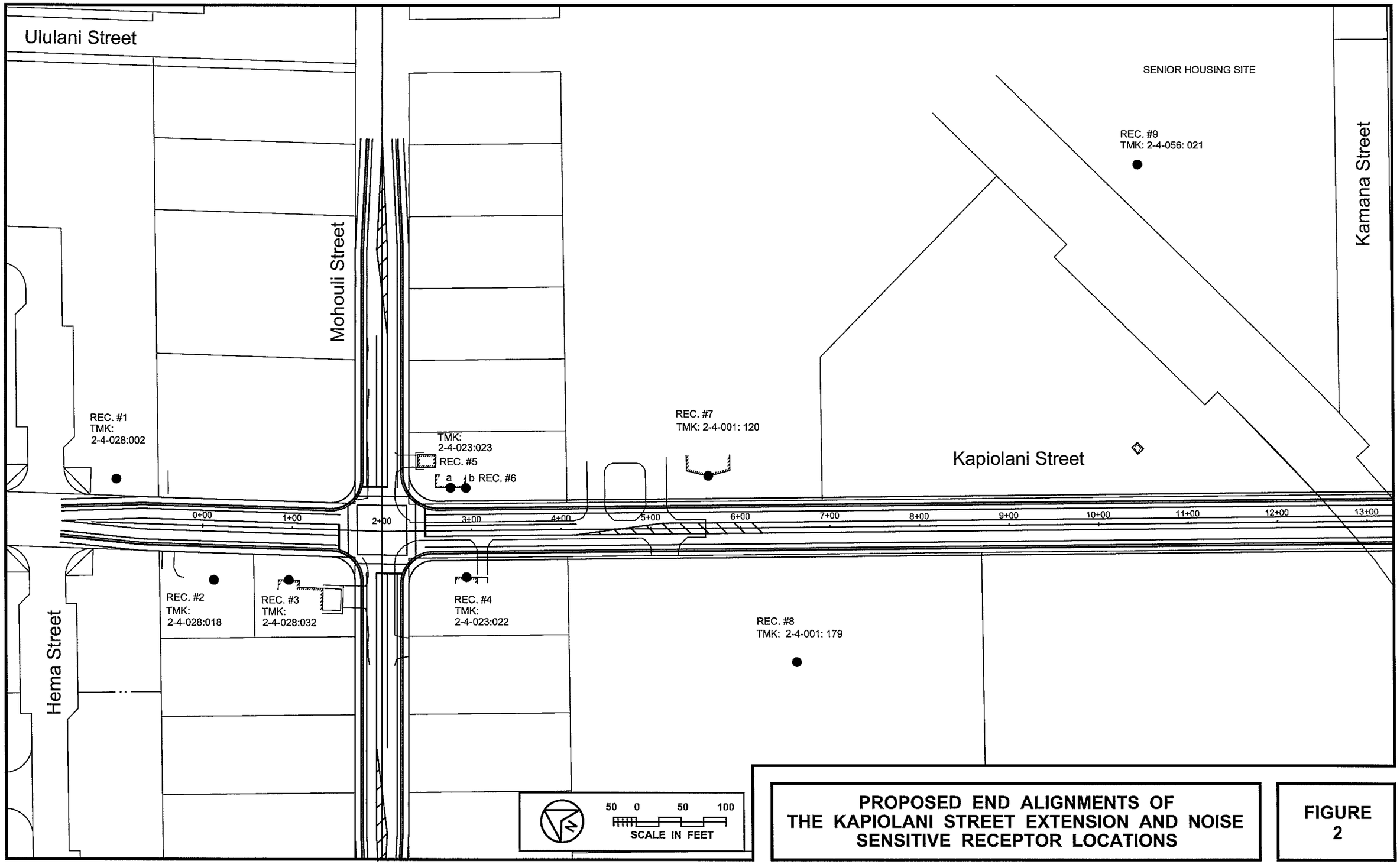
measurement results. For the purposes of this study, the AM or PM peak hour (as indicated by the data in Reference 2) was used to model the period with the highest traffic noise levels.

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2034 traffic noise levels as required by Reference 3. Aerial photo maps, tax maps, and project highway plans and profiles (where available) were used to determine terrain, ground cover, and local shielding effects and distances from building structures, which were entered into the noise prediction model. Where topographic contours were not available receptor elevations were assumed to be equal to the closest available elevation contours.

Future year (2034) traffic noise levels were then developed for the No Build and Build (roadway improvement) Alternatives using the future traffic assignments of Reference 2. Under the Build Alternative, it was assumed that the proposed Kapiolani Street Extension would be constructed as shown in Figure 2, with traffic volumes in the project environs as shown in Appendix C. Forecast mixes of vehicle types were assumed to be identical for both existing and future traffic, and vehicle speeds for Year 2034 along existing roadways were assumed to be identical to their Base Year values. Future posted traffic speeds along the new sections of the Kapiolani Street Extension were assumed to be 25 and 35 miles per hour. Modeled traffic speeds along the existing and new sections of Kapiolani Street were assumed to be 10 miles per hour greater than their posted speed limits. Future traffic conditions on existing roadways under the No Build Alternative may worsen, with average vehicle speeds declining as a result of increased congestion. Nevertheless, under the No Build Alternative, average vehicle speeds were assumed to remain the same as current values.

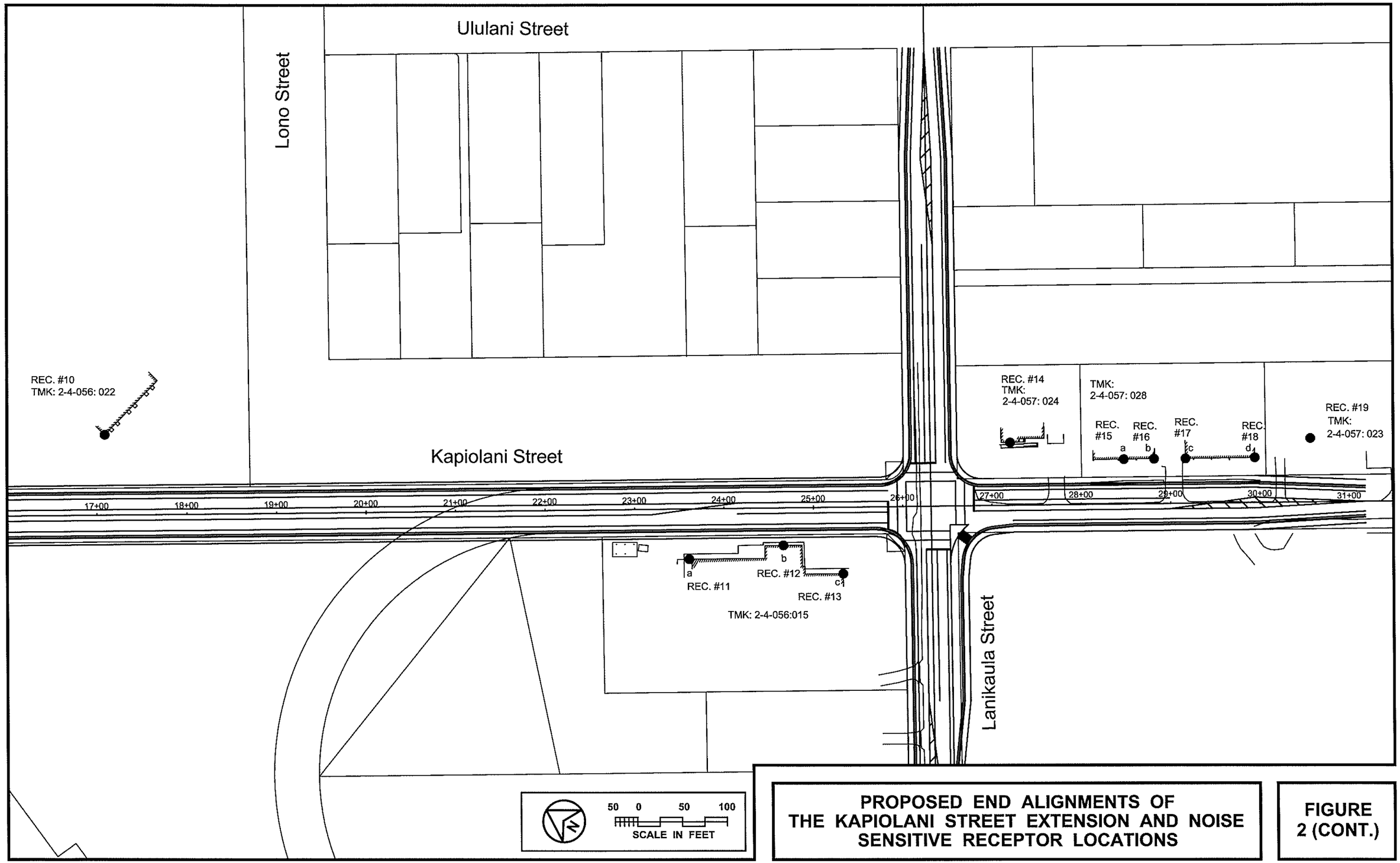
Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations of the future traffic noise levels and impacts at existing and potential receptor locations along the Kapiolani Street Extension and within the limits of construction were made. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 2) were made to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT "equal to or greater than 66 Leq(h)" noise abatement threshold criteria and the HDOT "equal to or greater than 15 dB increase" criteria were applied to all noise sensitive buildings (Categories B and C in Table 2) in the project environs. By Reference 4, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria for noise sensitive receptors in Activity Categories B and C. Along the project roadway corridors, the locations of the 66 Leq(h) traffic noise contours, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive receptor locations where the HDOT's noise abatement criteria would not be exceeded, and which would not require more detailed evaluations. In addition, the HDOT's criteria of "equal to or greater than 15 dB increase above existing background noise levels" was also used as a noise abatement criteria for this project within the limits of project construction (from Reference 4).



PROPOSED END ALIGNMENTS OF THE KAPIOLANI STREET EXTENSION AND NOISE SENSITIVE RECEPTOR LOCATIONS

FIGURE 2



PROPOSED END ALIGNMENTS OF THE KAPIOLANI STREET EXTENSION AND NOISE SENSITIVE RECEPTOR LOCATIONS

FIGURE 2 (CONT.)

TABLE 2

FHWA & HDOT NOISE ABATEMENT CRITERIA
[Hourly A–Weighted Sound Level––Decibels (dBA)]

ACTIVITY CATEGORY	LEQ (h)*	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extra–ordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Residential.
C	67 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libra–ries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F. Includes undeve–loped lands permitted for this activity category.
F	None	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water re–sources, water treatment, electrical), and warehousing.
G	None	Undeveloped lands that are not permitted.

---

* The Hawaii State Department of Transportation, Highways Division, utilizes Noise Abatement Criteria levels which are 1 Leq unit less than the FHWA values shown.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2012 was used as the Base Year for calculating changes in traffic noise levels associated with the future No Build and Build Alternatives. The Base Year noise environment along the project corridor was described by calculating the Hourly Equivalent Sound Level [Leq(h)] along the existing roadways during the AM or PM peak traffic hour (whichever had the highest traffic volume) for the 2012 time period. The hourly sound level, expressed in decibels, represents the average level of traffic noise along the project roadway during the peak traffic hour of the study's Base Year.

Table 3 presents the traffic volume, speed, and mix assumptions used to calculate the Base Year noise levels during the AM or PM peak hour along the existing sections of Kapiolani Street in the project environs. Shown in Table 3 are the calculated peak hour Leq(h)'s at reference distances of 50, 100, and 150 FT from the geometrical centers of the roadways. The calculated distances to the 66 and 71 Leq noise contour lines under unobstructed, line-of-sight conditions to the roadways are shown in Table 4 for the applicable AM or PM peak hour. The actual distances to the contour lines will generally be less than indicated in Table 4 when intervening structures or terrain obstructions exist between the roadway and a receptor. This reduction (or shrinkage) of the traffic noise contour distances from the roadway's centerline is the result of noise shielding (or attenuation) effects caused by the intervening structures or terrain features (such as roadway cuts).

By using the traffic noise data shown in Tables 3 and 4, and aerial photo maps of the existing improvements on the north (makai) and south (mauka) sides of Kapiolani Street and along the roadway corridor for the Kapiolani Street Extension, the relationship of the existing free-field traffic noise contours to existing buildings in the project area were obtained. No park lands border the new roadway's corridor within the limits of project construction, but single and multifamily residences, a student center, a church, a new Hospice, and a YMCA facility are located on both sides of the new roadway alignment within the limits of project construction.

Along Kapiolani Street between Mohouli Street and Lanikaula Street, the existing developments consist of noise sensitive residences and public use facilities. There are no commercial or light industrial buildings along the corridor of the proposed Kapiolani Street Extension. From Table 3, existing traffic noise levels at 50 foot setback distance from the centerline of the existing sections of Kapiolani Street are approximately 41 to 65 Leq. The existing traffic noise levels do not exceed the 66 Leq criteria for Activity Categories B and C (see Table 2) at existing noise sensitive buildings along the existing Kapiolani Street sections at Mohouli Street and Lanikaula Street.

At the Olaloa Homes and Kamana Elderly Homes, which are removed from the Mohouli and Lanikaula Street ends of the proposed Kapiolani Street Extension, existing traffic noise levels are lower and in the order of 50 to 53 Leq.

TABLE 3

EXISTING (CY 2012) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (AM OR PM PEAK HOUR)

ROADWAY SECTION (PEAK HR.)	SPEED (MPH)	TOTAL VPH	********* VOLUMES (VPH) ********** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Kapiolani Street North of Mohouli Street (PM)	31	278	277	1	0	59.3	56.3	54.4
Kapiolani Street South of Mohouli Street (AM)	25	7	7	0	0	40.6	37.6	35.7
Kapiolani Street North of Lanikaula Street (PM)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kapiolani Street South of Lanikaula Street (AM)	35	580	574	3	3	64.9	61.9	60.0
Mohouli Street Between Kapiolani and Kinoole (AM)	35	927	915	6	6	66.5	63.5	61.6
Mohouli Street Between Kapiolani and Kumukoa (PM)	35	893	883	5	5	66.3	63.3	61.4
Lanikaula Street Between Kapiolani and Kinoole (AM)	35	978	966	6	6	66.7	63.7	61.8
Lanikaula Street West of Kapiolani Street (AM)	35	919	907	6	6	66.5	63.5	61.6

Notes:

1. All distances shown are from the center of roadways.
2. Calculated Leq's are for unobstructed line-of-sight conditions.

TABLE 4

YEAR 2012 AND 2034 DISTANCES TO 66 AND 71 LEQ CONTOURS (AM OR PM PEAK HOUR, WITH PROJECT)

ROADWAY SECTION (PEAK HR.)	66 Leq SETBACK (FT)		71 Leq SETBACK (FT)	
	EXISTING	CY 2034	EXISTING	CY 2034
Kapiolani Street North of Mohouli Street (PM)	< 12	29	< 12	< 12
Kapiolani Street South of Mohouli Street (AM or PM)	< 12	32	< 12	< 12
Kapiolani Street North of Lanikaula Street (PM)	N/A	35	N/A	12
Kapiolani Street South of Lanikaula Street (AM)	39	59	12	21
Mohouli Street Between Kapiolani and Kinoole (AM)	56	66	18	22
Mohouli Street Between Kapiolani and Kumukoa (PM)	54	66	17	22
Lanikaula Street Between Kapiolani and Kinoole (AM)	59	66	19	22
Lanikaula Street West of Kapiolani Street (AM)	56	62	18	21

Notes:

1. All distances shown are from the center of roadway.
2. See TABLES 3 and 5 for traffic volume, speed, and mix assumptions.
3. Setback distances are for unobstructed line-of-sight conditions.

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the project during CY 2034 were evaluated for the No Build and Build Alternatives. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the Year 2034 noise levels. Under both the No Build and Build Alternatives, vehicle mixes and average speeds on existing roadway sections were assumed to be identical to the Base Year values. Future posted traffic speeds along the new sections of Kapiolani Street were assumed to be 25 miles per hour (mph) at the Mohouli Street and Lanikaula Street ends of the new roadway, and 35 mph between Stations 8+00 and 23+00 of the new roadway. Modeled traffic speeds along the new sections of Kapiolani Street were assumed to be 10 miles per hour greater than their posted speed limits.

Tables 4 and 5 summarize the traffic conditions, noise levels, and setback distances for the Build Alternative during the AM or PM peak hour in CY 2034. Table 6 indicates the changes in future traffic noise levels expected under the No Build and Build Alternatives at existing receptor locations in the project environs prior to any sound attenuation measures. As indicated in Table 6, future traffic noise levels along the existing sections of the Kapiolani Street Extension project are predicted to increase by approximately 0.9 to 4.7 dB between CY 2012 and CY 2034 solely as a result of non-project traffic volume increases under the No Build Alternative. Under the Build Alternative, the increase in future traffic noise due to project traffic along the Mohouli Street end of the Kapiolani Street Extension will range from 3.2 to 11.0 dB at noise sensitive receptors at that end of the project. Under the Build Alternative, the increase in future traffic noise due to project traffic along the Lanikaula Street end of the Kapiolani Street Extension will range from 1.0 to 9.4 dB at noise sensitive receptors at that end of the project.

Table 7 presents the predicted traffic noise levels at various noise sensitive receptor locations along the Kapiolani Street Extension. The locations of these receptors are shown in Figure 2, where multiple receptors are shown for single buildings due to the influence of cross street traffic noise at the buildings near Mohouli Street and Lanikaula Street. Also included in Table 7 are the existing background noise levels at the noise sensitive receptor locations. In Table 7, the traffic noise level contributions from only the Kapiolani Street Extension are shown separately from the combined traffic noise levels from the Kapiolani Street Extension plus the intersecting Mohouli Street and Lanikaula Street. From Table 7, it was concluded that the HDOT "66 Leq" noise abatement criteria will be exceeded at the existing YMCA building and the 3-story, University Palms apartment building which is located south of the Lanikaula Street intersection.

Under the Build Alternative, future traffic noise levels at Olaloa Homes (Receiver #9) and Kamana Elderly Homes (Receiver #10) makai of the Kapiolani Street Extension are expected to increase by 3.0 to 9.3 dB as a result of the project. However, predicted traffic noise levels at these residences should not exceed the HDOT "66 Leq" or "15 dB" increase noise abatement criteria.

TABLE 5

FUTURE (CY 2034) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAY SECTIONS IN PROJECT ENVIRONS (WITH PROJECT; AM OR PM PEAK HOUR)

ROADWAY SECTION (PEAK HR.)	SPEED (MPH)	TOTAL VPH	********* VOLUMES (VPH) ********** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Kapiolani Street North of Mohouli Street (PM)	31	690	687	3	0	63.5	60.3	58.4
Kapiolani Street South of Mohouli Street (PM)	35	490	484	3	3	64.0	60.8	58.9
Kapiolani Street North of Lanikaula Street (PM)	35	545	539	3	3	64.4	61.2	59.3
Kapiolani Street South of Lanikaula Street (AM)	35	830	820	5	5	66.8	63.5	61.6
Mohouli Street Between Kapiolani and Kinoole (AM)	35	1,063	1,051	6	6	67.3	64.1	62.2
Mohouli Street Between Kapiolani and Kumukoa (PM)	35	1,060	1,048	6	6	67.3	64.1	62.1
Lanikaula Street Between Kapiolani and Kinoole (AM)	35	1,070	1,058	6	6	67.3	64.1	62.2
Lanikaula Street West of Kapiolani Street (AM)	35	995	983	6	6	67.0	63.8	61.9

Notes:

1. All distances shown are from the center of roadways.
2. Calculated Leq's are for unobstructed line-of-sight conditions.

TABLE 6

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2034) (BUILD ALTERNATIVE)

ROADWAY SECTION	NOISE LEVEL INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC
Kapiolani Street North of Mohouli Street (PM)	1.0	3.2
Kapiolani Street South of Mohouli Street (AM or PM)	4.7	11.0*
Kapiolani Street North of Lanikaula Street (PM)	N/A	9.4**
Kapiolani Street South of Lanikaula Street (AM)	0.9	1.0
Mohouli Street Between Kapiolani and Kinoole (AM or PM)	0.7	0.1
Mohouli Street Between Kapiolani and Kumukoa (PM)	0.8	0.2
Lanikaula Street Between Kapiolani and Kinoole (AM)	0.9	-0.3
Lanikaula Street West of Kapiolani Street (AM)	0.7	-0.2

Notes:

* Increase of 11.0 dBA above existing background noise level of 53 dBA.
** Increase of 9.4 dBA above existing background noise level of 55 dBA.

TABLE 7

EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT NOISE SENSITIVE RECEPTOR LOCATIONS (4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	SETBACK DIST. FROM KSE C/L	EXISTING (CY 2012) Leq	FUTURE LEQ (1) (CY 2034) / (CHANGE)		FUTURE TOTAL LEQ (2) (CY 2034) / (CHANGE)	
HEMA STREET:						
Receiver #1 (TMK:2-4-028:002)	49 FT	59.4	63.3 / 3.9		63.8 / 4.4	
Receiver #2 (TMK:2-4-028:018)	60 FT	61.0	62.5 / 1.5		63.7 / 2.7	
Receiver #3 (TMK:2-4-028:032)	58 FT	62.4	62.7 / 0.3		64.7 / 2.4	
MOHOULI STREET:						
Receiver #4 (TMK:2-4-023:022)	52 FT	60.5	63.7 / 3.2		65.5 / 5.0	
Receiver #5 (TMK:2-4-023:023a)	48 FT	62.7	64.3 / 1.6		66.2 / 3.5	*
Receiver #6 (TMK:2-4-023:023b)	48 FT	61.0	64.3 / 3.3		65.9 / 4.9	
Receiver #7 (TMK:2-4-001:120)	58 FT	53.0	59.8 / 6.8		60.3 / 7.3	
Receiver #8 (TMK:2-4-001:179)	150 FT	53.0	54.7 / 1.7		56.9 / 3.9	
Receiver #9 (TMK:2-4-056:021)	400 FT	51.9	51.9 / 0.0		54.9 / 3.0	
KAMANA STREET:						
Receiver #10 (TMK:2-4-056:022)	90 FT	52.0	60.8 / 8.8		61.3 / 9.3	
Receiver #11 (TMK:2-4-056:015a)	56 FT	55.8	66.1 / 10.3	*	66.4 / 10.6	*
Receiver #12 (TMK:2-4-056:015b)	42 FT	58.1	67.4 / 9.3	*	67.9 / 9.8	*
Receiver #13 (TMK:2-4-056:015c)	74 FT	60.7	64.6 / 3.9		66.0 / 5.3	*
LANIKAULA STREET:						
Receiver #14 (TMK:2-4-057:024)	70 FT	65.0	65.0 / 0.0		66.4 / 1.4	*
Receiver #15 (TMK:2-4-057:028a)	50 FT	65.6	66.6 / 1.0	*	67.0 / 1.4	*
Receiver #16 (TMK:2-4-057:028b)	50 FT	65.5	66.5 / 1.0	*	66.8 / 1.3	*
Receiver #17 (TMK:2-4-057:028c)	50 FT	65.4	66.4 / 1.0	*	66.7 / 1.3	*
Receiver #18 (TMK:2-4-057:028d)	50 FT	65.3	66.5 / 1.2	*	66.7 / 1.4	*
Receiver #19 (TMK;2-4-057:023)	71 FT	63.8	64.8 / 1.0		65.0 / 1.2	

Notes:

1. Future traffic noise level contribution from only Kapiolani Street Extension.
2. Future total traffic noise levels from Kapiolani, Mohouli, and Lanikaula Streets.

* Denotes exceedance of State DOT "66 Leq" Criteria for Activitiy Categories B and C.

Under the Build Alternative, future traffic noise levels at the Christ Lutheran Church at the Mohouli Street end of the Kapiolani Street Extension are expected to increase by 7.3 dB as a result of the project. This increase is much larger than the 4.7 dB increase expected at the church without the project. However, predicted traffic noise levels at the church should not exceed the HDOT "66 Leq" or "15 dB" increase noise abatement criteria. Smaller increases in future traffic noise levels are predicted at the new Hospice of Hilo facility across the Christ Lutheran Church due to the larger setback distance of the hospice facility. Future traffic noise levels should be approximately 3.4 dB lower than the church at the hospice.

Along the existing sections of Mohouli and Lanikaula Streets where they intersect with Kapiolani Street, existing and future traffic noise levels will probably exceed the HDOT "66 Leq" at noise sensitive buildings located along these two streets. Increases in future traffic noise levels from these two roadways will range from 0.7 to 0.9 dB at these buildings without the Kapiolani Street Extension project. With the extension project, relatively small increases of 0.1 to 0.2 dB are predicted to occur along Mohouli Street as a result of project related traffic and as a result of the addition of turning lanes at the two intersections. Along Lanikaula Street, future traffic noise levels should decrease by 0.2 to 0.3 dB as a result of the project. These project related increases of 0.1 to 0.2 dB will be difficult to measure or perceive, and are considered to be insignificant.

The following general conclusions can be made in respect to the impacted structures and lands which can be expected by CY 2034 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive or public use structure in the project environs or within the limits of project construction. Maximum increases in traffic noise levels at any existing noise sensitive or public use receptor location within the limits of project construction should not exceed 10.6 dB as a result of the Kapiolani Street Extension project.

- Within the limits of project construction, exceedances of the "66 Leq" noise abatement criteria are expected to occur solely as a result of the project at the YMCA (Receivers #11 and #12) and University Palms apartment building (Receivers #15 through #18).

- Within the limits of project construction, exceedances of the "66 Leq" noise abatement criteria are expected to also occur at a single family residence (Receiver #5) at Mohouli and Kapiolani Streets as a result of traffic along both the Kapiolani Street Extension and Mohouli Street.

- Within the limits of project construction, exceedances of the "66 Leq" noise

abatement criteria are expected to also occur at a single family residence (Receiver #14) at Lanikaula and Kapiolani Streets as a result of traffic along both the Kapiolani Street Extension and Lanikaula Street.

CHAPTER V. FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Future traffic noise levels are expected to exceed the HDOT "66 Leq(h)" noise abatement criteria by CY 2034 under the Build Alternative at two buildings if the traffic noise contributions from Mohouli and Lanikaula Streets are not considered and only the future traffic noise contributions from the Kapiolani Street Extension sections are considered. These two buildings are the YMCA facility at Kapiolani Street and Lanikaula Street, and the existing University Palms apartments located on Kapiolani Street south of the Lanikaula Street intersection. If the posted speed limit in the middle section of the Kapiolani Street Extension is reduced from 35 to 25 mph, predicted future traffic noise levels at the YMCA facility are predicted to be less than the HDOT 66 Leq noise abatement criteria, so speed reduction could be an effective noise mitigation measure along the new section of the Kapiolani Street Extension.

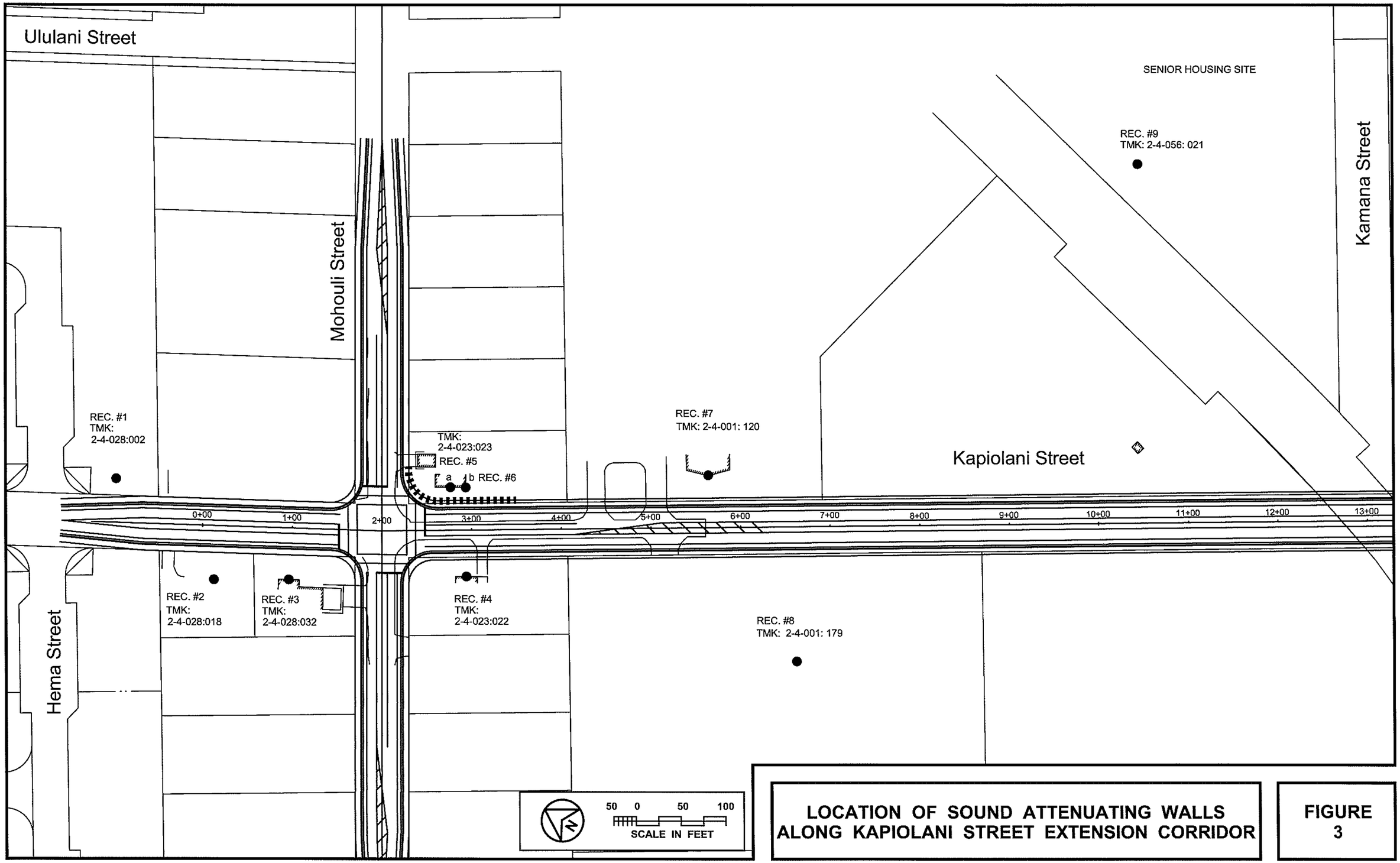
Because a sound attenuating wall may be effective in providing 5 to 7 dB of attenuation at the first floor units, it was investigated as a noise mitigation measure for this project. The required heights of the sound attenuating wall to provide noise mitigation at the second and third floor units was not investigated, because the wall height requirements for first floor units at the University Palms apartments were excessive.

The footprints of sound attenuating walls which were investigated at the YMCA (Receivers #11 through #13), two single family residences Receivers #5 and #14, and at the University Palms (Receivers #15 through #18 are shown in Figure 3. By existing HDOT policy and guidelines (Reference 4), a minimum sound attenuation of 5 dBA at two thirds of the impacted front row receptors is required. The total count of impacted front row receptors are 2 each, single family residence receptors, 3 each, equivalent receptors at the YMCA (which has an equivalent frontage equal to 3 residences along the Right-of-Way); and 6 ground floor multifamily residence receptors at the University Palms apartments; for a total of 11 receptors which could benefit from the sound attenuating walls shown in Figure 3.

By existing HDOT policy, at least 5 dB of attenuation will be required at a minimum of 7 receptors before the sound attenuation walls can be considered to be acoustically feasible. The minimum wall heights required to achieve at least 5 dB of attenuation at each of the receptors is shown in Figure 4. If it is considered feasible to actually construct the walls shown in Figure 4, the sound attenuation walls must also meet the following "reasonableness" criteria under the HDOT noise policy (Reference 4):

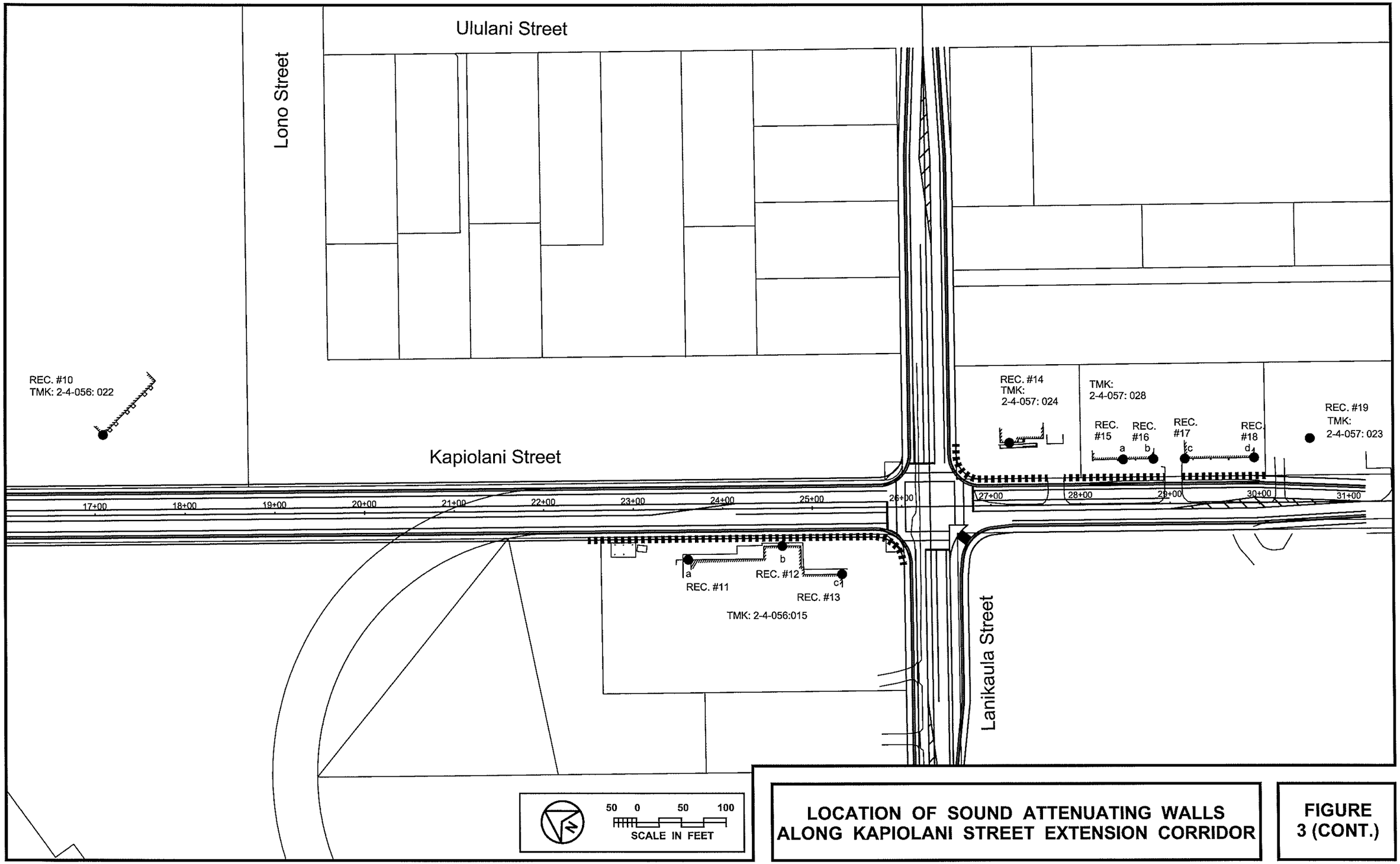
1. At least two thirds of the land owners and impacts residents must approve of the sound attenuating walls;

2. A noise reduction of 7 dB is required at a minimum of 75 percent of the benefiting front row receptors along the entire project; and



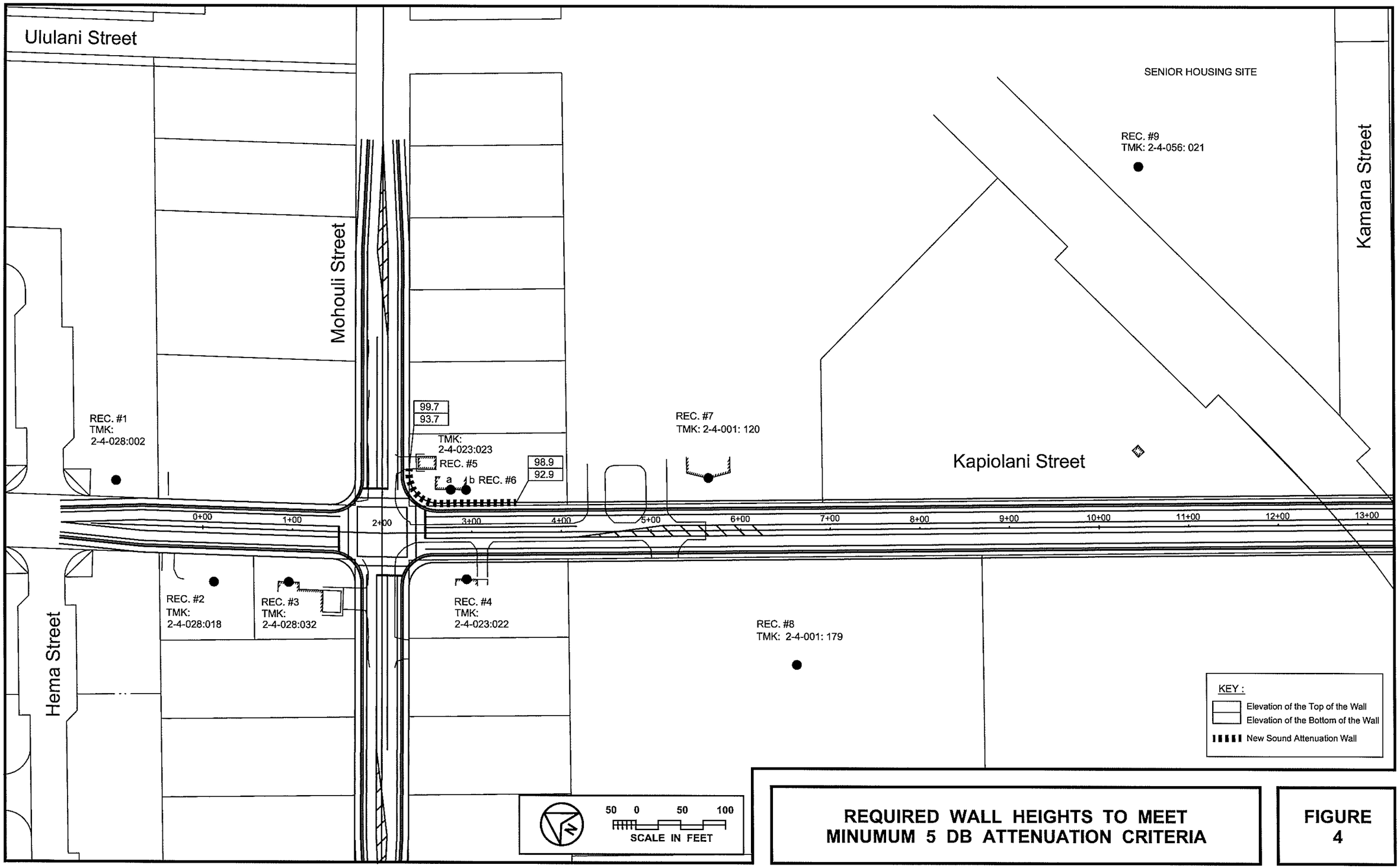
LOCATION OF SOUND ATTENUATING WALLS ALONG KAPIOLANI STREET EXTENSION CORRIDOR

FIGURE 3



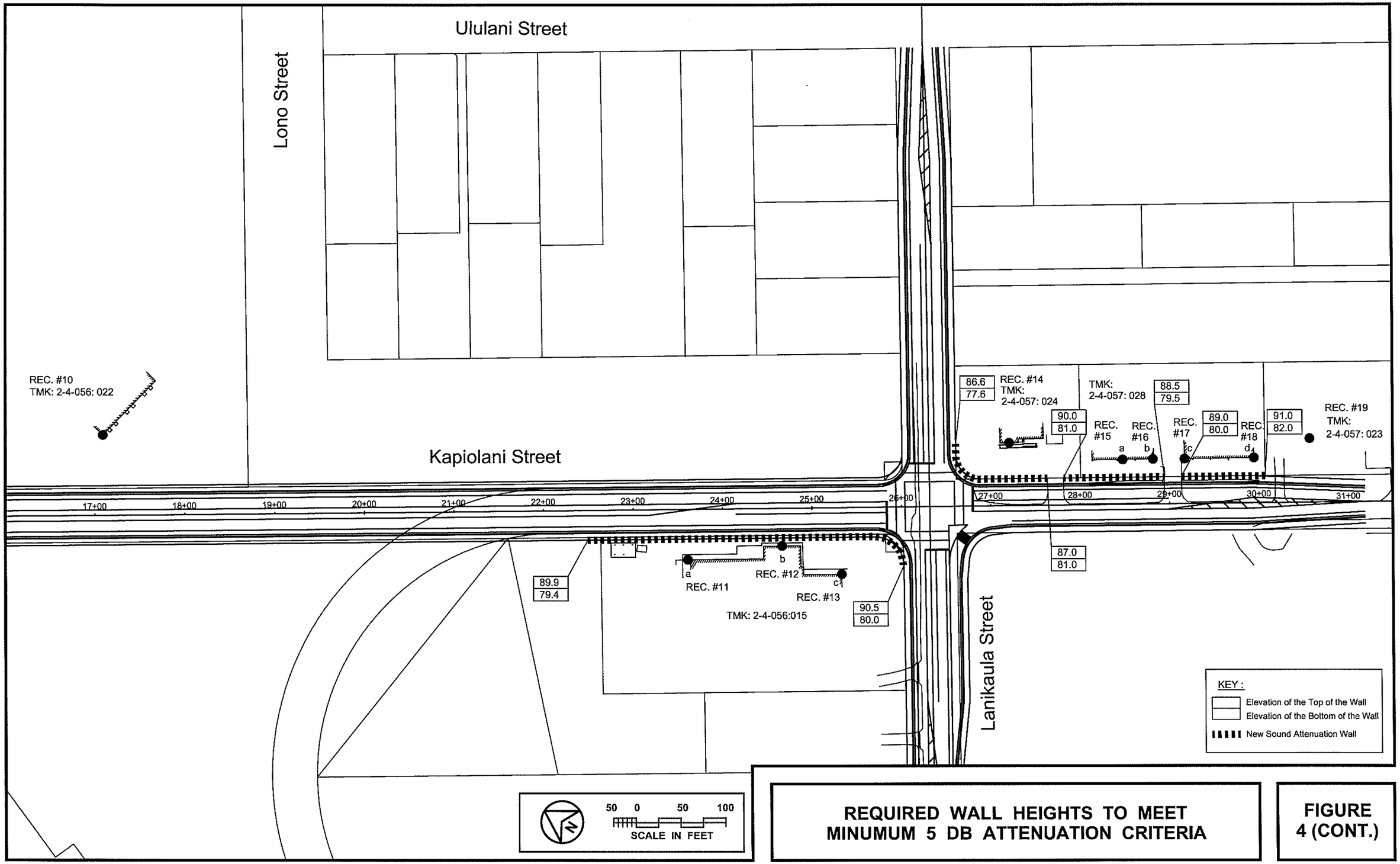
LOCATION OF SOUND ATTENUATING WALLS ALONG KAPIOLANI STREET EXTENSION CORRIDOR

FIGURE 3 (CONT.)



REQUIRED WALL HEIGHTS TO MEET MINUMUM 5 DB ATTENUATION CRITERIA

FIGURE 4



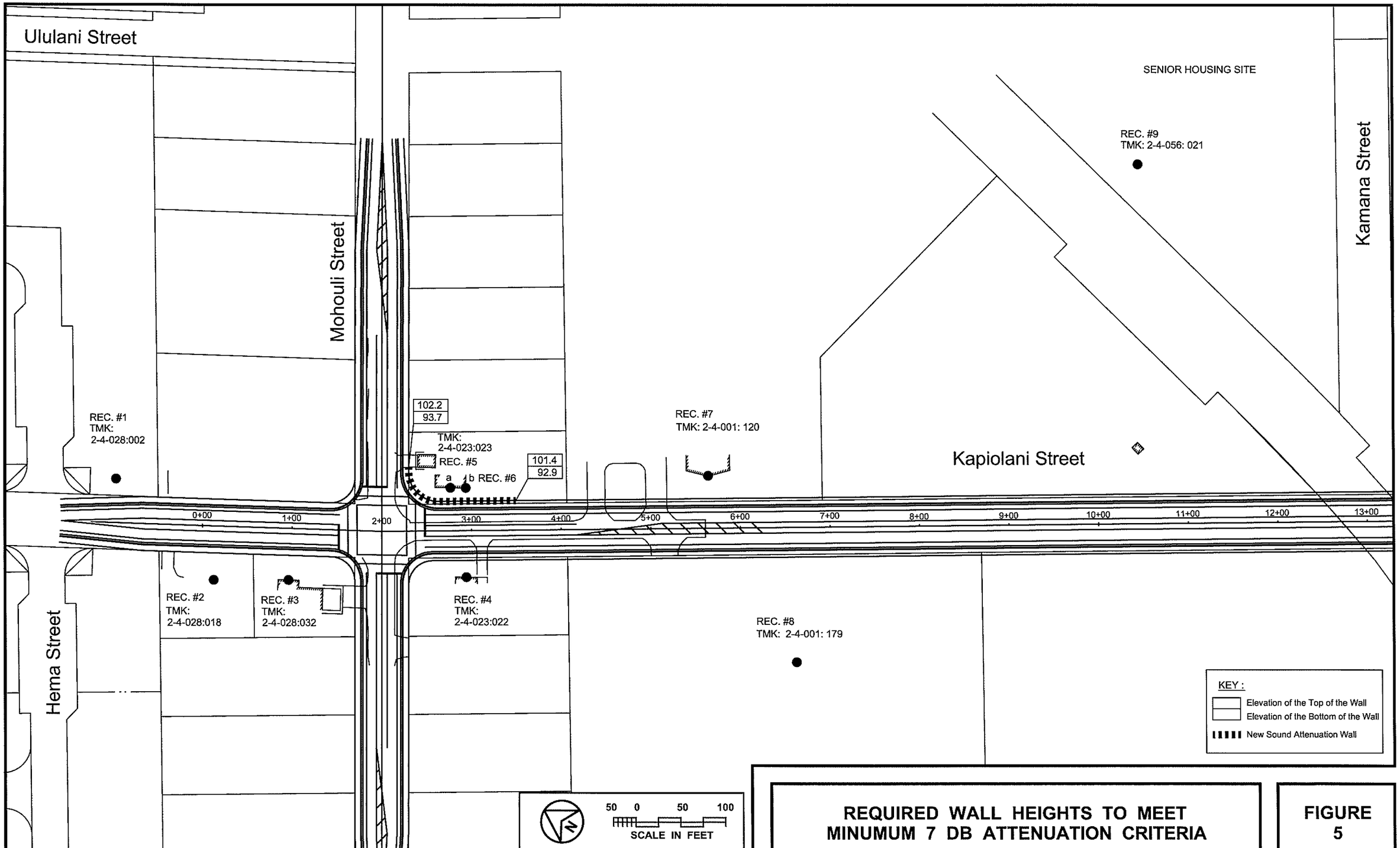
REQUIRED WALL HEIGHTS TO MEET MINUMUM 5 DB ATTENUATION CRITERIA

FIGURE 4 (CONT.)

3. The total cost of the sound attenuating walls cannot exceed $60,000 per benefited receptor.

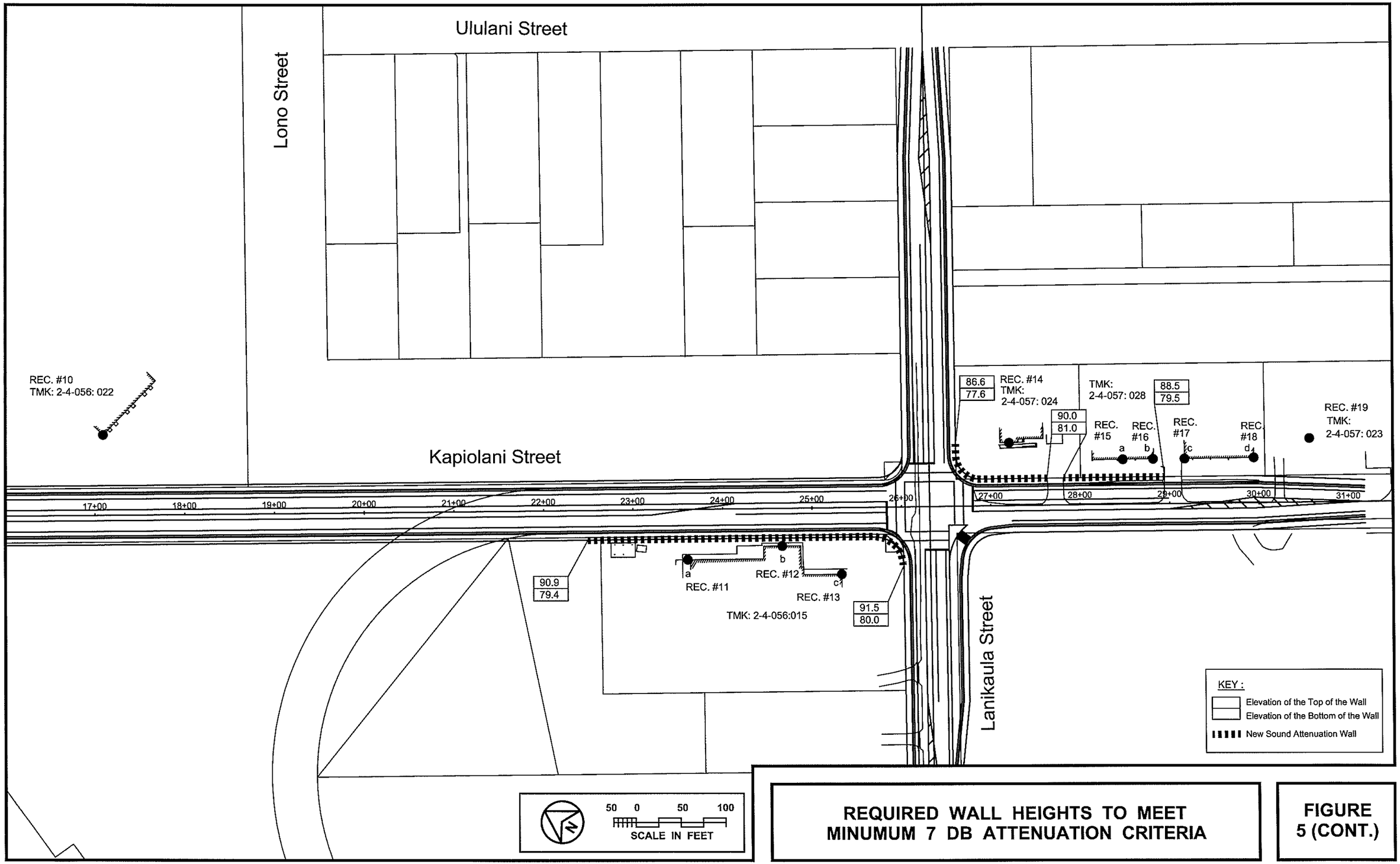
The wall heights required to meet the 7 dB minimum sound attenuation requirement are shown in Figure 5. At the University Palms apartments, the presence of the driveways will nullify the effectiveness of the sound attenuating walls, and will not allow for 7 dB of attenuation to be achieved at the 6 ground floor receptors. Because of this, it will not be possible to achieve 7 dB of attenuation at a minimum of 8 impacted receptors along the project corridor. Therefore, the use of sound attenuating walls for this project would not meet the "reasonableness" criteria of the existing HDOT noise abatement policy (Reference 4).

Future noise sensitive facilities or housing units which may be planned alongside the new Kapiolani Street Extension represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas adjacent to the roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for future noise abatement measures under existing HDOT procedures.



REQUIRED WALL HEIGHTS TO MEET MINUMUM 7 DB ATTENUATION CRITERIA

FIGURE 5



REQUIRED WALL HEIGHTS TO MEET MINUMUM 7 DB ATTENUATION CRITERIA

FIGURE 5 (CONT.)

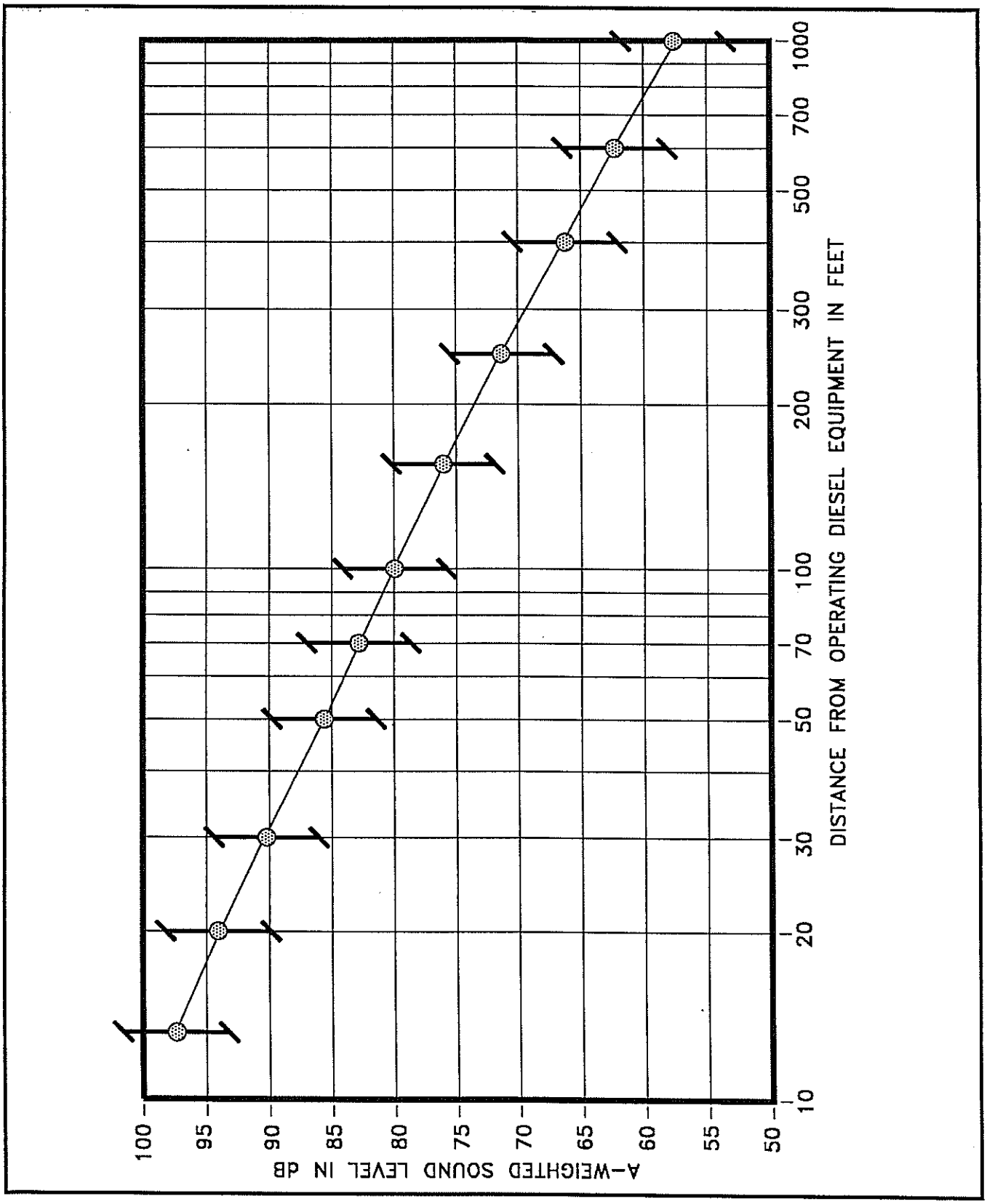
CHAPTER VI. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the existing and future roadway sections may occur. These impacts can occur as a result of the short distances (less than 30 FT) between existing noise sensitive structures to the anticipated construction corridor. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 6. The maximum impulsive noise levels of rock breaking equipment (such as hoe rams) can be 5 to 8 dB greater than those shown in Figure 6. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project work areas.

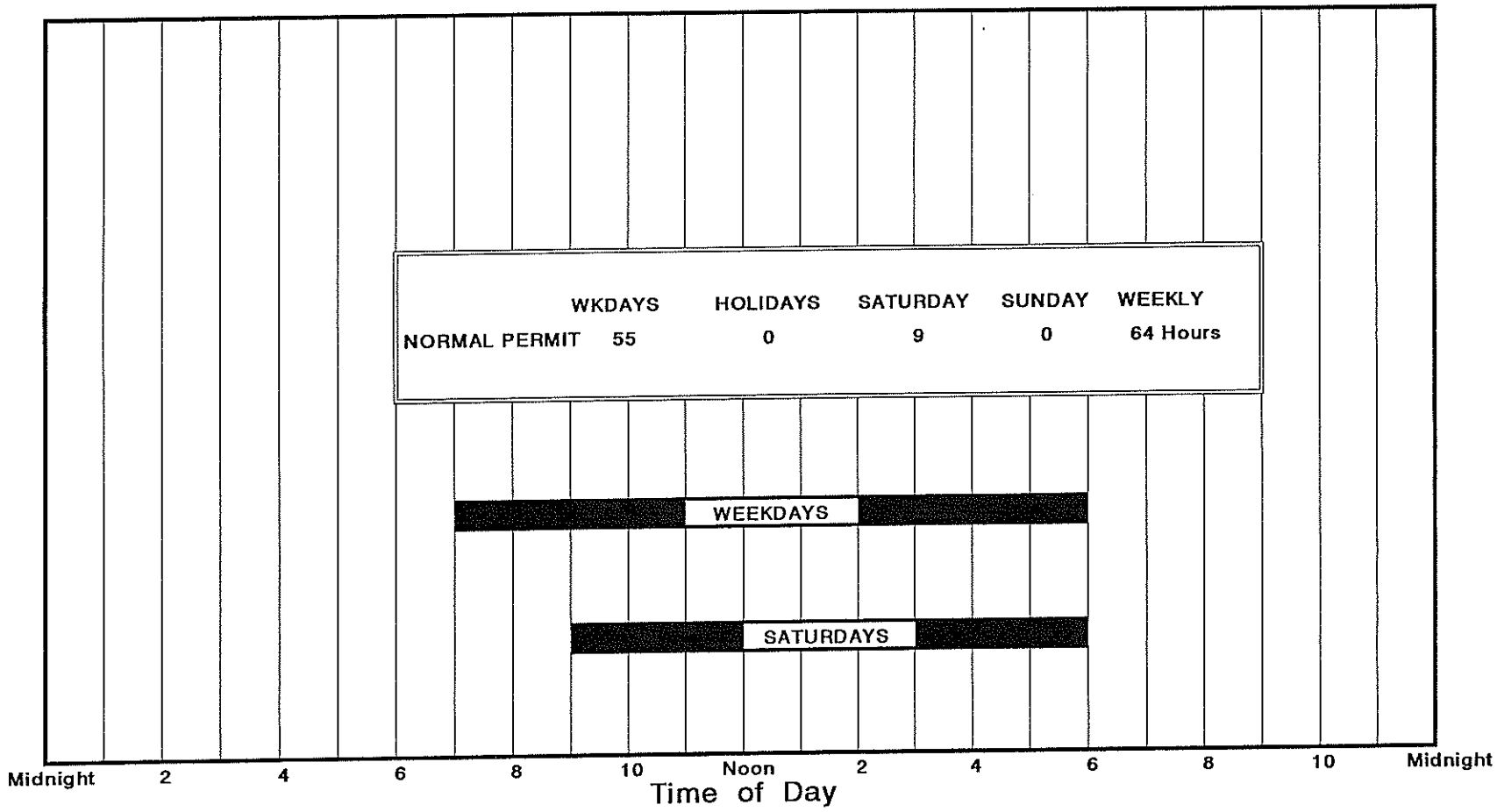
Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the Kapiolani Street Extension project, close-in distances between the construction sites and receptors are expected to be between 30 and 200 FT, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 5). Under current permit procedures (see Figure 7), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors (such as residences) along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use within 500 FT of noise sensitive properties. Heavy truck and equipment staging areas should also be located at areas which are at least 500 FT from noise sensitive properties whenever possible. Truck routes which avoid residential communities should be identified wherever possible.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 6



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 7

APPENDIX A. REFERENCES

(1) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(2) Existing and Future Traffic Turning Movements for the Kapiolani Street Extension Project; SSFM International, Inc.; Via Emails of May 25 and July 7, 2012.

(3) Federal Highway Administration; "Procedures for Abatement of Highway Traffic Noise and Construction Noise;" 23 CFR Chapter I, Subchapter H, Part 772;" April 1, 1995.

(4) "Highway Noise Policy and Abatement Guidelines;" State of Hawaii, Department of Transportation, Highways Division and U.S. Department of Transportation, Federal Highway Administration; April 25, 2011 and List of Corrections dated November 29, 2011.

(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

	TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1.	Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND FUTURE YEAR (2034) TRAFFIC VOLUMES ALONG ROADWAYS IN PROJECT ENVIRONS

ROADWAY LANES	**** CY 2012 ***** AM VPH	PM VPH	CY 2034 (NO BUILD) AM VPH	PM VPH	CY 2034 (BUILD) AM VPH	PM VPH
Mohouli St., W. of Kumukoa (EB)	833	447	940	505	930	560
Mohouli St., W. of Kumukoa (WB)	428	682	480	770	475	820
Two-Way	1,261	1,129	1,420	1,275	1,405	1,380
Mohouli St., Between Kumukoa & Kapiolani (EB)	579	346	653	393	655	418
Mohouli St., Between Kumukoa & Kapiolani (WB)	307	547	350	618	355	643
Two-Way	885	893	1,003	1,010	1,010	1,060
Mohouli St., Between Kapiolani & Kinoole(EB)	563	392	635	445	648	458
Mohouli St., Between Kapiolani & Kinoole(WB)	364	486	413	550	415	575
Two-Way	927	878	1,048	995	1,063	1,033
Mohouli St., E. of Kinoole (EB)	471	424	540	485	550	495
Mohouli St., E. of Kinoole (WB)	356	456	390	505	395	525
Two-Way	827	880	930	990	945	1,020
Kapiolani St., N. of Mohouli (NB)	178	79	205	90	370	235
Kapiolani St., N. of Mohouli (SB)	94	199	110	235	270	455
Two-Way	272	278	315	325	640	690
Kapiolani St., S. of Mohouli (NB)	3	4	10	10	200	200
Kapiolani St., S. of Mohouli (SB)	4	2	5	10	180	290
Two-Way	7	6	15	20	380	490
Lanikaula St., W. of Kapiolani (EB)	468	365	530	415	505	450
Lanikaula St., W. of Kapiolani (WB)	451	378	510	430	490	455
Two-Way	919	743	1,040	845	995	905
Lanikaula St., Between Kapiolani & Kinoole (EB)	497	381	565	433	545	458
Lanikaula St., Between Kapiolani & Kinoole (WB)	482	440	548	498	525	523
Two-Way	978	821	1,113	930	1,070	980
Lanikaula St., E. of Kinoole (EB)	451	438	500	480	490	495
Lanikaula St., E. of Kinoole (WB)	353	416	395	465	380	480
Two-Way	804	854	895	945	870	975
Kapiolani St., N. of Lanikaula (NB)	N/A	N/A	N/A	N/A	200	250
Kapiolani St., N. of Lanikaula (SB)	N/A	N/A	N/A	N/A	175	295
Two-Way	N/A	N/A	N/A	N/A	375	545
Kapiolani St., S. of Lanikaula (NB)	282	199	320	230	420	310
Kapiolani St., S. of Lanikaula (SB)	298	244	340	280	410	415
Two-Way	580	443	660	510	830	725

[This page intentionally left blank]

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 8
Phase I Environmental Site Assessment

Note: Appendices are not reproduced due to length but are available for review upon request to Department of Public Works (Allan Simeon, 808.961.8327)

[This page intentionally left blank]

PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT
PROPOSED KAPIOLANI STREET EXTENSION
HILO, ISLAND OF HAWAI'I
PORTIONS OF TMKS
(3) 2-4-001:024
(3) 2-4-013:019
(3) 2-4-056:014

MNA PROJECT 31360

JULY 31, 2012

Myounghee Noh & Associates

Environmental Studies and Consulting Services

94 Kohola Street, Hilo, Hawai'i, USA 96720 • 808.935.8727
99-1046 Iwaena Street, Suite 210A, Aiea, Hawai'i, USA 96701 • 808.484.9214

This Phase I ESA report is prepared for:

Geometrician Associates, LLC
PO Box 396
Hilo, Hawai‘i 96721

PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT
PROPOSED KAPIOLANI STREET EXTENSION
HILO, ISLAND OF HAWAI‘I
PORTIONS OF TMKS
(3) 2-4-001:024
(3) 2-4-013:019
(3) 2-4-056:014

MNA Job No. 31360

July 31, 2012

I declare that, to the best of my professional knowledge and belief, I meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Myounghee Noh
Principal

Myounghee Noh & Associates, L.L.C.
Environmental Studies & Consulting Services
94 Kohola Street, Hilo, HI 96720
Tel (808) 935-8727 Fax (808) 935-8729

99-1046 Iwaena Street, Suite 210A, Aiea, HI 96701
Tel (808) 484-9214 Fax (808) 484-4660
www.noh-associates.com

TABLE OF CONTENTS

SIGNATURE PAGE ii

TABLE OF CONTENTS iii

LIST OF ABBREVIATIONS v

EXECUTIVE SUMMARY vi

FINDINGS vi
RECOGNIZED ENVIRONMENTAL CONDITIONS vii

1.0 INTRODUCTION 1

1.1 PURPOSE 1
1.2 DETAILED SCOPE OF SERVICES 1
1.2.1 Site History 1
1.2.2 Regulatory Records 3
1.2.3 Site Reconnaissance 3
1.2.4 Site Geology and Hydrogeology 3
1.2.5 Data Evaluation and Reporting 4
1.3 SIGNIFICANT ASSUMPTIONS 4
1.4 LIMITATIONS AND EXCEPTIONS 4
1.5 SPECIAL TERMS AND CONDITIONS 4
1.6 USER RELIANCE 4

2.0 SITE DESCRIPTION 5

2.1 LOCATION AND LEGAL DESCRIPTION 5
2.2 SITE AND VICINITY GENERAL CHARACTERISTICS 5
2.2.1 Geology 5
2.2.2 Hydrogeology 7
2.3 CURRENT USE OF THE SUBJECT PROPERTY 8
2.4 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS 8
2.5 PAST USES OF THE SUBJECT PROPERTIES 8
2.6 CURRENT AND PAST USES OF ADJOINING PROPERTIES 11

3.0 USER PROVIDED INFORMATION 14

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS 14
3.2 SPECIALIZED KNOWLEDGE 15
3.3 VALUATION REDUCTION 15
3.4 REASON FOR PERFORMING THE PHASE I ESA 15

4.0 RECORDS REVIEW 15

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES 15
4.1.1 Federal National Priorities List 16
4.1.2 Federal RCRA CORRACTS TSD Facilities List 16
4.1.3 State Sites of Interest 16
4.1.4 Delisted NPL Site List 18
4.1.5 Federal CERCLIS List 18
4.1.6 Federal CERCLIS NFRAP Site List 18
4.1.7 Federal RCRA non-CORRACTS TSD facilities list 18

4.1.8 State Brownfield Sites ... 18
4.1.9 State Landfill/Solid Waste Disposal Sites ... 19
4.1.10 State LUST List ... 19
4.1.11 State Voluntary Cleanup Sites ... 20
4.1.12 Federal RCRA Generators List ... 20
4.1.13 Federal ICs and ECs Registries ... 20
4.1.14 State ICs and ECs Registries ... 21
4.1.15 State Registered UST List ... 21
4.1.16 Federal ERNS List ... 22
4.1.17 State Releases List ... 22
4.2 ADDITIONAL RECORD SOURCES ... 22
4.2.1 Subject Property ... 22
4.2.2 Surrounding Properties ... 22
4.3 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY ... 25
4.3.1 Historical Aerial Photographs ... 25
4.3.2 Historical Topographic Maps ... 26

5.0 SITE RECONNAISSANCE ... 27

5.1 METHODOLOGY AND LIMITING CONDITIONS ... 27
5.2 GENERAL SITE SETTING ... 28
5.3 EXTERIOR OBSERVATIONS ... 28
5.4 INTERIOR OBSERVATIONS ... 28
5.5 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS ... 28
5.6 ABOVEGROUND AND UNDERGROUND STORAGE TANKS ... 28

6.0 INTERVIEWS ... 28

6.1 Sherman Viernes ... 28
6.2 Wayne Subica ... 29

7.0 DATA GAPS AND DEVIATIONS ... 29

8.0 KEY FINDINGS & OPINION ... 29

9.0 CONCLUSION ... 29

REFERENCES ... 31

TABLES

Table 1. Upper Aquifer Classification System ... 8
Table 2. Users and Primary Uses of Subject Properties ... 9
Table 3. Users and Primary Uses of Adjoining Properties ... 11
Table 4. Aerial Photograph Details ... 25

FIGURES

Figure 1. Site Location Map ... 2
Figure 2. Project Area ... 6
Figure 3. Aerial Site Map ... 10

APPENDICES

Appendix A Environmental FirstSearch Report and Maps
Appendix B Site Reconnaissance Photographs

LIST OF ABBREVIATIONS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generators
CORRACTS	RCRA Facilities that are undergoing "corrective action"
DLNR	State of Hawai'i Department of Land and Natural Resources
DPW	County of Hawai'i Department of Public Works
EC	Engineering Control
ERNS	Emergency Response Notification System
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
HDOH	Hawai'i Department of Health
HEER Office	Office of Hazard Evaluation and Emergency Response
HHC	Hawaiian Homes Commission
IC	Institutional Control
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MNA	Myounghee Noh & Associates, L.L.C.
NFRAP	CERCLIS No Further Remedial Action Planned
NLR	No Longer Regulated generators
NPL	National Priorities List
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SHWB	Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	Treatment/Storage/Disposal
USGS	United States Geological Survey
UIC	Underground Injection Control
UST	Underground Storage Tank

EXECUTIVE SUMMARY

Myounghee Noh & Associates, L.L.C. (MNA) was retained in April 2012 to conduct a Phase I Environmental Site Assessment (ESA) for the subject property, comprised of portions of three Tax Map Keys (TMK): Island 3, Zone 2, Section 4, Plat 001, and Parcel 024 ([3] 2-4-001:024), [3] 2-4-001:019, and [3] 2-4-056:014. The subject property is located within the town of Hilo, County of Hawai‘i, State of Hawai‘i. All three TMK were owned by the State of Hawai’i at the time of this Phase I ESA. This Phase I ESA was completed for Geometrician Associates, LLC, and the County of Hawai’i Department of Public Works (DPW).

MNA performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM E 1527-05 of the subject property, comprised of portions of TMK (3) 2-4-001:024, :019, and 2-4-056:014, County of Hawai‘i, hereafter referred to as the *subject property*. The purpose of this Phase I ESA is to identify *recognized environmental conditions* (RECs) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. A Phase I ESA consists of four parts. Three of those parts are intended to collect information that will aid in the identification of RECs at the subject property. The information generating parts of the Phase I ESA are a review of state, federal, and local environmental records; a site reconnaissance visit; and interviews with key site personnel and other individuals with knowledge of the subject property. The fourth part of a Phase I ESA is a report that documents the collection of information about the subject property and evaluation of that information towards making a determination of the presence of RECs at the subject property.

At the time of the site reconnaissance, the subject property was located in an undeveloped area in Hilo, approximately a half mile southwest of the Waiakea Pond, and one mile southwest of Hilo Bay. The subject property was unoccupied and undeveloped.

FINDINGS

The subject property was located between two main roads, Mohouli Street and West Lanikaula Street, and was accessed via the dead end south of the intersection between Mohouli Street and Kapiolani Street. The subject property was vacant, undeveloped, and surrounded mostly by residential areas. The Hawai’i County DPW Flood Control Ditch runs through the center of the subject property. Vegetation was moderate throughout most of the subject property.

A review of the County of Hawaii tax records indicated that the subject property has been unused and undeveloped. Based on the records review and the site reconnaissance observations, there were no indications that the subject property was or has been anything but vacant. No indications of illegal dumping were observed during the site reconnaissance to the subject property or adjoining properties. As a result, there are no *recognized environmental conditions* in connection with the current use of the subject property.

There were no findings in connection with the adjoining properties.

RECOGNIZED ENVIRONMENTAL CONDITIONS

MNA performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM E 1527-05 of the subject property, comprised of portions of TMK (3) 2-4-001:024, 2-4-001:019, and 2-4-056:014, Hilo, County of Hawai‘i, State of Hawai‘i, referred to as the *subject property*. Any exceptions to, or deletions from, this practice are described below. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the *subject property*.

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) of the subject property comprised of portions of three Tax Map Keys (TMK). Approximately 0.50 acre is located on the north end of TMK of Island 3, Zone 2, Section 4, Plat 001, and Parcel 024 (TMK [3] 2-4-001:024). Approximately 0.25 acre is located on the center of TMK [3] 2-4-001:019, and approximately 1.25 acre is located on the south end of TMK [3] 2-4-056:014. The subject property is located in Hilo, County of Hawai‘i, State of Hawai‘i. The location of the subject property is identified in Figure 1. This Phase I ESA was conducted by Myounghee Noh & Associates, L.L.C., herein referred to as MNA, for Geometrician Associates, LLC, and the County of Hawai’i Department of Public Works. At the time of this Phase I ESA, the subject property was owned by the State of Hawai‘i and was unoccupied and undeveloped.

1.1 PURPOSE

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* (RECs) at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. This practice is intended to permit a user to satisfy one of the requirements to qualify for the *innocent landowner defense* to CERCLA liability, “all appropriate inquiry into the previous ownership and uses of the site consistent with good commercial or customary practice.” The term *recognized environmental condition* denotes the presence, or likely presence, of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property (ASTM International, 2005).

This report is part of the Phase I ESA conducted for the subject property. The assessment was conducted in accordance with the practices described in *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM International, 2005).

1.2 DETAILED SCOPE OF SERVICES

A Phase I ESA has four components: records review, site reconnaissance, interview, and report. MNA conducted this ESA using information sources with the potential to identify past or current releases of hazardous substances or petroleum products into the subject property. Adjoining properties were also evaluated for their potential to impact the subject property. Per the American Society for Testing and Materials (ASTM) Phase I ESA Standard, adjoining properties include parcels touching the subject property as well as those properties across a roadway (ASTM International, 2005).

1.2.1 Site History

Where available and as needed, MNA researched historical and current topographic maps, tax records, fire insurance maps, and aerial photographs to identify previous and current uses of the property, adjoining properties, and the surrounding area.

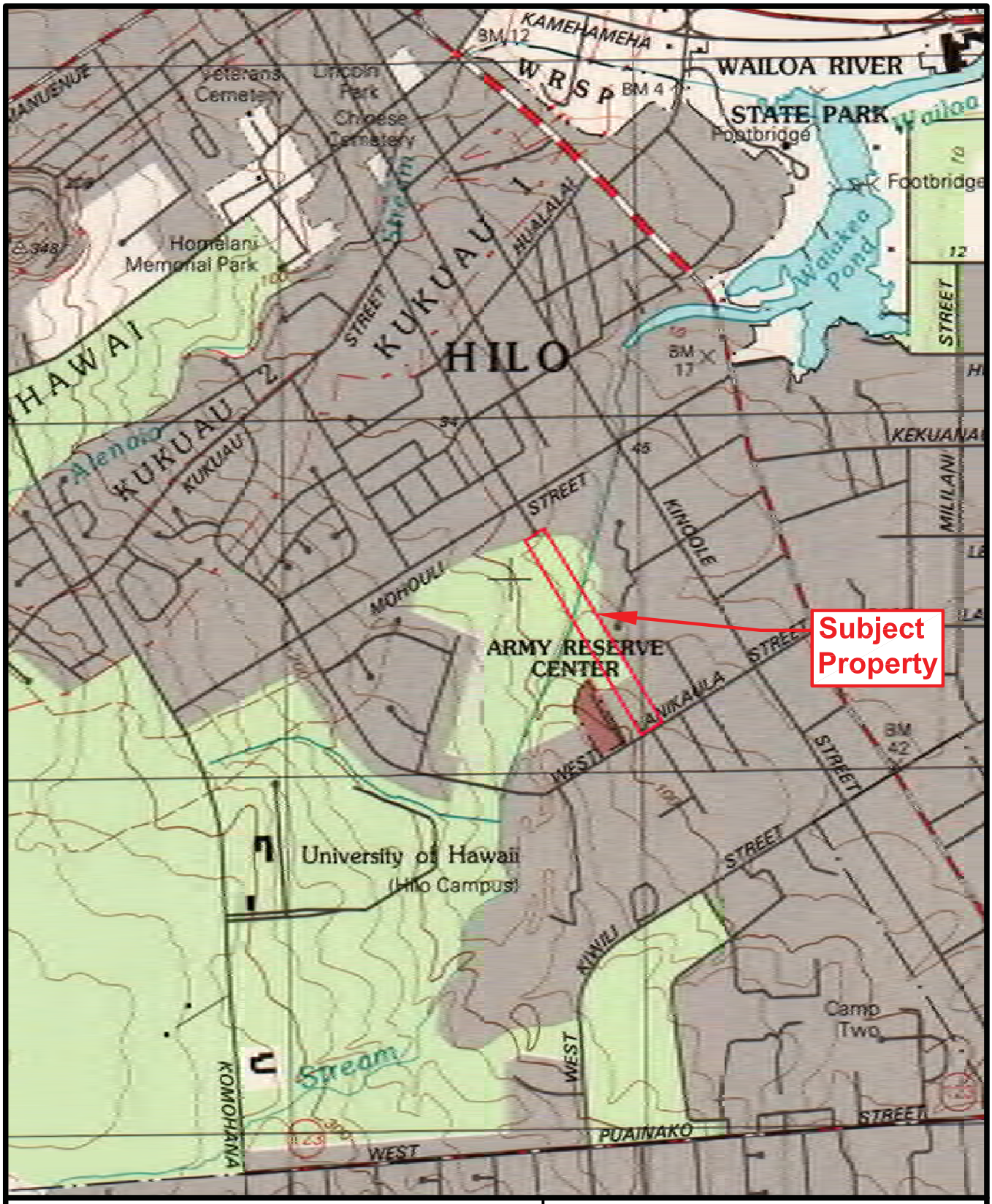


Figure 1. Site Location Map
Phase I Environmental Site Assessment Report
Kapiolani Extension
Hilo, Hawai'i

July 2012

1.2.2 Regulatory Records

MNA examined government records with respect to environmental conditions, citations, complaints, and permits at the subject property, at adjoining properties, and within the surrounding area. MNA utilized a records search provided by FirstSearch Corporation to review records from the following federal and state programs.

- National Priorities List (NPL)
- Delisted NPL
- Resource Conservation and Recovery Act (RCRA) facilities that are undergoing "corrective action" (CORRACTS)
- RCRA-Treatment, Storage, & Disposal (TSD)
- Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- Federal Brownfields
- Solid Waste & Landfill
- Leaking Underground Storage Tank (LUST)
- RCRA-Violators/Enforcement
- Underground Storage Tank (UST)
- Emergency Response Notification System (ERNS)
- RCRA-Large Generator
- RCRA-Small Generator
- Hawai‘i Sites of Interest
- Hawai‘i Releases
- Hawai‘i Land Use Controls

Additionally, MNA reviewed state environmental databases and case files from the Hawai‘i Department of Health (HDOH), County of Hawai‘i Fire Department, and Hawaiian Electric Light Company (HELCO).

1.2.3 Site Reconnaissance

MNA performed a site reconnaissance to obtain information indicating the likelihood of contamination, to interview available site personnel, and to conduct a brief assessment of the adjoining properties. During the site reconnaissance, MNA looked for a variety of indicators of environmental hazards including, but not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, aboveground and underground storage tanks, disposal areas, groundwater wells, drywells, and sumps. Sampling and testing of soil and groundwater were not part of this assessment.

1.2.4 Site Geology and Hydrogeology

MNA reviewed published information for the property and surrounding area on surface and subsurface conditions such as topography, drainage, surface water bodies, subsurface geology, and

groundwater. MNA used this information to assess the potential for migration and impact of the subject property by releases of hazardous substances or petroleum products at off-site properties.

1.2.5 Data Evaluation and Reporting

MNA evaluated the information collected, and prepared this report as part of the assessment. Section 2 presents the site background information; Section 3 user provided information; Section 4 information collected from records review; Section 5 site reconnaissance; Section 6 interviews; Section 7 data gaps; Section 8 key findings and opinion; and Section 9 conclusion.

1.3 SIGNIFICANT ASSUMPTIONS

The conclusion presented in this report is based upon the assumption that reasonably ascertainable and relevant information pertaining to the environmental condition of the subject property was made available to MNA during the assessment. Information obtained from government agencies and other resources is presumed to be accurate and updated. Additionally, information collected in interviews is collected in "good faith" and believed to be true and accurate to the best knowledge of the interviewee.

1.4 LIMITATIONS AND EXCEPTIONS

The Phase I ESA provides a "snapshot" of the property conditions at the time of the assessment. Findings, opinions, and conclusions apply to property conditions existing at the time of the investigation and those reasonably foreseeable. They do not apply to conditions at, or changes to, the property, of which MNA is not aware, could not reasonably be aware, and has not had the opportunity to evaluate.

This report is based upon visual observations of the property and vicinity, interpretation of the available historical and regulatory information and documents reviewed, and interviews of individuals with knowledge of the subject or surrounding property. MNA cannot ensure the accuracy of the historical or regulatory information. This report is intended exclusively for the purpose outlined and applies only to the subject property.

This Phase I ESA excludes asbestos, lead paint, and investigation of geotechnical concerns. No surface or subsurface sampling was involved.

1.5 SPECIAL TERMS AND CONDITIONS

This Phase I ESA was conducted and prepared by MNA for the exclusive use of Geometrician Associates LLC and the County of Hawai'i Department of Public Works. This report shall not be relied upon or transferred to any other party without written authorization from Geometrician Associates LLC and County of Hawai'i Department of Public Works.

1.6 USER RELIANCE

This report is an instrument of service of MNA, which summarizes its findings and opinions with respect to *recognized environmental conditions* at the subject property. Findings and opinions are predicated on information that MNA obtained on the dates and from individuals stated

herein, from public records reviewed, a site reconnaissance, and ancillary Phase I ESA activities. This assessment relies upon the accuracy and completeness of the information provided. The information obtained for this assessment is used without extraordinary verification. It is possible that other information exists and is discovered, or environmental conditions change subsequent to submittal of this Phase I ESA report, to which MNA shall not be held responsible for exclusion.

2.0 SITE DESCRIPTION

This section contains location and legal description; site and vicinity general characteristics; current subject property use; structures, roads, and other improvements; past subject property use; and current and past use of adjoining properties.

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property is comprised of portions of three TMK. The subject property is located in the city of Hilo on the County of Hawai'i, State of Hawai'i. County tax records indicate the property zoning as residential. According to the County of Hawai'i tax record, TMK [3] 2-4-001:024 consists of 35.11 acres of land, TMK [3] 2-4-001:019 consists of 33.09 acres of land, and TMK [3] 2-4-056:014 consists of 7.52 acres of land (County of Hawai‘i, 2012). This subject property of this Phase I ESA is a 2.00-acre portion of these three TMK. Approximately 0.50 acre is located on the north end of [3] 2-4-001:024. Approximately 0.25 acre is located on the center of 2-4-001:019, and approximately 1.25 acre is located on the south end of 2-4-056:014. An area map is presented in Figure 2.

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

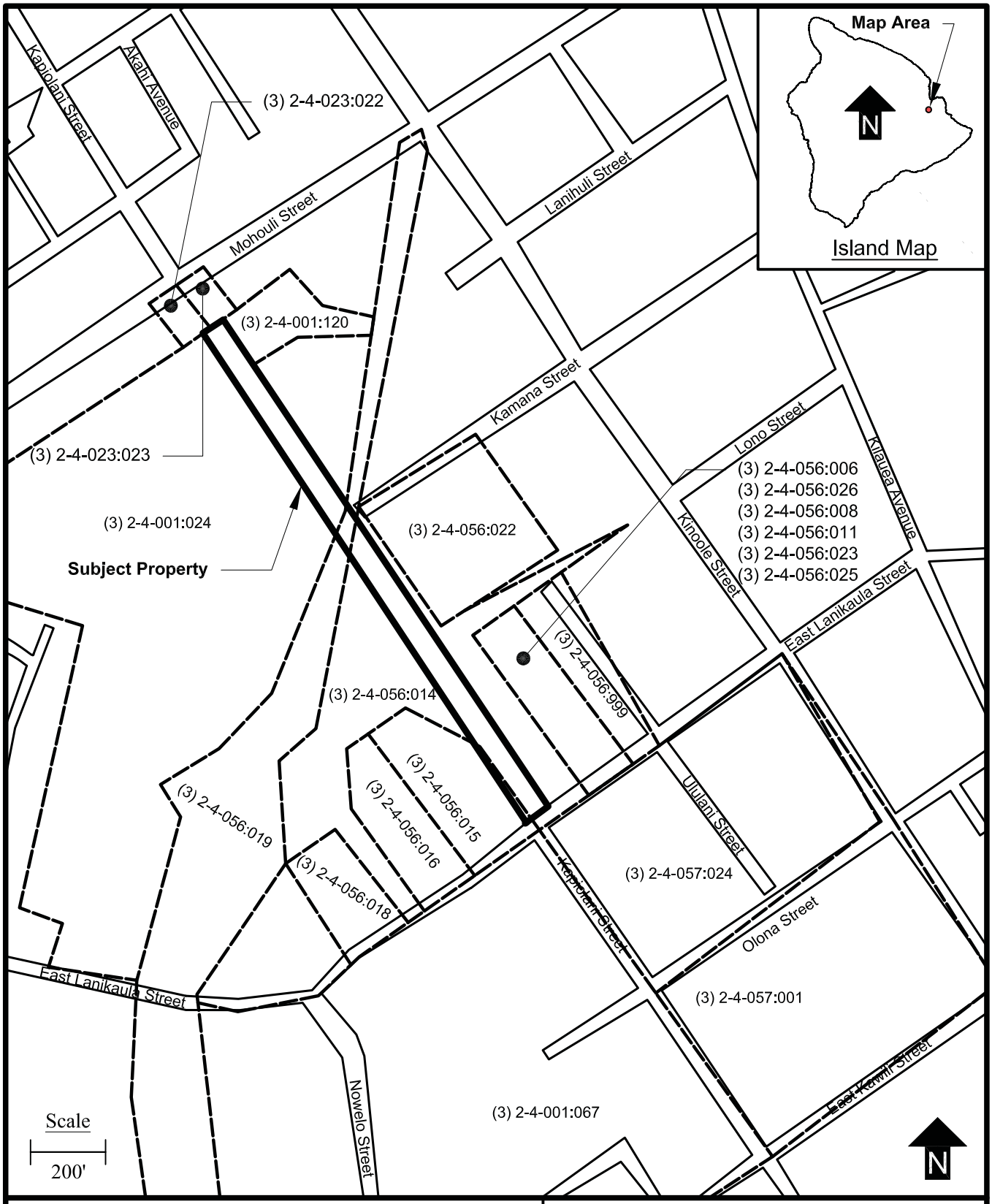
The subject property is located in Hilo and is approximately one half mile southwest of Waiakea Pond, and one mile southwest of Hilo Bay. The subject property is surrounded by residential areas and is moderately vegetated.

2.2.1 Geology

The Island of Hawai‘i is of volcanic origin and was built by the Kohala, Mauna Kea, Mauna Loa, Kīlauea, and Hualālai volcanoes. The island is comprised of numerous thin, extremely permeable tholeiitic basalt lava flows (Stearns, 1985).

Hawai‘i, the youngest and largest Hawaiian Island, is larger than all the other Hawaiian islands combined. In 1996, Hazlett and Hyndman described the island as follows:

> It sprawls over an area the size of Connecticut, spanning 90 miles from north to south and 80 miles from east to west. Five large volcanoes coalesce to make the visible part of the Big Island; a sixth lies buried beneath the surface. The southern part of the island is still volcanically active and building out along much of the coastline. To the north, volcanism is in the waning stages. Of all the Hawaiian Islands, the Big Island shows the greatest diversity of rocks and landscapes (Hazlett & Hyndman, 1996).



Legend and Notes:

TMK Boundary

Figure 2. Project Area Map
Phase I Environmental Site Assessment Report
Kapiolani Extension

July 2012

Myounghee Noh & Associates, L.L.C.

31360

The subject property is located on the lower southeastern slopes of the Mauna Loa volcano. The Mauna Loa volcano is the second youngest of the five Hawaiian volcanoes and is an active volcano. The Mauna Loa volcano is the largest volcano on the Island of Hawai‘i and makes up 50.5% of the land area of the island. The Mauna Loa volcano is a shield volcano and has a summit elevation of 13,777 feet (Morgan, 1996). The volcano is composed of Ka‘u Basalt (Mink & Lau, 1990).

In 1990, Mink and Lau described the geology in the vicinity of the subject property as follows:

> Virtually the entire region is covered with pre-historic lavas of the Ka‘u Basalt, onto which long tongues of historic lavas from the northeast rift have flowed. Other than scanty recent alluvium, no sediments occur (Mink & Lau, Technical Report No. 191: Aquifer Identification and Classification for Hawai‘i: Groundwater Protection Strategy for Hawai'i, 1990).

The United States Department of Agriculture Natural Resources Conservation Service classifies the soil at the subject properties as Olaa extremely stony silty clay loam (OID), 0 to 20 percent slopes, Keaukaha extremely rocky muck (rKFD), 6 to 20 percent slopes, and Papai extremely stony muck (rPAE), 3 to 25 percent slopes.

Olaa extremely stony silty clay loam soil type is described as extremely stony silty clay loam from 0 to 25 inches and extremely cobbly material from 25 to 35 inches. Keaukaha extremely rocky muck soil type is described as bedrock from 0 to 60 inches. Papai extremely stony muck soil type is described as extremely stony muck from 0 to 8 inches, and from 8 to 60 inches, extremely cobbly material. All soils are described as well drained with no flooding or ponding (United States Department of Agriculture, 2012).

2.2.2 Hydrogeology

The HDOH Safe Drinking Water Branch has established an Underground Injection Control (UIC) line to serve as a boundary between drinking water and non-drinking water portions of aquifers. Areas above (mountain side) the UIC line are within drinking water portions of the aquifer, while areas below (ocean side) the UIC are in non-drinking water portions of the underlying aquifer. The subject property is above the UIC in a drinking water portion of the aquifer (Hawai'i Department of Health Safe Drinking Water Branch, 1999).

The hydraulic gradient of the basal groundwater within the basaltic formation is, in general, from mountain areas to the shoreline. According to the Mink and Lau Technical Report #191, published by the University of Hawai‘i, Water Resources Research Center, the subject property is located above Hilo aquifer. In 1992, Mink and Lau described the hydrogeology and aquifer as follows:

> Average annual rainfall starts at 120 inches at the coast, increases to a maximum of 300 inches, then decays to 20 inches on the upper slopes of Mauna Loa. Despite the extraordinary rainfall, perennial streams do not exist south of Wailuku River. Rain easily infiltrates into the permeable basalt.

> A voluminous basal lens extends at least 4 miles inland of the coast, beyond which high-level water has been encountered. Toward the rift zone dike-impounded high-level water probably occurs. Elsewhere the high-level water is likely to be perched. The flux of groundwater in the basal lens is enormous; the fresh water springs at Hilo-Waiakea have been measured at 150 million gallons per day. The gradient is about 5 feet per mile, and the permeability of the basalt is probably at least 5,000 feet (Mink & Lau, 1990)

Information for the Hilo aquifer is provided in Table 1 (Mink & Lau, 1990).

Table 1. Upper Aquifer Classification System

Aquifer Code	**80401111**
Island Code	8–Hawai‘i
Aquifer Sector	04–Northeast Mauna Loa
Aquifer System	01–Hilo
Aquifer Type, hydrogeology	1–Basal
Aquifer Condition	1–Unconfined
Aquifer Type, geology	1–Flank, Horizontally extensive lavas
Status Code	**11111**
Development Stage	1–Currently used
Utility	1–Drinking
Salinity (in mg/L Cl^-)	1–Fresh (<250)
Uniqueness	1–Irreplaceable
Vulnerability to Contamination	1–High

mg/L Cl^--milligrams per liter of chloride

2.3 CURRENT USE OF THE SUBJECT PROPERTY

At the time of the Phase I ESA, the subject property was undeveloped and unoccupied. The subject property was moderately vegetated and unused.

2.4 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS

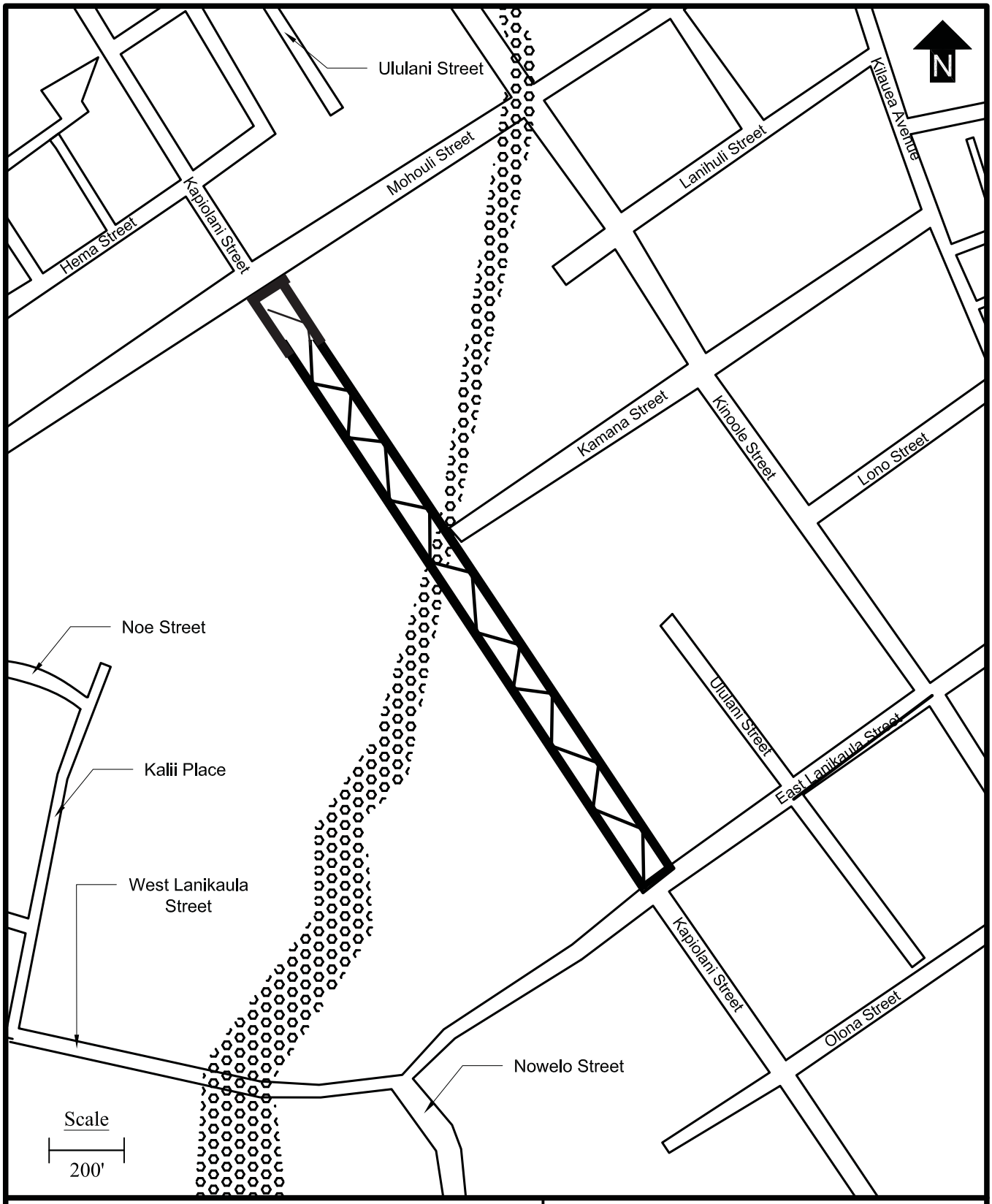
There were no structures on the subject property. The County of Hawai’i DPW Flood Control Ditch runs north to south through the center of the subject property. Kapiolani Street, a two-way paved road, dead ends at the northwest end of the subject property. The southeast end of the subject property is at the intersection with West Lanikaula Street and the continuation of Kapiolani Street. An aerial site map is presented in Figure 3.

2.5 PAST USES OF THE SUBJECT PROPERTIES

Information regarding past uses of the subject property was obtained from a review of tax records (County of Hawai‘i, 2012), historic topographic maps, historic aerial photographs (FirstSearch Technology Corporation, 2012), user provided information, and interviews. Table 2 summarizes the information available regarding the historical use and users of the subject property.

Table 2. Users and Primary Uses of Subject Properties [**2-4-056:014, 2-4-001:019 and 024]**

Period (approx.)	**Owner/Property User**	**Area acres**	**Primary Use**
TMK (3) 2-4-056:014, 600 Lanikaula Street			
2006-2012	State of Hawaii Total area was changed to 7.521 acres due to mapping change.	7.521	Undeveloped
1987-2006	State of Hawaii, Veronica L. Willams, and Lawrence A. Horstmanshoff	12.622	Undeveloped
1962-1987	State of Hawaii, Yotsuo Fuke, and Sakea Fuke	12.622	Undeveloped
1953-1962	Territory of Hawaii	19.60	Undeveloped
TMK (3) 2-4-001:019, No address was found.			
1965-2012	State of Hawaii	33.087	Undeveloped (stream)
TMK (3) 2-4-001:024, 590 Kapiolani Street			
2010-2012	State of Hawaii Total area was changed to 35.111 acres due to mapping change.	35.111	Undeveloped
2009-2010	State of Hawaii Total area was changed to 38.334 acres due to mapping change.	38.334	Undeveloped
1999-2009	State of Hawaii Total area was changed to 39.1060 acres due to mapping change.	39.1060	Undeveloped
1972-1999	State of Hawaii Total area was changed to 39.4560 acres due to mapping change.	39.4560	Undeveloped
1966-1972	State of Hawaii	35.002	Undeveloped



Legend and Notes:

Subject Property

Approximate Path Walked

Flood Control Ditch

Myounghee Noh & Associates, L.L.C.

31360

Figure 3. Aerial Site Map
Phase I Environmental Site Assessment Report
Kapiolani Extension
Hilo, Hawai'i
July 2012

2.6 CURRENT AND PAST USES OF ADJOINING PROPERTIES

Information regarding past uses of the adjoining properties was obtained from review of tax records (County of Hawai‘i, 2012), historic topographic maps (FirstSearch Technology Corporation, 2012), historic aerial photographs (FirstSearch Technology Corporation, 2012), user provided information, and interviews. The property use information is summarized in Table 3.

Table 3. Users and Primary Uses of Adjoining Properties

Period (approx.)	Owner/Property User	Area (acres)	Primary Features/Uses
TMK (3) 2-4-056:015, 300 W. Lanikaula Street Adjoining property to the southeast			
2010-2012	Island of Hawaii YMCA and Waiakea Uka Bible Church Total area was changed to 1.85 acres due to mapping change.	1.85	YMCA Buildings
1988-2010	Island of Hawaii YMCA and Waiakea Uka Bible Church	3.70	YMCA Buildings
1963-1988	Island of Hawaii YMCA	3.70	YMCA Buildings
TMK (3) 2-4-056:016, 360 W. Lanikaula Street Adjoining property to the southeast			
1962-2012	United States of America	3.7	Office
TMK (3) 2-4-056:018, 440 W. Lanikaula Street Adjoining property to the southeast			
1987-2012	Church of the Holy Cross	3.002	Church
-1987	No information was found	----	----
TMK (3) 2-4-057:024, 1367 Kapiolani Street Adjoining property to the southeast			
2006-2012	Andrew Shigeru Talbot, Terence Shigeru Yamamoto, Joan Kazuko Hosaka, Grant Akira Talbot, and Laura Mariko Talbot	0.4028	Residential
1998-2006	Katsumi Yamamoto Trust, Mildred Yamamoto Trust, Terence Shigeru Yamamoto, and Joan Kazuko Hosaka	0.4028	Residential
1979-1998	Katsumi Yamamoto Trust, Mildred Yamamoto Trust, and Terence Shigeru Yamamoto	0.4028	Residential

Period (approx.)	Owner/Property User	Area (acres)	Primary Features/Uses
1951-1979	Katami Yamamoto and Fujiko Yamamoto	0.4028	Residential
TMK (3) 2-4-057:001, 1430 Ululani Street Adjoining property to the east			
2011-2012	State of Hawaii Total area was changed to 0.106 acre due to mapping change.	0.106	Apartment
2010-2011	State of Hawaii Total area was changed to 0.7546 acre due to mapping change.	0.7546	Apartment
2009-2010	State of Hawaii Total area was changed to 0.8740 acre due to mapping change.	0.8740	Apartment
2006-2009	State of Hawaii Total area was changed to 0.9920 acre due to mapping change.	0.9920	Apartment
2002-2006	Hawaii electric Light Company, Inc. Total area was changed to 4.69 acres due to mapping change.	10.30	Apartment
1998-2002	State of Hawaii	11.126	Apartment
1988-1998	State of Hawaii Constructors Hawaii, Inc.	11.126	Switch station
1962-1988	State of Hawaii	11.126	Switch station
TMK (3) 2-4-001:167, 200 W. Kawili Street Adjoining property to the east			
2010-2012	State of Hawaii Total area was changed to 101.079 acres due to mapping change.	101.079	UH-Hilo Buildings
2005-2010	State of Hawaii Total area was changed to 95.164 acres due to mapping change.	95.1640	UH-Hilo Buildings
1998-2005	State of Hawaii	36.0880	UH-Hilo Buildings
1963-1998	State of Hawaii	----	UH-Hilo Buildings
TMK (3) 2-4-056:006, 226 W. Lanikaula Street Adjoining property to the east			
1994-2012	Lloyd K. Suyama	0.3134	Residential
1987-1994	Lloyd K. Suyama and Kimi Suyama	0.3134	Residential

Period (approx.)	Owner/Property User	Area (acres)	Primary Features/Uses
1967-1987	Hajimi Suyama and Kimi Suyama	0.3134	Residential
1951-1967	Kenji Kamo	0.3134	Residential
TMK (3) 2-4-056:026, 1328 Ululani Street Adjoining property to the east			
1996-2012	Darren T. Tagawa and Cyd Y Tagawa	0.2645	Residential
1992-1993	Jack Tagawa, Eloise Tagawa, Darren T. Tagawa, and Cyd Y Tagawa	0.2645	Residential
-1992	No information was found	----	----
TMK (3) 2-4-056:008, 1322 Ululani Street Adjoining property to the east			
2008-2012	Harumi Takahashi, Demmos Takahashi, Leslie Takahasi, Charlene Sorares, and Pauline Toshie Taknaka	0.9034	Residential
1956-2008	Toshimasa Takahashi and Harumi Takahashi	0.9034	Residential
TMK (3) 2-4-056:011, 1322 A Ululani Street Adjoining property to the east			
2008-2012	Harumi Takahashi, Demmos Takahashi, Leslie Shizuo Takahasi, Charlene Sorares, and Pauline Toshie Taknaka	0.2755	Residential
1955-2008	Toshimasa Takahashi and Harumi Takahashi	0.2755	Residential
TMK (3) 2-4-056:023, 1302 Ululani Street Adjoining property to the east			
2003-2012	Richard Tanimoto and Todd Tanimoto	0.3031	Residential
1999-2003	Richard Tanimoto	0.3031	Residential
1998-1999	Richard Tanimoto and So-young Kang	0.3031	Residential
1995-1998	Takeyuki Miyamura, Melvin Miyamura, Clyde Miyamura, Martle Miyamura, and Ann Miyamura	0.3031	Residential
1984-1995	Takeyuki Miyamura	0.3031	Residential
-1984	No information was found	----	----
TMK (3) 2-4-056:025, 1292 A Ululani Street Adjoining property to the east			
2008-2012	John Hamilton	0.2335	Residential

Period (approx.)	Owner/Property User	Area (acres)	Primary Features/Uses
2003-2008	John Hamilton and Ginger Hamilton	0.2335	Residential
1990-2003	Charles Ryan Sugiyama	0.2335	Residential
-1990	No information was found	----	----
TMK (3) 2-4-056:022, 688 Kinoole Street Adjoining property to the east			
1997-2012	State of Hawaii and Kamana, Inc.	7.159	Residential
1980-1997	State of Hawaii and Big Island HSNG Foundation	7.159	Residential
-1980	No information was found	----	----
TMK (3) 2-4-001:120, 595 Kapiolani Street Adjoining property to the east			
1967-2012	State of Hawaii and Christ Lutheran Church of Hilo	3.101	Church
TMK (3) 2-4-023:022, 237 Mohouli Street Adjoining property to the north			
2003-2012	Jutaro Usagawa Trust	0.3554	Residential
1957-2003	Jutaro Usagawa and Takiko Usagawa	0.3554	Residential
TMK (3) 2-4-023:023, 223 Mohouli Street Adjoining property to the north			
2003-2012	Sean Peter Botbyl	0.3237	Residential
1993-2003	Edmund nakano	0.3237	Residential
1955-1993	Torao Nakano and Edmund Nakano	0.3237	Residential

TMK - Tax Map Key

3.0 USER PROVIDED INFORMATION

User provided information was obtained by having the user of the Phase I ESA, State of Hawai'i Department of Land and Natural Resources (DNLR) Land Division, complete a "User Questionnaire" administered by MNA. The user questionnaire was completed by Gordon Heit, of State of Hawai'i DLNR Land Division. The information in the following sections was obtained from the questionnaire.

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

DLNR is unaware of any environmental cleanup liens or use limitations for the subject property.

3.2 SPECIALIZED KNOWLEDGE

DLNR has no specialized knowledge regarding the use of chemicals or processes, or otherwise, on the subject property.

3.3 VALUATION REDUCTION

The area of land referred to as the subject property is being transferred from State of Hawai'i to County of Hawai'i for the Kapiolani Street extension. There will be no purchase of land, or commercial transaction.

3.4 REASON FOR PERFORMING THE PHASE I ESA

The purpose of this Phase I ESA is to identify any *recognized environmental conditions* (RECs) at the subject property, within the scope of ASTM Standard 1527-05, to satisfy County of Hawai'i DPW due diligence efforts prior to accepting the set aside property.

4.0 RECORDS REVIEW

Under ASTM 1527-05, records are to be reviewed by the environmental professional that may help identify RECs in connection with the subject properties.

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

MNA used Environmental FirstSearch to search standard federal and state government databases for hazardous substance or petroleum product releases that could impact the subject properties. A copy of the report is provided in Appendix A.

ASTM E 1527-05 specifies a minimum search distance for specific environmental record sources. The following sources are specified for <u>incidents or sites within one mile of the subject properties</u>:

- Federal NPL site list;
- Federal RCRA CORRACTS TSD facilities list; and
- State Sites of Interest.

The following sources are specified for <u>incidents or sites within ½ mile of the subject properties</u>:

- Federal Delisted NPL site list;
- Federal CERCLIS list;
- Federal CERCLIS NFRAP site list;
- Federal RCRA non-CORRACTS TSD facilities list;
- State Brownfield Sites;
- State landfill and/or solid waste disposal site list;
- State leaking UST list; and
- State voluntary cleanup program sites.

The following sources are for incidents on the subject and adjoining properties:

- Federal RCRA generators list; and
- State registered UST list.

Finally, the following are for incidents for the subject properties:

- Federal ERNS list;
- Federal Institutional Controls (IC) and Engineering (EC) Registries;
- State IC and EC Registries; and
- State releases list.

The following subsections summarize the results of the Environmental FirstSearch records review for the datasets enumerated above (FirstSearch Technology Corporation, 2012)

4.1.1 Federal National Priorities List

The NPL, maintained by the United States Environmental Protection Agency (EPA), is a list of highly contaminated sites that have been identified by Superfund. There were no NPL sites identified within 1 mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.1.2 Federal RCRA CORRACTS TSD Facilities List

The RCRA CORRACTS TSD facilities list maintained by the EPA contains generators, transporters, treaters, storers, and disposers of hazardous waste that have reported violations and are subject to corrective actions. No RCRA CORRACTS TSD facilities were identified within 1 mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.3 State Sites of Interest

The State Sites of Interest List, maintained by the HDOH Office of Hazard Evaluation and Emergency Response (HEER Office), contains facilities, sites, or areas in which the HEER Office has an interest, or has, or may investigate. This list includes CERCLIS sites. Environmental FirstSearch™ identified 20 State Sites of Interest within 1 mile of the subject property (FirstSearch Technology Corporation, 2012). Table 6 provides a summary for those 20 sites.

Six sites were located with one half mile of the subject property. Four of those sites were issued a No Further Action (NFA) letter. Two of the six sites located within the half mile distance were listed as site status as ongoing in the Environmental FirstSearch™ report.

Hilo Quality Washerette site status was listed as one of the ongoing in the Environmental FirstSearch™ report due to institutional controls implemented to manage the hazard onsite. The hazard priority was listed as low. This site was listed as located at 210 Hoku Street approximately 2,270 feet northwest. After further research on the County Real Property Tax website and Google Earth, it was discovered that the owners address was listed as 210 Hoku and

the actual physical address of the State Site of Interest was located at 202 Hoku Street, which is approximately 50 feet further from the subject property.

The University of Hawai'i at Hilo Auto Shop located at 200 West Kawili Street was also listed as ongoing environmental interest. The Environmental FirstSearch™ report was last updated July 24, 2008. No other updates were listed after this time.

Of the 11 sites within one mile, seven sites were issued a NFA letter. One site was listed as inactive, and the other three sites were listed as ongoing was most likely due to the fact that the Environmental FirstSearch™ report for these sites was last updated prior to 2010. Three non-geocoded locations were identified. The Hilo Bay Front Soccer Field was listed as a Closed Environmental Investigation, and the site was referred to FEMA and County of Hawaii for follow-up. Hilo Judiciary Center Project was located on Kilauea Avenue and received a NFA letter. Hilo Safeway/Target, located at Makaala Street & Railroad Avenue, was listed as ongoing because of the presence of a hazard. The site was listed as high priority status and was updated March 10, 2010. No other information was provided, however, the Enviornmental FirstSearch™ report refers to the lead agency responsible for this site as the HEER Office.

Table 6. State Sites of Interest

Site	Relative Location (feet)[1]	Address	Status
University of Hawaii-Hilo Auto Shop	1,003 SE	200 W. Kawili Street	Ongoing
Sun Sun Lau Chop Suey House	1,690 NE	1055 Kinoole Street	NFA
Forest Service Pacific Southwest Experiment Station	2,218 SE	1643 Kilauea Avenue	NFA
Hilo Quality Washerette	2,270 NW	210 Hoku Street	Ongoing
Hilo Shopping Center	2,323 NE	1255 Kilauea Avenue	NFA
Hilo Quality Cleaners	2,376 NW	865 Kinoole Street	NFA
Larry S. Kaikoo Chevron	2,957 NE	835 Kilauea Avenue	NFA
Hilo Macaroni Factory	3,221 NW	639 Kinoole Street	NFA
Exempt UST Closure at Excelsior Diary	3,590 NE	458 Kekuanaoa Street	NFA
Hilo Soda Works Tank Closure	3,749 SE	270 E. Kawili Street	NFA
Hadata Bakery (Former)	3,802 NW	55 Kukuau Street	Inactive
Hilo Arsenic	4,066 NW	33 Liliuokalani Lane	Ongoing
Hilo Arsenic	4,066 NW	33 Liliuokalani Lane	Ongoing EI with LUC
Hilo Mechanical, Inc.	4,488 SE	50 Holomua Street	NFA
Roberts Bakery Boiler UST Removal	4,594 NW	374 Kinoole Street	NFA
Bayside Chevron Service	4,752 NE	774 Kamehameha Avenue	NFA
Hawaii Pest Control	5,016 SE	56 Wiwoole Street	Ongoing
Hilo Bay Front Soccer Field	Non-GC	Kamehameha Avenue & Ponahawai Street	Closed EI - Site Referred
Hilo Judiciary Center Project	Non-GC	Kilauea Avenue	NFA
Hilo Safeway/Target	Non-GC	Makaala Street & Railroad Avenue	Ongoing

[1]Relative locations are based on a geocoded street address for the site and do not reflect the closest distance between the subject property and the site.
Non-GC - Non-geocoded EI – Environmental Investigation

NFA - No Further Action LUC – Land Use Controls

4.1.4 Delisted NPL Site List

The delisted NPL site list, maintained by the EPA, contains delisted NPL sites. No delisted NPL sites were identified within ½ mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.1.5 Federal CERCLIS List

The CERCLIS list, maintained by the EPA, contains sites that are either proposed to be or are on the NPL list, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. No CERCLIS sites were specifically identified within ½ mile of the subject property; however, one site was identified as Kilauea Volcano Air Monitoring within the Hilo zip code. No details were provided in the FirstSearch Report, but on February 27, 2012, the status was documented as Not Proposed (FirstSearch Technology Corporation, 2012).

4.1.6 Federal CERCLIS NFRAP Site List

The CERCLIS NFRAP list, maintained by the EPA, contains designated CERCLA sites that, to the best of the EPA's knowledge, assessment has been completed and has determined that no further steps will be taken to list the sites on the NPL. One CERCLIS NFRAP site was identified within ½ mile of the subject property. The site was identified as the USDA Forest Service Pacific Southwest (PSW) Experiment Station located 1643 Kilauea Avenue in Hilo. The status was last updated on February 27, 2012, as No Further Remedial Action Planned. One other site was identified in the FirstSearch report as the Hilo Rubbish Dump. The record list the facility within the Hilo zip code on Leilani Street, but no specific address was listed. The closest distance from Leilani Street to the subject site was just over one half mile to the east (FirstSearch Technology Corporation, 2012).

4.1.7 Federal RCRA non-CORRACTS TSD facilities list

The RCRA non-CORRACTS TSD facilities list, maintained by the EPA, contains RCRA permitted facilities that treat, store, or dispose of hazardous waste. No RCRA TSD facilities listed were identified within ½ mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.1.8 State Brownfield Sites

The State Brownfield Sites database, maintained by the HDOH HEER Office, is an inventory of state designated brownfield sites. Under the Small Business Liability Relief and Brownfields Revitalization Act, a brownfield is defined as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." The EPA provides grants and loans to state and local governments for the assessment, cleanup, and redevelopment of these properties. Properties located on the state brownfield list may have received federal funding under this program or be designated a brownfield for state administration or funding purposes. No state brownfield sites were identified within ½ mile of the subject property; however, one state brownfield site was

identified within the Hilo zip code. The site was identified as the Hilo Rubbish Dump, located on Leilani Street. The closest distance from the subject site to end point of Leilani Street was over one half mile to the east (FirstSearch Technology Corporation, 2012).

4.1.9 State Landfill/Solid Waste Disposal Sites

The HDOH records contain an inventory of permitted landfills in the State of Hawai'i. No permitted solid waste landfills, incinerators, or transfer stations were identified within ½ mile of the subject property (FirstSearch Technology Corporation, 2012).

4.1.10 State LUST List

The state LUST list, maintained by the HDOH Solid and Hazardous Waste Branch (SHWB), maintains an inventory of sites with LUSTs. Environmental FirstSearch™ Report identified eight LUST facilities within ½ mile of the subject properties. Table 7 provides a summary for the eight sites within one mile of the subject properties.

Of the eight sites, seven were listed as having completed site cleanups and were issued NFA letters. The eighth site was documented as having a disconfirmed release. All eight facilities were over 1,000 feet away.

In addition, three LUST facilities were located within the Hilo zip code. Hilo Central Office was listed as non-geocoded, however, with the address 161 Kinoole Street which is located approximately 5,545 feet north. The listing documented a confirmed release; however, no details were provided in the FirstSearch Report. University of Hawaii 88 Telescope was listed under the address Mauna Kea Summit. A site cleanup was completed and a NFA letter was issued. The final non-geocoded LUST site identified by the FirstSearch report was Yamada Transfer, Inc., located at 573 Lanikaula Street. The site is approximately 2,311 feet east of the subject site and was listed as implementing Monitored Natural Attenuation (FirstSearch Technology Corporation, 2012).

Table 7. State Registered LUST Facilities

Site	Relative Location (feet)[1]	Address	Status
University of Hawaii at Hilo	1,003 SE	200 W Kawili Street	SCC
Hilo Radiator & Glass	1,214 SE	1335 Kinoole Street	SCC
Fairway Service Station	1,954 NE	1260 Kilauea Avenue	SCC
Duke S. Kilauea Shell	2,112 NE	1104 Kilauea Avenue	SCC
Pacific Rent-All, Inc.	2,165 NE	1080 Kilauea Avenue	SCC
Hilo Quality Cleaners	2,376 NW	865 Kinoole Street	SCC
Division of Forestry & Wildlife	2,376 S	19 E. Kawili Street	Disconfirmed Release
Kilauea 76	2,534 SE	1698 Kilauea Avenue	SCC
Hilo Central Office	Non-GC	161 Kinoole Street	Confirmed Release
University of Hawaii 88 Telescope	Non-GC	Mauna Kea Summit	SCC

Site	Relative Location (feet)[1]	Address	Status
Yamada Transfer, Inc.	Non-GC	2110 Auiki St.	MNA

[1]Relative locations are based on a geocoded street address for the site and do not reflect the closest distance between the subject property and the site.
Non-GC – Non-geocoded SCC-Site Cleanup Completed MNA-Monitored Natural Attenuation

4.1.11 State Voluntary Cleanup Sites

The state voluntary cleanup sites list, maintained by the HDOH HEER Office, contains sites participating in the state's Voluntary Response Program. No facilities participating in the state Voluntary Response Program were identified within ½ mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.1.12 Federal RCRA Generators List

The RCRA Generators list, maintained by the EPA, contains small and large quantity generators of RCRA hazardous waste. The determination of generator size is used to establish the risk that the facility poses to public health and the environment and consequently, the amount of regulation and reporting required. Large Quantity Generators (LQG) are facilities that generate more than a 1,000 kg/month of hazardous waste and/or more than 1 kg/month of acute hazardous waste. Small Quantity Generators (SQG) are facilities that generate less than 1,000 kg/month but more than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste. Conditionally Exempt Small Quantity Generators (CESQG) are facilities that generate less than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste. The EPA also maintains the RCRA No Longer Regulated (NLR) list. This list contains facilities that were once on the RCRA generators list but are no longer in business at the listed address, or are no longer generating hazardous waste substances in quantities that require reporting. One CESQG was identified as the University of Hawaii at Hilo, located at 200 W. Kawili Street approximately 1,003 feet southeast of the subject site. According to the FirstSearch Report, which was last updated on January 10, 2012, all citations have been resolved (FirstSearch Technology Corporation, 2012).

4.1.13 Federal ICs and ECs Registries

Federal ICs and ECs sites are federally listed sites that have either an IC or EC. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land use controls can be either ICs or ECs. Institutional controls are limitations on how the property may be used such as limiting use to industrial activities. Engineering controls are physical structures or devices located on the property that contain or limit exposure to contamination. Engineering controls need to be maintained or protected to be effective. No Federal ICs or ECs were identified within ¼ mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.1.14 State ICs and ECs Registries

These sites are federally listed sites that have either an industrial controls or engineering controls. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land Use Controls can be either ICs or ECs. Institutional controls are limitations on how the property may be used such as limiting use to industrial activities. Engineering controls are physical structures or devices located on the property that contain or limit exposure to contamination. Engineering controls need to be maintained or protected to be effective. No sites within ¼ mile of the subject properties were listed in this database (FirstSearch Technology Corporation, 2012).

4.1.15 State Registered UST List

The HDOH SHWB maintains a database of registered USTs. Environmental FirstSearch™ identified two UST facilities within ¼ mile of the subject properties. Table 9 provides summary data for these facilities. All UST facilities over 1,000 feet away and were permanently out of use, except for the University of Hawaii at Hilo, which was located approximately 1,003 feet southeast of the subject site at 200 W Kawili Street and has one UST that was temporarily out of use.

Hilo Baseyard, located at 565 Lanikaula, approximately 6,293 feet east of the subject site, was listed as non-geocoded. The facility was reported as permanently out of use on August 10, 1998. Kui & I of Hilo Florist was identified as being located on Kinoole Street; however, the closest distance to Kinoole Street is over 1,000 feet east of the subject site. The facility was also listed as permanently out of use, and the report was last updated on December 15, 2011. The final non-geocoded UST site identified by the FirstSearch report was Yamada Transfer, Inc., located at 573 Lanikaula Street. The site is approximately 2,311 feet east of the subject site and was listed as permanently out of use (FirstSearch Technology Corporation, 2012).

Table 9. State Registered UST Facilities

Site	Relative Location (feet)[1]	Address	Status
University of Hawaii at Hilo	1,003 SE	200 W Kawili Street	1-Used Oil, Temporarily out of use 2-Diesel, out of use 1-Gasoline, out of use 2-Kerosene, out of use 3-Used Oil, out of use
Hilo Radiator & Glass	1,214 SE	1335 Kinoole Street	2-Gasoline, out of use
Hilo Baseyard	Non- GC	565 Lanikaula Street	1-Gasoline, out of use
Kui & I of Hilo Florist	Non- GC	Kinoole Street	1-Unlisted, out of use
Yamada Transfer, Inc.	Non- GC	573 Lanikaula Street	1-Diesel, out of use 1-Gasoline, out of use

Non-GC - Non-geocoded

4.1.16 Federal ERNS List

The ERNS list, maintained by the EPA, contains CERCLA hazardous substance releases or spills, as maintained at the National Response Center. No incidents were identified on the subject properties (FirstSearch Technology Corporation, 2012).

4.1.17 State Releases List

The HDOH HEER Office maintains a database of known releases to the environment of hazardous material or petroleum products. No release incidents were identified within ⅛ mile of the subject properties (FirstSearch Technology Corporation, 2012).

4.2 ADDITIONAL RECORD SOURCES

MNA reviewed additional record sources as needed and available. Additional record sources reviewed were obtained from the HDOH HEER Office and SHWB, the County of Hawai‘i Fire Department, and HELCO. Table 10 provides the information provided by HELCO in regards to transformers at or adjacent to the subject properties. Transformers were located at various parcels in the vicinity of the Kapiolani Street and Lanikaula Street intersection in Hilo. HELCO records indicated that there are five pole-mounted transformers in service, and there have been no transformer oil releases reported by HELCO at these locations.

Table 10. Transformers at or Adjacent to the Subject Properties

Vault/Pole Number	Transformer Number	Location	Date Purchased	Date Installed	PCB Status
10 KVA	40881	590 Kapiolani Street; TMK 2-4-001:024	07/11/2008	08/13/2008	PCB-free
10 KVA	33634	600 Lanikaula Street; TMK 2-4-056:014	06/28/2000	Unknown	PCB-free
25 KVA	38813		07/19/2006	08/15/2008	PCB-free
25 KVA	38904		07/26/2006	08/15/2008	PCB-free
25 KVA	38814		07/19/2006	08/15/2008	PCB-free

4.2.1 Subject Property

The HDOH HEER Office and SHWB identified no case files for the subject properties, which included TMK: 2-4-001:024, 2-4-001:019, and 2-4-056:014.

4.2.2 Surrounding Properties

Hilo Rubbish Dump was identified in the Environmental FirstSearch report at an unspecified location along Leilani Street. After reviewing the files provided by the HEER Office, the site was identified approximately 1.5 miles east of the subject properties, just south of Hilo Airport at TMK: 2-1-013:150. According to the records on file, a suspected release of metals in soils, and other dump related contaminants were presumed in one instance. In another instance, a small quantity spill of a hydrocarbon fuel (most likely diesel) was discovered, but because after monitoring it did not pose any concern about potential health effects, no further investigation was conducted. The Brownfield site, HID000606582, was issued a NFA letter on September 11,

2007. Because of the distance, low priority status, and inactivity of the site investigation, this is not a *REC*.

Hilo Quality Washerette – Approximately 0.50 mile northeast and down-gradient of the subject site, located at 210 Hoku Street and identified by TMK (3) 2-2-017:007. A release was discovered during routine fuel check of a 1,000-gallon diesel-UST in December 1995, a large quantity of fuel was lost due to corroded holes. According to the HDOH record, the tank was previously used for bunker fuel storage and the by-product from the combination of the two products caused the tank to breakdown; therefore, generating a leak. Approximately 88 cubic yards of soil were excavated, recovering an estimated 377 gallons, according to one record, but due to the infeasibility of excavating any additional impacted soil because of threat of compromising the structural integrity of the building onsite, no further remedial excavation was required or conducted. Since the UST, the source of the fuel, was removed, no further action was required as of January 1996, except for written follow-up because TPH-D levels were high and the extent of the contamination was unknown, in addition to the release occurring over a drinking water aquifer. The site status was still listed as ongoing, but the hazard priority was reduced to low from the medium category it was assigned in December 1996. The hazard was apparently managed with institutional controls, such as monitoring wells. This is not considered a *REC*.

Prince Kuhio Plaza Tank - One tank, estimated to be closed December 10, 1998, and removed from the ground, was identified at 111 East Puainako Street in Prince Kuhio Plaza. A site assessment was completed, and evidence of a leak was detected from a 300-gallon diesel UST installed in 1984. The facility ID No. is 9-603106. According to the records, the petroleum contamination was very low to "non-detectable" in all soil samples analyzed. Based on the information provided in a letter dated October 31, 2002, the SHWB concluded that no further action was necessary in response to the subject release. This is not a *REC*.

Hilo Arsenic Spill Site - Records were on file for the Hilo Arsenic Spill Site, Federal ID # HI0001290816, located at 33B Liliuokalani Lane and identified by TMK 2-2-008:039 and :021. The files indicated that on May 7, 1995, arsenic-containing liquid that had been stored under the home of the previous tenant onsite was dumped into the yard by the new tenant, who had poured the unknown contents of a 55-gallon drum on the ground. A site screening sheet, dated November 1, 1995, indicated that contamination of soil that posed a direct contact hazard, due to a release in an uncontrolled residential area was reported, and the priority category was considered medium to high. The groundwater was documented as Class A and is shallow, at 40 feet below ground surface. Also indicated was that the storm drain next to the spill area leads to the Waiakea Pond, which is a spawning area for many species of fish that are caught commercially.

Sampling was conducted, and while the results exceeded the action level standard, the hazard factor was considered low. Arsenic contaminated soils remain onsite. Contaminated soils were mixed with concrete and left in place. The institutional controls were to prohibit any activity that may disturb the integrity of the capping system. An Operations and Maintenance Manual was finalized and submitted for the site in May 1997. A NFA Letter, dated September 9, 1997, was issued for the site. Although the facility does have use restriction, this is not a *REC*.

Hilo Central Office, operating as Hawaiian Telcom, was located at 161 Kinoole Street and identified by TMK (3) 2-2-038:111. One 150-gallon diesel UST, installation date unknown, was

permanently out of use as of January 31, 1991. One 5,000-gallon diesel UST, installed on May 7, 1970, was permanently out of use as of December 20, 1990. Site assessments were completed for both of these tanks and no evidence of leaks were detected.

One 6,000-gallon diesel UST, which was installed December 1990, was currently in use. Site inspection indicated minor violation pertaining to a broken overfill prevention tube, which caused spill buckets to be filled with fuel product. As of February 12, 2008, the system was operational and working properly. A release from the tank piping was confirmed on March 08, 2011, according the Environmental FirstSearch Report. The facility ID and release ID numbers were 9-600563, and 110014, respectively. A letter, dated June 22, 2011, indicated that during the replacement of the existing fuel supply and return piping, it was noticed that the piping sump manhole and spill containment fill bucket were badly corroded and needed to be replaced. No signs of a release were observed at that time, and no other violations were found in the HDOH files. This is not a *REC*.

University of Hawaii – Hilo Campus Auto Repair Shop is located approximately 0.25 mile south of the subject site at 200 West Kawili Street in Hilo. Several violations were on file with the HDOH, as nine USTs were registered at this location; however, all had been resolved as of July 2007.

One 250-gallon used oil, Tank ID # 9, installed on January 01, 1983, was listed as temporarily out of use. One 850-gallon diesel, Tank ID # R-1, no installation date, was permanently closed on May 20, 1998. A site assessment was completed and no evidence of a leak was detected. One 550-gallon gasoline, Tank ID # R-2, no installation date, was permanently closed on May 20, 1998. A site Assessment was not completed, but evidence of a leak was detected.

The following six USTs were documented as being installed January on 01, 1983, and permanently closed on May 18, 1999. They included a 500-gallon kerosene (Tank ID no. R-3), a 500-gallon kerosene (R-4), two 250-gallon used oil (R-5 and R-6), a 550-gallon diesel (R-7), and a 250-gallon used-oil (R-8).

Two LUST incidents at this facility (ID no. 9-603380) were identified; however, the specific tank ID information could not be located in the files. A closure report was submitted on August 31, 1998, for release ID no. 980134, while a Closure Report, dated October 1999, was submitted for release ID no. 990202. HDOH records documented a NFA letter, dated August 3, 1999, only for release ID 980134, but according to the Environmental FirstSearch report's status update, dated April 04, 2000, both site cleanups were complete and both were issued a NFA letter. This is not considered a *REC*.

A Release Notification (Case No. 20030602-1513) was found in the HDOH files. Release comments, dated June 2, 2003, stated that petroleum contaminated soil was discovered, April 22, 2003, during excavation work at the University of Hawaii Campus in Hilo, which is adjacent to the Auto Shop. The amount and the source were unknown. Because no other information was found in regards to this case file, MNA concludes that this was an isolated occurrence, and does not constitute a *REC*.

Safeway/Target Site, located at 111 East Puainako Street and identified by TMK (3) 2-2-047:072, had several records on file, including two environmental investigations that were conducted

in 2009, which revealed soil contaminated with arsenic, dioxins, and total petroleum hydrocarbons as gasoline, diesel, and oil. Capping of the contamination was considered the most appropriate action alternative and was compatible with the proposed redevelopment plans for the site, according to the Long-Term Soil Management Plan prepared by Tetra Tech EM, Inc. Although long-term engineering and institutional controls will be required for the site indefinitely, this is not a *REC*.

No other information regarding the use of the surrounding properties was identified.

4.3 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY

MNA reviewed historical use information for the subject property included aerial photographs and United States Geological Survey (USGS) topographic maps. No fire insurance maps were available.

4.3.1 Historical Aerial Photographs

MNA reviewed photographs from the years 1954, 1965, 1985, 1992, and 2000, which were provided by First Search Technology Corporation. Table 4 provides details for the photographs reviewed.

Table 4. Aerial Photograph Details

Date	Source	Image Type	Approximate Scale
1954	Environmental FirstSearch	B/W	1”=750’
1965	Environmental FirstSearch	B/W	1”=750’
1985	Environmental FirstSearch	B/W	1”=750’
1992	Environmental FirstSearch	B/W	1”=750’
2000	Environmental FirstSearch	C	1”=750’

B/W - Black and white photograph
C - Color photograph

For the reviewed aerial photographs, the following observations were made.

1954: The subject site was largely forested. Mohouli Street and Kinoole Street were visible and developed. Lanikaula Street was not depicted. Properties located to the south and west of the subject site were forested. The properties to the north and east were residential. The location of the present day Hilo Shopping Center was visibly developed with one structure. A few small structures appear in the general area of the subject site. Mohouli Pond existed.

1965: Lanikaula Street was delineated and several structures were constructed along its length. Some of the major structures included a Church, presently located, as well as the University of Hawaii (Hilo Campus), which was developed at the time of this photograph with four major buildings. The State-owned canal, identified as TMK (3) 2-4-001:019, meanders south from Waiakea Fishpond and intersects the subject site. Mohouli Pond was no longer in existence. The small structures that were visible in the general area of the subject site, identified in the 1954 image, were no longer

visible. The area south of the University campus was forested. The areas north and east of the subject site, in general, were more densely developed with housing units and other building structures. Hilo Shopping Center was fully established.

1985: The residential neighborhood located west of the subject site at Noe Street and Kalili Place was fully developed. Also fully developed was the State-owned housing units located at Kamana Street. The area south of the University was no longer forested. Areas north along Lanikaula Street were more densely developed, including the University campus. More areas north of Mohouli Street were densely developed as well. In the area of North Aohoku Place, one structure, now known as the Joint Astronomy Center, was visible. North Aohoku Place was not delineated.

1992: North Aohoku Place was visible and routed to the one structure, known as the Joint Astronomy Center. Besides some additional development in the area, in general, no major changes from the 1985 image were observed.

2000: Besides additional development in the area, in general, no other major changes from the 1992 photograph were observed.

No *recognized environmental conditions* were identified from the photograph review.

4.3.2 Historical Topographic Maps

USGS topographic maps that cover the subject property and vicinity were reviewed. Maps were available for the years 1917, 1932, 1963, 1981, and 1995. Copies of these historical topographic maps were provided by FirstSearch Corporation and are included in Appendix A. The maps depicted the following details:

1917: Hilo was developed, but not delineated. Wailoa River was depicted, as well as Waiakea Fishpond, located northeast of the subject property. Many buildings and tanks were visible, particularly around the bay area. Kilauea Avenue, which was identified as "Volcano" on the map, was represented. Railroad tracks were depicted from Waiakea Mill to the south through Camp Two and further towards Waiakea Uka School. Railroad tracks were also depicted from the east side of Hilo Bay to the south along the west side of the Hilo airport. Directly east of the subject property was Waiakea Mill. Other than one small structure, no development was depicted at the subject site.

1932: Major development from the 1917 map was observed, particularly in the area east of the subject site and down along either sides of Kilauea Avenue. Housing subdivisions were visible in these areas. Hilo Bay area was more densely populated with building structures and infrastructure, and Wailoa River was more clearly defined. No other changes from the 1917 map were observed.

1963: The subject site was largely undeveloped and was displayed with dense vegetative cover. Hilo was characterized. Kamehameha Highway, Kilauea Avenue, and Kanoelehua Avenue were marked as major thoroughfares. Mohouli Street, Kinoole Street, and Lanikaula Street frame the north, east, and south sides of the subject site, respectively.

Minor roads and buildings were shown to the north of the subject site. Mohouli Street, and north towards Hilo, was developed with housing and school buildings. Mohouli Pond was visible. The Army Reserve Center was indicated in the area near the subject site. The Church of the Holy Cross, located on Lanikaula Street, was symbolized. Several smaller structures were also visible to the north and south of Lanikaula Street to the west of Ululani Street. Homelani Cemetery was denoted west of Hilo. Hilo High School was marked, as was the Hilo Shopping Center. The University of Hawaii (Hilo Campus) was comprised mainly of four large buildings with a few smaller structures located nearby. Development on the east side of Hilo was more pronounced and the Hilo airport was depicted in this map. Wailoa River State Park was designated east of the river area. Hawaii Technical School was shown to the east of the subject site, between Kilauea Avenue and Kanoelehua Avenue. Waiakea-Kai School was visible to the west of Camp Two.

1981: Development had further encroached upon the subject site. Wailoa River State Park was designated further west along Hilo Bay. Kamehameha Highway and Kanoelehua Avenue were marked as the primary highways, and Waianuenue Avenue was marked as a major thoroughfare. A shopping center was indicated along Kilauea Avenue, northwest of Waiakea Pond, this is currently the location the District Court House and other County offices. The University of Hawaii (Hilo Campus) was depicted with 15 additional buildings. West Puainako Street and Kawili Street were identified. Areas alongside and around these two streets were developed with housing, tanks, schools, and churches. Hawaii Technical School was identified as Hawaii Community College.

1995: The subject site, still undeveloped, was completely surrounded by highly developed areas. All areas east of Komohana Street to Kanoelahua Avenue were depicted as highly developed land, except for the subject site, a few areas north near Homelani Memorial Park, and areas west and south of the University campus. Beside increased development of the Hilo area, in general, no other major changes from the 1981 photograph were observed.

In summary, no *recognized environmental conditions* were identified from a review of the historical topographic maps.

5.0 SITE RECONNAISSANCE

The site reconnaissance was conducted on May 17, 2011, by Phillip Cabanila of MNA. The site reconnaissance focused on identifying *recognized environmental conditions.* A site map of the subject property is presented in Figure 3.

5.1 METHODOLOGY AND LIMITING CONDITIONS

The site reconnaissance was conducted by visually inspecting the subject property by foot. Vegetation was moderately dense. MNA observed most of the subject property perimeter and also made several transects across the property. Figure 3 presents the path walked during the site reconnaissance. Photographs from the site reconnaissance are presented in Appendix B.

5.2 GENERAL SITE SETTING

The subject property is located in Hilo, Hawai‘i. The surrounding area is predominantly residential land. Vehicular access was limited to the gates at the dead ends of Kapiolani Street on the northern and southern boundaries of the subject property. Pedestrian access was available around the perimeter of the subject property and along transects through the middle of the subject property. Pedestrian access was limited in the area of the County of Hawai’i DPW Flood Control Ditch running through the center of the property. However, DPW personnel granted access while MNA was on site.

The adjoining properties to the north, east, and south of the subject property were residential. The adjoining property to the west was vacant, undeveloped land owned by the State of Hawai’i.

Photographs of the general site setting and adjoining properties are included in Appendix B, Photographs 1 through 8.

5.3 EXTERIOR OBSERVATIONS

The subject property was undeveloped and had generally flat topography. Moderately dense vegetation was present. The County of Hawai’i DPW Flood Control Ditch runs through the center of the subject property.

5.4 INTERIOR OBSERVATIONS

No structures or buildings were observed on the subject property, and as a result, no interior observations were made.

5.5 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

No hazardous substances or petroleum products were observed on the subject property.

5.6 ABOVEGROUND AND UNDERGROUND STORAGE TANKS

MNA observed no evidence of aboveground storage tanks or USTs on the subject property, such as fill pipes, vent pipes, or dispensers.

6.0 INTERVIEWS

MNA interviewed Sherman Viernes of the County of Hawai’i DPW, construction supervisor for DPW, and familiar with the project area.

6.1 Sherman Viernes

On May 17, 2012, MNA interviewed Sherman Viernes. Mr. Viernes is a construction supervisor with DPW. Mr. Viernes has been employed by DPW since 1992. According to Mr. Viernes, the subject property has been undeveloped, unused, and public access has been prevented by gates. It is suspected that pig hunters have forced access for pig hunting on the subject property. The

area of the subject property that is the DPW Flood Control Ditch includes regular vegetation management. According to Mr. Viernes, vegetation control is usually conducted manually, and Roundup® is occasionally applied.

Mr. Viernes was not aware of any chemicals or chemical releases, or of indications of hazardous substance or petroleum product releases on the subject property.

6.2 Wayne Subica

On May 17, 2012, MNA interviewed Wayne Subica, Imata and Associates Survey Party Chief, for the survey crew that is completing the survey for the extension project. Mr. Subica has been employed by Imata and Associates since 1992. According to Mr. Subica, the subject property has been undeveloped and access has been restricted due to the locked gates at the north and south end.

Mr. Subica was not aware of any chemicals or chemical releases, or of indications of hazardous substance or petroleum product releases on the subject property.

7.0 DATA GAPS AND DEVIATIONS

MNA did not encounter any major data gaps during this Phase I ESA. MNA was unable to thoroughly inspect the ground surface of the subject property due to the presence of moderate vegetation throughout the subject property. This was considered a minor data gap because there were no indications that hazardous substances or petroleum products were present or had been present on the property.

No deviations from the ASTM Phase I ESA Standard were conducted.

8.0 KEY FINDINGS & OPINION

The subject property was located in Hilo, between two main roads, Mohouli Street and West Lanikaula Street, and was accessed via the dead end south of the intersection between Mohouli Street and Kapiolani Street. The subject property was vacant, undeveloped, and surrounded mostly by residential areas. No indications of illegal dumping were observed during the site reconnaissance to the subject property or adjoining properties, and the property was not easily accessed. As a result, there are no *recognized environmental conditions* in connection with the current use of the subject property.

There were no significant findings in connection with the adjoining properties.

9.0 CONCLUSION

MNA performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM E 1527-05 of a 20-acre portion of the 1,270 acres of land covered by the

TMK (3) 2-1-013:001, located in the South Hilo District, County of Hawai‘i, State of Hawai‘i, the *subject property*. Any exceptions to, or deletions from, this practice are described in Section 7.0 of this *report*. This assessment has revealed evidence of *recognized environmental conditions* in connection with the *subject property* due to the aforementioned illegally dumped tank and drum with unknown contents and condition, and the material threat of release that each poses.

REFERENCES

ASTM International. (2005). *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* West Conshohocken: ASTM International.

County of Hawai‘i. (2012). Tax Record Land Appraisal Cards and Parcel History Report. Hilo, Hawai‘i: County of Hawai‘i.

FirstSearch Technology Corporation. (2012). *Environmental FirstSearch Report.* FirstSearch Technology Corporation.

Hawai‘i Department of Health. (2009, June 23). *Hawai‘i Department of Health Solid and Hazardous Waste Section - Undergound Storage Tank Section*. Retrieved January 25, 2010, from Hawaii UST-LUST Databse: http://hawaii.gov/health/environmental/waste/ust/data.html

Hawaii Department of Health. (2009, December 31). *Hawai'i Department of Health Solid and Hazardous Waste Section - Undergound Storage Tank Section*. Retrieved March 18, 2009, from Hawaii UST-LUST Databse: http://hawaii.gov/health/environmental/waste/ust/data.html

Hawai'i Department of Health Safe Drinking Water Branch. (1999, September). *UIC Map of Oahu.* Retrieved January 26, 2010, from Underground Injection Control (UIC) Program: http://hawaii.gov/health/environmental/water/sdwb/uic/pdf/oahuic.pdf

Hazlett, R. W., & Hyndman, D. W. (1996). *Roadside Geology of Hawai'i.* Missoula, Montana: Montana Press Pubishing Company.

HDOH Safe Drinking Water Branch. (1999, September). *UIC Map of Oahu.* Retrieved July 16, 2009, from Underground Injection Control (UIC) Program: http://hawaii.gov/health/environmental/water/sdwb/uic/pdf/oahuic.pdf

Mink, J. F., & Lau, L. S. (1990). *Aquifer Identification and Classification for Hawai'i: Groundwater Protection Strategy for Hawai'i.* University of Hawaii, Water Resources Research Center.

Mink, J. F., & Lau, L. S. (1990). *Technical Report No. 191: Aquifer Identification and Classification for Hawai‘i: Groundwater Protection Strategy for Hawai'i.* University of Hawai‘i, Water Resources Research Center.

Morgan, J. (1996). *Hawai'i: A Unique Geography.* Honolulu: The Bess Press, Inc.

Podmore, G. (1928, January 23). Bernice P. Bishop Estate Map Showing Hionamoa.

Podmore, G. (1927, August). Estate of Bernice P. Bishop Map Showing Hionamoa.

Podmore, G. (1930, November). Estate of Bernice P. Bishop Map Showing Hionamoa.

Stearns, H. T. (1985). *Geology of the State of Hawai'i.* Palo Alto: Pacific Books.

United States Department of Agriculture. (2012, November 13). *Natural Resources Conservation Service.* Retrieved April 16, 2012, from Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 9
List of Properties Affected

[This page intentionally left blank]

PROPERTIES AFFECTED BY ROW TAKE AND TEMPORARY CONSTRUCTION EASEMENTS

Note: Figures from Draft to Final EA to account for reduction of ROW width from 66 to 60 ft.

TMK NO.	Property Owner/s	Approximate Area, ft^2		
		Add'l ROW	TCE	***Total***
2-4-001:024	State of Hawai'i	0	6,380	6,380
2-4-001:120	Christ Lutheran Church of Hilo State of Hawai'i	0	2,448	2,448
2-4-001:167	State of Hawai'i	2,960	7,500	10,460
2-4-001:179	Hospice of Hilo State of Hawai'i	0	5,080	5,080
2-4-001:183	State of Hawai'i	0	7,670	7,670
2-4-023:009	Ishii, Howard Ishii, Luvia	0	280	280
2-4-023:010	Hatada, Brian Toshio Hatada, Lynn Setsue	0	520	520
2-4-023:019	Koizumi, Debbie	0	940	940
2-4-023:020	Kaneshiro, Sadako Kaneshiro, Seiko	0	870	870
2-4-023:021	Chartrand, Deborah Chartrand, Lionel	0	520	520
2-4-023:022	Usagawa, Jutaro	150	2,100	2,250
2-4-023:023	Botbyl, Sean Peter	160	1,620	1,780
2-4-023:024	Harada, Gladys Harada, James	0	560	560
2-4-023:025	Hata, Howard Yoichi Higuchi, Sandra Seiko	0	560	560
2-4-023:026	Hasegawa Geraldine Niwao, Jitsuo	0	320	320
2-4-028:014	Hawai'i Bukkyo Kai Kan	170	1,330	1,500
2-4-028:015	Esaki, Ryan Esaki, Stephen	0	700	700
2-4-028:032	Rosendahl, Lois Elaine Rosendahl, Paul Harner	150	550	700
2-4-056:004	Ogata, Angeline Ogata, Tesuo	0	620	620
2-4-056:005	Kuroyama, Fujiyo Kuroyama, Hachiro	0	1,530	1,530
2-4-056:006	Suyama, Lloyd	0	600	600

PROPERTIES AFFECTED TABLE, CONT'D				
2-4-056:014	State of Hawai'i	0	11,540	11,540
2-4-056:015	Island of Hawai'i YMCA	70	6,700	6,770
	Waiakea Uka Bible Church			
2-4-056:016	USA	0	450	450
2-4-056:021	Hawai'i Housing Authority	0	310	310
2-4-056:022	Kamana Inc.	0	10,860	10,860
	State of Hawai'i			
2-4-056:028	State of Hawai'i	110	18,550	18,660
2-4-056:030	Island of Hawai'i YMCA	0	2,100	2,100
	Waiakea Uka Bible Church			
2-4-057:024	Talbot, Andrew Shigeru	160	1,260	1,420
	Talbot, Grant Akira			
	Talbot, Laura Mariko			
	Yamamoto, Joan Kazuko Hosaka			
	Yamamoto, Terence Shigeru			
2-4-057:028	Hawaiian View Properties LLC	0	2,170	2,170
	Talbot, Andrew Shigeru			
	Talbot, Grant Akira			
	Talbot, Laura Mariko			
	Yamamoto, Joan Kazuko Hosaka			
	Yamamoto, Terence Shigeru			

* Property Owner/s based on http://www.hawaiipropertytax.com - Last Updated: 21 Jun 2012

TCE Temporary Construction Easement

TMKs 2-4-001: 181, 182 and 2-4-056:029 are parcels subdivided specifically for Kapiolani ROW and are not included as ROW take.

2-4-001: 019 is the Waiakea Drainage Channel already under control of DPW and use of this property is not included as ROW take.

According to a September 6, 2012 letter from the Hawaii State Land Division in response to the EA:

"Pursuant to your request for comments on the above matter, we offer the following:

TAX MAP KEY	ENCUMBRANCE
3rd/2-4-001 :0019	E.O. 2125 to the County of Hawaii for Wailoa River and Tributaries Control Project
2-4-001 :024	Unencumbered
2-4-001: 120	GL S-6019 Christ Lutheran Church
2-4-001:167	E.O.4372 University of Hawaii at Hilo
2-4-001:179	GL 5-5976 Hospice of Hilo
2-4-001:183	Unencumbered
3rd/2-4-056:14	Unencumbered
2-4-056:022	GL S-4610 Kamana, Inc.

The above State properties will be affected by the proposed Kapiolani Street extension as described in The County Public Works Department draft environmental assessment. All unencumbered properties, or portions thereof will require set aside to the County of Hawaii for roadway purposes. All encumbered State properties (leases and Executive Orders) identified in the DEA will require the withdrawal of any portions identified within the Kapiolani Street extension and set aside to the county for roadway purposes."

[This page intentionally left blank]

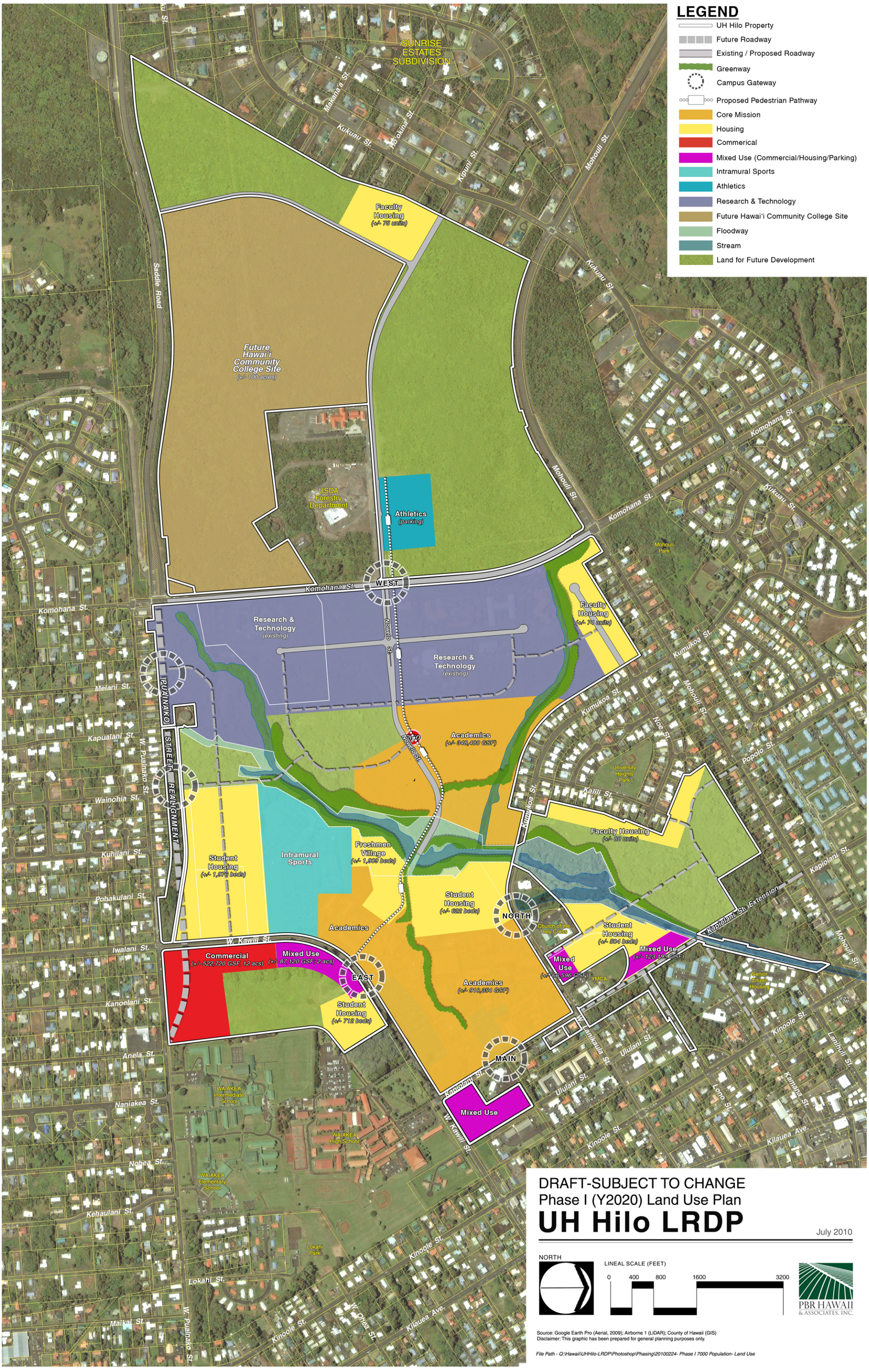
KAPIOLANI STREET EXTENSION
SOUTH HILO, ISLAND OF HAWAI‘I
STATE OF HAWAI‘I

ENVIRONMENTAL ASSESSMENT

County of Hawai‘i, Department of Public Works

Appendix 10
UH Hilo Long Range Development Plan 2020 Preferred Plan

[This page intentionally left blank]


LEGEND
UH Hilo Property
Future Roadway
Existing / Proposed Roadway
Greenway
Campus Gateway
Proposed Pedestrian Pathway
Core Mission
Housing
Commerical
Mixed Use (Commercial/Housing/Parking)
Intramural Sports
Athletics
Research & Technology
Future Hawai'i Community College Site
Floodway
Stream
Land for Future Development
SUNRISE ESTATES SUBDIVISION
Faculty Housing (+/- 76 units)
Future Hawai'i Community College Site (+/- 100 acres)
USDA Forestry Department
Athletics (parking)
WEST
Research & Technology (existing)
Research & Technology (existing)
Faculty Housing (+/- 74 units)
Academics (+/- 348,480 GSF)
Student Housing (+/- 1,976 beds)
Intramural Sports
Freshmen Village (+/- 1,909 beds)
Faculty Housing (+/- 80 units)
Student Housing (+/- 622 beds)
NORTH
Academics
Student Housing (+/- 504 beds)
Mixed Use (+/- 123,195 GSF)
Mixed Use (+/- 66,996 GSF)
Commercial (+/- 522,720 GSF, 12 acs)
Mixed Use (+/- 87,120 GSF, 2 acs)
EAST
Academics (+/- 918,354 GSF)
Student Housing (+/- 712 beds)
MAIN
Mixed Use
Saddle Road
Komohana St.
Kukuau St.
Mohouli St.
Makana'a St.
Ho'okina St.
Kipuni St.
Nowelo St.
Kumukoa St.
Popolo St.
Kaliili St.
Noe St.
Kapiolani St.
Kapiolani St. Extension
W. Kawili St.
Kinoole St.
Melani St.
Kapualani St.
Wainohia St.
Kuhilani St.
Pohakulani St.
Iwalani St.
Kanoelani St.
Anela St.
Naniakea St.
Nohea St.
Kehaulani St.
Maikai St.
Lokahi St.
W. Puainako St.
IPUAINAKO STREET REALIGNMENT
W. Kanikeaula St.
Ululani St.
Lono St.
Kamana St.
Laniniuli St.
Kilauea Ave.
W. Onea St.
Mohouli Park
University Heights Park
Church of the Holy Cross
YMCA
Senior Citizen Housing
WAIAKEA Intermediate School
WAIAKEA High School
WAIAKEA Elementary School
Lokahi Park
DRAFT-SUBJECT TO CHANGE
Phase I (Y2020) Land Use Plan
UH Hilo LRDP
July 2010
NORTH
LINEAL SCALE (FEET)
0 400 800 1600 3200
PBR HAWAII & ASSOCIATES, INC.
Source: Google Earth Pro (Aerial, 2009); Airborne 1 (LiDAR); County of Hawaii (GIS)
Disclaimer: This graphic has been prepared for general planning purposes only.
File Path - Q:\Hawaii\UHHilo-LRDP\Photoshop\Phasing\20100224- Phase I 7000 Population- Land Use

[This page intentionally left blank]