FILE COPY
JUN 08 2017

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR

KATHY K. SOKUGAWA
ACTING DIRECTOR

TIMOTHY F. T. HIU
DEPUTY DIRECTOR

2016/ED-10(WA)

May 15, 2017

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

RECEIVED
'17 MAY 16 A9:13
OFC. OF ENVIRONMENTAL
QUALITY CONTROL

Dear Mr. Glenn:

SUBJECT:	Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200, Hawaii Administrative Rules Final Environmental Assessment (FEA)
Project:	Ala Wai 46kV Underground Cable Relocation and Replacement
Applicant:	Hawaiian Electric Company (HECO), Inc. (Kerstan Wong)
Agent:	Belt Collins Hawaii LLC (Joanne Hiramatsu)
Location:	Ala Wai Elementary School, Ala Wai Canal, University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street - Waikiki
Tax Map Keys:	2-6-017: 064; 2-7-036: 001; and 2-7-036: 007
Proposal:	To relocate the underground 46kV sub-transmission cables that connect HECO's Waikiki Substation located on Kaiolu Street to two utility poles located on the McCully side of the Project area. The proposed action also includes removal of the cables currently installed in the Ala Wai Canal.

We respectfully request publication of the Project summary of the FEA in the next edition of "The Environmental Notice" on **June 8, 2017**. Enclosed are one hard copy and one electronic copy of the FEA and the Publication Form. The Publication Form, including Project summary, was also sent via electronic mail to your office.

17-496

Should you have any questions, please contact William Ammons at 768-8025 or via email at wammons@honolulu.gov.

Very truly yours,

Kathy K. Sokugawa
Acting Director

Enclosure: FEA, one hard copy and one disk
One copy of OEQC Publication Form

Doc 1455003

APPLICANT
PUBLICATION FORM

Project Name:	Ala Wai 46kV Underground Cable Relocation
Project Short Name:	Ala Wai 46kV Cable Replacement
HRS §343-5 Trigger(s):	Use of State or County lands and within the Waikīkī Special District
Island(s):	Oahu
Judicial District(s):	Honolulu
TMK(s):	(1)2-6-017:064 [Hawaiian Electric's Waikīkī substation], (1)2-7-036:001 [Ala Wai Neighborhood and Community Park], (1) 2-7-36:007 (Ala Wai Elementary School), Ala Wai Canal, University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street
Permit(s)/Approval(s):	Nationwide Permit 12 – Utility Line Activities, Blanket 401 Water Quality Certificate, National Pollutant Discharge Elimination System (NPDES) General Permit
Approving Agency:	Department of Planning and Permitting, City and County of Honolulu William Ammons (808) 768-8025, wammons@honolulu.gov 650 South King Street, 7th Floor, Honolulu, Hawaii 96813
Contact Name, Email, Telephone, Address	Ms. Kathy K. Sokugawa, Acting Director City and County of Honolulu Department of Planning and Permitting 650 S. King Street, 7th Floor Honolulu, Hawai'i 96813 808-768-8000
Applicant:	Hawaiian Electric Company, Inc. (HECO) Kerstan Wong, Manager, (808) 543-7059, kerstan.wong@hawaiielectric.com P.O. Box 2750, Honolulu, Hawaii 96840
Contact Name, Email, Telephone, Address	Jayson K. Shibata, P.E. Project Manager Engineering Department Hawaiian Electric Company 820 Ward Avenue Honolulu, HI 96814 Phone: (808) 543-7902 Jayson.shibata@hawaiianelectric.com
Consultant:	Belt Collins Hawai'i Joanne Hiramatsu, (808) 521-5361, jhiramtsu@bchdesign.com 2153 North King Street, Suite 200, Honolulu, Hawaii 96819
Contact Name, Email, Telephone, Address	Joanne Hiramatsu Senior Associate/Director of Planning Belt Collins Hawai'i LLC 2153 North King Street, Suite 200 Honolulu, Hawai'i 96819 Phone: (808) 521-5361 jhiramatsu@bchdesign.com

Status (select one)	**Submittal Requirements**
____ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
__x__ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.

____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary

The Hawaiian Electric Company, Inc. (Hawaiian Electric), is proposing to relocate underground sub-transmission line cables that connect to Hawaiian Electric's Waikīkī Substation located on Kaiʻolu Street. The proposed action would shift the alignment of the cable to the west of the existing route that passes beneath the Ala Wai Elementary School grounds, the Community Gardens and within the Ala Wai Canal. The project will install the new cables using horizontal directional drilling to cross under the Ala Wai Canal and open trenching within the roadways. The existing cables will be removed from the Ala Wai Canal and under the Ala Wai Elementary School and Community Gardens. Other actions will include two utility pole replacements.

The purpose for the proposed action is to support the Department of Land and Natural Resources' (DLNR) efforts to provide continuous maintenance dredging of the Ala Wai Canal. The Canal is listed on the State Register of Historic Places that requires site preservation efforts. The replacement cables will also maintain the reliability of the electrical distribution system.

FINAL ENVIRONMENTAL ASSESSMENT

ALA WAI 46KV UNDERGROUND CABLE RELOCATION

Waikīkī, Island of Oʻahu, Hawaiʻi
Tax Map Keys: (1) 2-6-017:064 [Hawaiian Electric's Waikīkī substation], (1) 2-7-036:001 [Ala Wai Neighborhood and Community Park], (1) 2-7-36:007 (Ala Wai Elementary School), Ala Wai Canal, University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street

April 2017

Prepared for:
Hawaiian Electric Company, Inc.

Prepared by:
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

Table of Contents

ACRONYMS AND ABBREVIATIONS vii

EXECUTIVE SUMMARY ..... ES-I

CHAPTER 1
PURPOSE AND NEED 1-1

1.1 Introduction 1-1
1.2 Purpose and Need 1-1
1.2.1 Purpose 1-1
1.2.2 Need 1-1
1.3 Environmental Review 1-3
1.4 Applicant And Approving Agency 1-3

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Proposed Action 2-1
2.1.1 Methods of Installation 2-3
2.1.2 Preliminary Schedule 2-4
2.1.3 Preliminary Cost Estimates 2-4
2.2 Alternatives Analysis 2-4
2.2.1 No Action Alternative 2-4
2.2.2 Alternative Route: Kapahulu Avenue 2-4
2.2.3 Alternative Route: McCully Street 2-5
2.2.4 Alternative Route: New Bridge Crossing 2-6

CHAPTER 3
AFFECTED ENVIRONMENT 3-1

3.1 Land Use and Land Tenure 3-1
3.1.1 Regional Land Use 3-1
3.1.2 Existing Land Use 3-1
3.1.3 Surrounding Land Uses 3-3
3.1.4 Potential Impacts and Mitigation Measures 3-3
3.2 Geology, Soils and Topography 3-4
3.2.1 Geology 3-4
3.2.2 Soils 3-5
3.2.3 Topography 3-6
3.2.4 Potential Impacts and Mitigation Measures 3-6

3.3 Hydrology 3-6
3.3.1 Water Resources 3-6
3.3.2 Surface Water 3-7
3.3.3 Water Quality 3-8
3.3.4 Groundwater 3-9
3.3.5 Potential Impacts and Mitigation Measures 3-9
3.4 Archaeological and Cultural Resources 3-10
3.4.1 Pre-Consultation for Archaeological and Cultural Resources 3-10
3.4.2 Archaeological Resources 3-10
3.4.3 Cultural Resources 3-12
3.4.4 Potential Impacts and Mitigation Measures 3-15
3.5 Flora, Fauna and Aquatic Biology 3-17
3.5.1 Flora 3-17
3.5.2 Fauna 3-19
3.5.3 Aquatic Biology 3-20
3.5.4 Potential Impacts and Mitigation Measures 3-21
3.6 Public Health and Safety 3-23
3.6.1 Flood Hazards 3-23
3.6.2 Climate Change and Sea Level Rise 3-23
3.6.3 Tsunami Evacuation Zone. 3-24
3.6.4 Earthquakes 3-24
3.6.5 Hurricanes 3-25
3.6.6 Electromagnetic Fields (EMFs) 3-25
3.6.7 Hazardous and Regulated Materials 3-26
3.6.8 Potential Impacts and Mitigation Measures 3-26
3.7 Air Quality 3-28
3.7.1 Existing Conditions 3-28
3.7.2 Potential Impacts and Mitigation Measures 3-29
3.8 Noise 3-30
3.8.1 Existing Conditions 3-30
3.8.2 Potential Impacts and Mitigation Measures 3-31
3.9 Circulation and Traffic 3-32
3.9.1 Existing Conditions 3-32
3.9.2 Potential Impacts and Mitigation Measures 3-32
3.10 Infrastructure 3-34
3.10.1 Water 3-34
3.10.2 Sewer 3-37
3.10.3 Electricity, Telephone, and Cable TV 3-37

3.10.4 Fuel and Utility Gas Lines 3-37
3.10.5 Drainage 3-37
3.10.6 Potential Impacts and Mitigation Measures 3-39
3.11 Public Services and Facilities 3-39
3.11.1 Police, Fire, and Emergency Services 3-39
3.11.2 Medical Centers 3-40
3.11.3 Parks and Recreation Areas 3-40
3.11.4 Schools 3-41
3.11.5 Solid Waste 3-41
3.11.6 Potential Impacts and Mitigation Measures 3-42
3.12 Visual and Aesthetic Resources 3-43
3.12.1 Existing Conditions 3-43
3.12.2 Potential Impacts and Mitigation Measures 3-43
3.13 Socio-Economic Setting 3-44
3.13.1 Existing Conditions 3-44
3.13.2 Potential Impacts and Mitigation Measures 3-53

CHAPTER 4
FEDERAL, STATE, AND COUNTY LAND USE AND ENVIRONMENTAL POLICES 4-1

4.1 Federal Laws 4-1
4.1.1 Rivers and Harbors Act of 1899, Section 10 4-1
4.1.2 Migratory Bird Treaty Act of 1918 4-1
4.1.3 Coastal Zone Management Act of 1972 4-2
4.1.4 Endangered Species Act of 1973 4-2
4.1.5 Section 1424(E) of the Safe Drinking Water Act of 1974 4-2
4.2 State Policies and Statutes 4-3
4.2.1 State Land Use Law 4-3
4.2.2 Hawai‘i State Plan 4-3
4.2.3 State Functional Plans 4-5
4.2.4 Hawai‘i State Plan, HRS Chapter 226 Part III – Priority Guidelines 4-5
4.2.4.1 State Conservation Functional Plan 4-7
4.2.4.1.1 Objective of the Plan 4-7
4.2.4.1.2 Relevance to Proposed Project 4-7
4.2.4.2 State Energy Functional Plan 4-7
4.2.4.2.1 Objective of the Plan 4-7
4.2.4.2.2 Relevance to Proposed Project 4-7
4.2.4.3 State Historic Preservation Functional Plan 4-8

4.2.4.3.1 Objective of the Plan....4-8
4.2.4.3.2 Relevance to Proposed Project....4-8
4.2.4.4 State Recreation Functional Plan....4-8
4.2.4.4.1 Objective of the Plan....4-8
4.2.4.4.2 Relevance to Proposed Project....4-8
4.2.4.5 State Tourism Functional Plan....4-9
4.2.4.5.1 Objective of the Plan....4-9
4.2.4.5.2 Relevance to Proposed Project....4-9
4.2.5 State Environmental Policy....4-9
4.2.6 Section 401 Water Quality Certification....4-10
4.2.7 Stream Channel Alteration Permit....4-10
4.2.8 Hawai'i Water Pollution Law....4-10
4.2.9 HRS Ch. 6E, Historic Preservation....4-11
4.2.10 Hawaii Coastal Zone Management Program....4-11
4.2.10.1 Recreational Resources....4-12
4.2.10.2 Historic Resources....4-12
4.2.10.3 Scenic and Open Space Resources....4-12
4.2.10.4 Coastal Ecosystems....4-12
4.2.10.5 Economic Uses....4-12
4.2.10.6 Coastal Hazards....4-12
4.2.10.7 Managing Development....4-13
4.2.10.8 Public Participation....4-13
4.2.10.9 Beach Protection....4-13
4.2.10.10 Marine Resources....4-13
4.3 County Policies and Statutes....4-13
4.3.1 O'ahu General Plan....4-13
4.3.2 Primary Urban Center Development Plan (PUC DP)....4-13
4.3.3 City Land Use Ordinance....4-14
4.3.3.1 Waikīkī Special District....4-14
4.3.3.2 Diamond Head Special District....4-16
4.3.4 Special Management Area (SMA)....4-16
4.3.5 Summary of Required Permits And Approvals....4-16

CHAPTER 5
DETERMINATION.... 5-1

CHAPTER 6
FINDINGS AND REASONS SUPPORTING DETERMINATION.... 6-1

CHAPTER 7
COMMENTS 7-1

7.1 Pre-Consultations 7-1
7.1.1 Responding Parties To Pre-Consultation 7-4
7.2 Draft Environmental Assessment Consultation 7-4
7.2.1 Responding Parties To Draft Environmental Assessment 7-8

CHAPTER 8
REFERENCES CITED 8-1

List of Figures

Figure 1-1 Location Map 1-2
Figure 2-1 Proposed Cable Relocation 2-2
Figure 3-1 Zoning Map 3-2
Figure 3-2 Utilities Plan and Profile 3-35
Figure 3-2A Utilities Plan And Profile (continued) 3-36
Figure 3-3 Beachwalk Buffer Zone 3-38
Figure 3-4 Honolulu Census Tracts in American Community Survey 3-45

List of Tables

Table 3-1 Land Commission Awards in the Project Area Provided by CSH 3-14
Table 3-2 Inventory of Bird Species Observed in Project Area 3-21
Table 3-3 Air Quality Standards 3-29
Table 3-4 Maximum Permissible Sound Levels in dBA 3-30
Table 3-5 Age Characteristics, City and County of Honolulu and Project Area 3-46
Table 3-6 Race and Migrant Characteristics, City and County of Honolulu and Project Area 3-47
Table 3-7 Household Characteristics, City and County of Honolulu and Project Area 3-48
Table 3-8 Share of the Population Below the Poverty Level 3-48
Table 3-9 Employment and Commuting 3-49
Table 3-10 Disability Status of the Population 3-50
Table 4-1 Hawai'i State Plan – HRS Chapter 226, Part III 4-6
Table 4-2 List of Required Permits 4-17

List of Appendices

Appendix A	National Register of Historic Places Registration Form for the Ala Wai Canal
Appendix B	Archaeological Inventory Survey
Appendix C	Cultural Impact Assessment
Appendix D	Biological Resource Assessment
Appendix E-1	Preconsultation Letters
Appendix E-2	Community Comments and Belt Collins Hawaii Responses

Prepared by Belt Collins Hawaii LLC.

Acronyms and Abbreviations

AIS	Archaeological Inventory Survey
APE	area of potential effect
BLNR	Board of Land and Natural Resources (State of Hawai‘i)
BMP(s)	Best Management Practice(s)
BWS	Honolulu Board of Water Supply
CAA	Clean Air Act
CAB	Clean Air Branch (State of Hawai‘i)
CFR	Code of Federal Regulations
CSH	Cultural Surveys Hawai‘i
CIA	Cultural Impact Assessment
City	City and County of Honolulu
CO	carbon monoxide
CT	Census Tract
CWA	Clean Water Act of 1977
CWB	Clean Water Branch (state of Hawai‘i)
CZM	Coastal Zone Management
DA	Department of the Army
dBA	decibels, A-weighted scale
DBEDT	Department of Business, Economic Development and Tourism (State of Hawai‘i)
DEIS	Draft Environmental Impact Statement
DFM	Department of Facilities Management (City and County of Honolulu)
DHSD	Diamond Head Special District
DLNR	Department of Land and Natural Resources (State of Hawai‘i)
DOE	Department of Education (State of Hawai‘i)
DOH	Department of Health (State of Hawai‘i)
DP	Development Plan
DPP	Department of Planning and Permitting (City and County of Honolulu)
DPR	Department of Parks and Recreation (City and County of Honolulu)
DTS	Department of Transportation Services (City and County of Honolulu)
EA	Environmental Assessment
EMF	electromagnetic field
EMS	Department of Emergency Services
ENV	Department of Environmental Services (City and County of Honolulu)
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

Acronyms and Abbreviations

FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map(s)
FONSI	Finding of No Significant Impact
H_2S	hydrogen sulfide
HAR	Hawai‘i Administrative Rules
HDD	Horizontal Directional Drilling
HFD	Honolulu Fire Department
HPD	Honolulu Police Department
HRS	Hawai‘i Revised Statutes
kV	kilovolt
LCA	Land Commission Awards
LUC	Land Use Commission (State of Hawai‘i)
LUO	Land Use Ordinance
m	meter
MBTA	Migratory Bird Treaty Act
MGD	million gallons per day
$\mu g/m^3$	microgram per cubic meter
MPDC	Mānoa-Pālolo Drainage Canal
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NHO	Native Hawaiian Organization
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
O_3	ozone
OHA	Office of Hawaiian Affairs (State of Hawai‘i)
OIBC	O‘ahu Island Burial Council
Pb	lead
PCB	polychlorinated biphenyl
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter up to 2.5 microns in diameter
ppb	parts per billion
ppm	part per million
RCRA	Resource Conservation and Recovery Act
ROW	right of way

Acronyms and Abbreviations

SCAP	Stream Channel Alteration Permit
SHPD	State Historic Preservation Division
SIHP	State Inventory of Historic Properties
SMA	Special Management Area
SO_2	sulfur dioxide
SOBA	Southern Oʻahu Basal Aquifer
State	State of Hawaiʻi
STP	shovel test pit
SWCA	SWCA Environmental Consultants
TCLP	toxicity characteristic leaching procedure
TCP	traffic control plan
TMDL	Total Maximum Daily Load
TMK	Tax Map Key
UBC	Uniform Building Code
UH	University of Hawaiʻi at Mānoa
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WQC	Water Quality Certification

EXECUTIVE SUMMARY

PROPOSING ORGANIZATION	Hawaiian Electric Company (Hawaiian Electric)
APPROVING AGENCY	City and County of Honolulu, Department of Planning and Permitting (DPP)
GENERAL PROJECT DESCRIPTION	The proposed action of this project is to relocate the route of the underground 46kV sub-transmission cables that connect Hawaiian Electric's Waikīkī Substation located on Kaiʻolu Street to two utility poles located on the McCully side of the project area. Currently the underground cables pass beneath Ala Wai Elementary School grounds and within the accumulated sediment of the Ala Wai Canal. The Proposed Action will relocate the existing underground sub-transmission route to the west by installing new cables deep beneath the Ala Wai Canal using horizontal directional drilling. The Proposed Action also includes removal of the cables currently installed in the Canal. The relocation of the cables will allow for efficient dredging of the Ala Wai Canal for maintenance purposes by the State of Hawaiʻi (State) Department of Land and Natural Resources (DLNR) who has jurisdiction over the Ala Wai Canal.
PROJECT LOCATION	The project is located near the Ala Wai Canal, within the McCully/Mōʻiliʻili and Waikīkī districts. The affected Tax Map Keys (TMKs) include (1) 2-7-036:001, 2-7-036:007, and 2-6-017-064. Affected streets consist of University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street, Honolulu, Hawaiʻi
EXISTING USES	Roadways, park, school and drainage canal and recreational purposes.
DETERMINATION	Finding of No Significant Impact (FONSI)
REQUIRED PERMITS AND APPROVALS	US Army Corps of Engineers, Nationwide Permit No. 12, Utility Line Activities State Department of Health, Clean Water Branch, Section 401 Blanket Permit State Department of Health, Clean Water Branch, National Pollutant Discharge Elimination System General Permit for Construction

REQUIRED PERMITS AND APPROVALS *(continued)*	State Department of Health, Indoor Radiation and Health Branch, Noise Permit/Variance City and County of Honolulu, Department of Planning and Permitting, Construction Plan Approval City and County of Honolulu, Department of Planning and Permitting, Grading, Grubbing, and Stockpiling Permit City and County of Honolulu, Department of Planning and Permitting, Trenching Permit City and County of Honolulu, Department of Transportation Services, Street Usage Permit
CONSULTED AGENCIES AND STAKEHOLDERS DURING DRAFT ENVIRONMENTAL ASSESSMENT COMMENT PERIOD *(Italicized text indicates a comment was received)* (* Indicates letters sent to stakeholders from DPP. All others sent by Hawaiian Electric.)	**FEDERAL AGENCIES** U.S. Army Corps of Engineers (USACE), Honolulu District* *U.S. Fish and Wildlife Services (USFWS), Pacific Region* **STATE OF HAWAIʻI** Department of Business, Economic Development, and Tourism (DBEDT) DBEDT, Office of Planning* Department of Commerce and Consumer Affairs (DCCA), Division of Consumer Advocacy DCCA, Public Utilities Commission (PUC) *Department of Education, Office of School Facilities and Support Services* Department of Education, Ala Wai Elementary School *Department of Health (DOH), Environmental Planning Office* DOH, Clean Air Branch* *DOH, Clean Water Branch (CWB)** DOH, Solid and Hazardous Waste Branch* *Department of Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR)* DLNR, Division of Boating and Ocean Recreation (DOBOR) *DLNR, Engineering Division* DLNR, Forestry and Wildlife *DLNR, Land Division** DLNR, Office of Conservation and Coastal Lands (OCCL) DLNR, State Historic Preservation Division (SHPD)* DLNR, SHPD, Oʻahu Island Burial Council (OIBC) Department of Transportation (DOT)* Hawaiʻi State Legislature Senate Districts 10, 11, 12, 21, 22, and 26 Hawaiʻi State Public Library, Main*

CONSULTED AGENCIES AND STAKEHOLDERS DURING EARLY CONSULTATION PERIOD *(continued)*	**STATE OF HAWAIʻI** *(continued)* Hawaiʻi State Public Library, Waikīkī* Hawaiʻi State Public Library, Waikīkī-Kapahulu* Land Use Commission (LUC)* *Office of Environmental Quality Control* *Office of Planning* University of Hawaiʻi (UH) Environmental Center* **CITY AND COUNTY OF HONOLULU** *Board of Water Supply (BWS)** *Department of Design and Construction (DDC)** Department of Environmental Services (ENV) *Department of Facility Maintenance (DFM)* Department of Parks and Recreation (DPR)* Department of Planning and Permitting (DPP), Planning Division* *DPP, Engineering Review Branch* *DPP, Policy Planning Branch* DPP, Site Development Division* *Department of Transportation Services (DTS)** Honolulu City Council Districts 4 and 5 *Honolulu Fire Department (HFD)** *Honolulu Police Department (HPD)** Neighborhood Board No. 8, McCully/Mōʻiliʻili *Neighborhood Board No. 9, Waikīkī** Satellite City Hall No. 1, Ala Moana* **ORGANIZATIONS** Ala Wai Watershed Association Hawaiian Electric ʻIolani School Office of Hawaiian Affairs* Waikīkī Business Improvement District Association Waikīkī Community Center Waikīkī Improvement Association *Waikīkī Surf Club* **ADJACENT LANDOWNERS** Condo Master, Kaimana Lanais (TMK 2-7-13:023) Condo Master, Ala Wai Cove (TMK 2-7-13:11) Condo Master, Ala Wai Skyrise (TMK 2-7-13:008) Condo Master, Kapiʻolani Gardens (TMK 2-7-19:001) Condo Master, Ala Wai Plaza (TMK 2-7-13:002)

CONSULTED AGENCIES AND STAKEHOLDERS DURING EARLY CONSULTATION PERIOD *(continued)*	**ADJACENT LANDOWNERS** *(continued)* Condo Master, Twin Towers (TMK 2-6-16:001) Condo Master, Lanikea at Waikīkī (TMK 2-6-16:002) Property Manager, Pacific Living Trust (TMK 2-6-16:003) Mr. Juan I. Ramos (TMK 2-6-16:005) Condo Master, La Casa (TMK 2-6-16:009) Mr. and Ms. John and Donna Gayer (TMK 2-6-17:037) Mr. Wilson B. Lau, WBL Inc. (TMK 2-6-17:081, 2-6-17:010, 2-6-17:082, 2-6-17:011) Property Manager, N T P Lynn's Investment Corp (TMK 2-6-17:012, 2-6-17:014, 2-6-17:015, 2-6-17:023) Condo Master, Hale Moani c/o Ms. Candace Villarmia, Certified Hawai'i (TMK 2-6-17:016) Condo Master, 2121 Ala Wai (TMK 2-6-17:003) Mr. Robert and Ms. Audrey M. Au (TMK 2-6-17:065) Condo Master, Kaiolu Sunrise (TMK 2-6-17:060) Condo Master, Four Paddle (TMK 2-6-17:057) Property Manager, Kapi'olani Real Estate LLC (TMK 2-6-17:056) Condo Master, 411 Kaiolu, Hawaiiana Management Company (TMK 2-6-17:053) Ms. Mary E. Gabriel, Condo Master, The Promenade (TMK 2-6-17:006) Condo Master, Aloha Towers (TMK 2-6-17:005) Condo Master, Rosalei Limited (TMK 2-6-17:004) Condo Master, Ariali Realty Inc. (TMK 2-6-17:029) Fee Owner, Francis and Edna Chen Trust, Wheeler Family Trust (TMK 2-7-13:024)

CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

Hawaiian Electric is proposing to relocate the route of two existing underground sub-transmission cables feeding the Waikiki Substation. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal's accumulated sediment layer. The Proposed Action will relocate the existing underground sub-transmission route to the west by installing new cables deep beneath the Ala Wai Canal using horizontal directional drilling. The Proposed Action also includes removal of the cables currently installed in the Canal and under Ala Wai Elementary School and Community Gardens. The relocation of the cables will allow for efficient dredging of the Ala Wai Canal for maintenance purposes by the State of Hawai'i (State) Department of Land and Natural Resources (DLNR) who has jurisdiction over the Ala Wai Canal.

Located in the McCully/Mō'ili'ili and Waikīkī districts, the project area is identified by Tax Map Key (TMK) as (1) 2-7-036:001 (Ala Wai Neighborhood and Community Park), (1) 2-7-036:007 (Ala Wai Elementary School), (1) 2-6-017:064 (Waikīkī Substation), along with University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street (rights-of-ways). Figure 1-1 identifies the project area in relation to the surrounding neighborhoods.

1.2 PURPOSE AND NEED

1.2.1 Purpose

The purpose of the Proposed Action is to remove interferences caused by Hawaiian Electric's power cables that impact the State DNLR's efforts to efficiently and routinely dredge the Ala Wai Canal.

1.2.2 Need

The Proposed Action is necessary because Hawaiian Electric's power cables are located within the accumulated sediment of the Canal at depths that are, in some locations, too shallow for DLNR to conduct its maintenance dredging that is planned to begin in 2018.



Figure 1-1
LOCATION MAP
Ala Wai 46kV UG Cable

The Proposed Action to relocate the power cables deeper under the Canal will allow for the continued transmission of electricity to the Waikiki Substation without future interference with Canal activities. The dredging by DLNR will increase the depth of the waterway, and so reduce the potential for flooding and increase the opportunities for recreational activities.

1.3 ENVIRONMENTAL REVIEW

This Environmental Assessment (EA) has been prepared because the Ala Wai Canal is listed on the Hawai'i State Register of Historic Places (State Inventory of Historic Properties [SIHP] No. 80-14-9757), and the project is located within the Waikīkī Special District. SIHP No. 50-80-14-5796, an original wetland surface, is also located within the project area and may be affected by the proposed action.

As noted, the Proposed Project is located in the Waikīkī and Diamond Head Special Districts. Because the electrical ducts will be placed underground, the City's Department of Planning and Permitting (DPP) determined that a Waikīkī Special District Permit and a Diamond Head Special District Permit would not be required for the proposed action.[1]

This EA has been prepared in accordance with Chapter 343, Hawai'i Revised Statutes (HRS), and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR). DPP will be issuing a Finding of No Significant Impact (FONSI) for the proposed action.

1.4 APPLICANT AND APPROVING AGENCY

HRS Chapter 343, Environmental Impact Statement, establishes an environmental review process whereby a private entity proposing a project must prepare an EA that considers potential adverse environmental impacts from the project. In this environmental review process, Hawaiian Electric is the applicant and DPP is the approving agency.

[1] Site Preconsultation response from DPP.

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

This project consists of installing two sets of new underground sub-transmission cables and removing a total of four cables, consisting of the two 46 kilovolt (kV) cables currently in use, and two inactive cables. The inactive cables originally installed in 1956 were abandoned in place in 1990 following installation of the cables currently in use today. In 2002, DLNR encountered Hawaiian Electric's cables during routine maintenance dredging of the Ala Wai Canal. As a temporary solution, sections of the active cables on the makai (seaward) side of the canal were covered with twelve 20-foot by 8-foot pre-cast concrete panels. The panels were placed approximately 50 feet from the makai canal wall. During this time, portions of the inactive cables within the canal were cut, sealed, and removed. The inactive cables were not removed in its entirety because there was concern this action could impact the active cables. The four existing cables and the twelve concrete panels will be removed after the new cables are installed and energized.

The new cables will be installed in six segment phases that will connect to Hawaiian Electric's Waikīkī Substation located on Kai'olu Street (see Figure 2-1). These cables will replace the existing cables that pass beneath Ala Wai Elementary School property, Ala Wai Community Gardens, and the Ala Wai Canal. The new route will move the alignment approximately 500 feet northwest of the existing alignment.

SEGMENT 1 connects the Waikīkī Substation on Kaiolu Street to the horizontal directional drilling pit on Kalaimoku Street. Cables will be installed via open trenching.

SEGMENT 2 is the route from Kalaimoku Street to the Ala Wai Neighborhood Park via horizontal directional drilling to install new cables under the Ala Wai Canal. A drill rig will be set up at a staging area on Kalaimoku Street. Construction staging areas and a possible second drill rig will be at the Ala Wai Neighborhood Park.

SEGMENT 3 connects the route from the Ala Wai Neighborhood Park to University Avenue and Hihiwai Street intersection via open trenching.

SEGMENT 4 will install the cables within an existing underground duct bank to a utility pole on University Avenue just mauka of the intersection with Kapi'olani Boulevard.

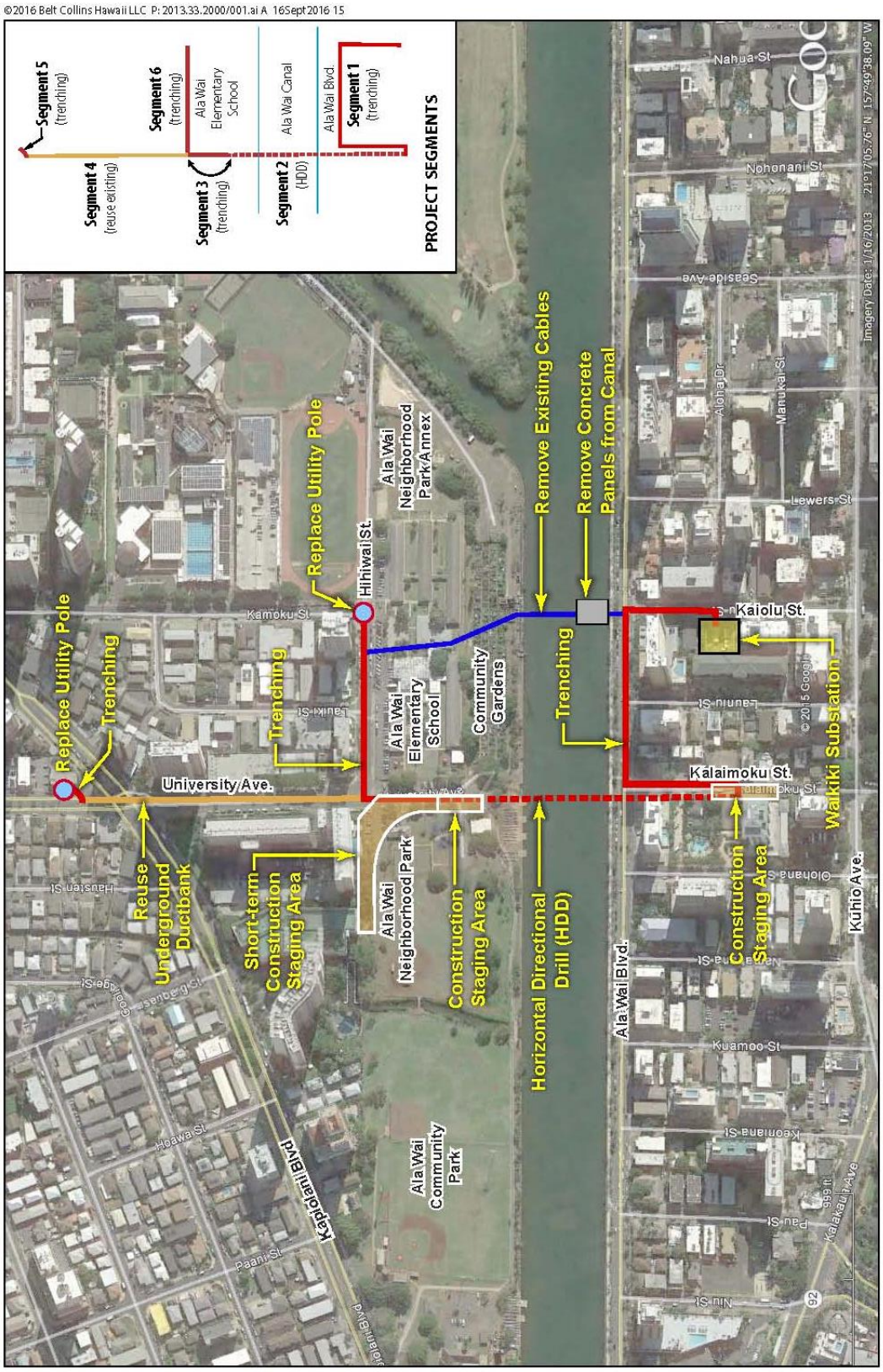


Figure 2-1
PROPOSED CABLE RELOCATION
Ala Wai 46kV UG Cable

SEGMENT 5 will trench a small section of University Avenue to bring the cables from the underground duct bank to the overhead utility pole. The existing utility pole will be replaced with a new pole.

SEGMENT 6 connects the route from the Ala Wai Neighborhood Park via Hihiwai Street to a utility pole on Kamoku Street. Cables will be installed via open trenching and the existing utility pole will be replaced with a new pole.

Hawaiian Electric will remove the existing cables that currently cross in the Ala Wai Canal and under the Ala Wai Elementary School property and a small section of the Ala Wai Community Garden once the new cables are installed and energized. Then Hawaiian Electric will either fill the existing conduits with concrete and leave it in place within the existing concrete jacket, or will remove the conduits, and fill the voided space with grout, leaving only the concrete jacket in place.

2.1.1 Methods of Installation

Three methods of installation are proposed for this project, open trenching along the roadways of the project area (Segments 1, 3, 5, and 6), Horizontal Directional Drilling (HDD) (Segment 2) for the cables crossing under the Ala Wai Canal, and use of an existing duct bank (Segment 4). Open trenching is considered the most basic method for installing an underground duct bank. Typically, construction methodology of open trenching consists of: removing the concrete or asphalt road surface, topsoil, and excavating material to a standard depth for electrical conduits. The conduits are installed at a minimum of three feet of cover in roadway areas and 18-inches of cover under sidewalk, curb and gutter areas. The conduits are horizontally and vertically stacked and placed at the base of the open trench. A concrete jacket is poured over the conduits creating the duct bank. The trench should be backfilled with soil that is free of debris and contamination. Any excess backfill material from the excavation is loaded into hauling trucks and transported to a landfill for either future reuse or disposal. All disturbed areas within the City's right-of-way shall be restored to DPP's prevailing standards and specifications. Landscaping will be restored to its pre-existing condition.

The HDD method requires excavation of two lateral bore holes (approximately 30 inches in diameter). The cables will be installed within these bore holes located approximately 10 feet apart. The maximum depth of the cables will be approximately 50 feet below msl under the canal. The length of the project segment to utilize HDD is approximately 1,000 feet and includes drilling from Kalaimoku Street, under Ala Wai Boulevard, under the width of Ala Wai Canal, then resurfaces at Ala Wai Neighborhood Park parking lot. See Figure 3-2 in Chapter 3 showing the plan and profile of the general route for the cable installation within the project.

There are three steps to the HDD process. First, a small pilot hole is drilled from entry to exit. Second, the pilot hole is expanded to a final bore hole diameter necessary for conduit installation. Finally, conduits will be assembled in the Ala Wai

Neighborhood Park and pulled back through the bore hole toward Kalaimoku Street. The conduits are tied in at each entry and exit site of the borings by open trenching.

2.1.2 Preliminary Schedule

Construction to install the new cables is expected to begin in late 2017 and be complete in early 2018. Removal of the existing cables will occur after the new cables are installed and energized, and is preliminarily scheduled to be complete by mid-2018.

2.1.3 Preliminary Cost Estimates

The preliminary project cost estimate for relocating the new cables and removing the existing cables is approximately $29.0 million.

2.2 ALTERNATIVES ANALYSIS

An analysis of alternatives to the Proposed Action was conducted to satisfy the requirements of HRS, Chapter 343 and its implementation rules, HAR 11-200. The following alternatives were considered to the Proposed Action.

2.2.1 No Action Alternative

One of the alternatives considered was No Action. Under this alternative, no effort would be made to relocate the existing cables that lie across the Ala Wai Canal. Existing uses and environmental conditions would continue to occur in their current state unchanged. This would lead to similar issues during DLNR's next maintenance dredging operation and DLNR will be unable to complete the necessary dredging of the canal where the existing cables are located.

DLNR has requested that Hawaiian Electric remove the cables so DLNR can complete the dredging it needs to maintain canal depths. The No Action alternative is not an option for this project.

2.2.2 Alternative Route: Kapahulu Avenue

An alternative to crossing the Ala Wai Canal to reach Kaiʻolu Street and the Waikīkī Substation is a route that parallels the canal along Ala Wai Boulevard to Kapahulu Avenue. This alternative would connect to existing circuits on Kapahulu Avenue and near the Kapahulu substation on Leahi Street. New underground cables would be installed via open trenching along Ala Wai Boulevard until the cables turn south on Kaiʻolu Street and ultimately connect with the Waikīkī Substation. This route would avoid crossing the Ala Wai Canal, but would require approximately 7,100 feet of underground construction and longer project completion schedule.

The greater distance of the Kapahulu route would lead to prolonged and increased construction impacts on neighborhood residents. These construction impacts include construction noise, fugitive dust, sedimentation from temporary stockpiles, potential archaeological and cultural impacts, potential major utility crossings, traffic disruptions, and temporary on-street parking removal. The long open trenching distance required for this route also raised concerns among the community regarding the presence of and impact to buried archaeological and cultural artifacts.

The potential negative impacts from the alternative route option make this alternative less attractive than the under canal crossing alternative.

2.2.3 Alternative Route: McCully Street

An alternative to crossing the Ala Wai Canal to reach Kaiʻolu Street and the Waikīkī Substation is a route that passes over the canal at the McCully Street bridge and connects to existing circuits along Kapiʻolani Boulevard. The McCully Street open trenching route would follow Kapiʻolani Boulevard west to McCully Street. Then the route would cross over the Ala Wai Canal parallel to the McCully Street bridge via a new independent ductbank support structure requiring piles in the canal. Open trenching would resume once the route turns southeast onto Ala Wai Boulevard and ending at the Waikīkī Substation on Kaiʻolu Street.

This route does not require cables in the Ala Wai Canal, but it does require a new independent duct bank support structure to be constructed parallel to the existing McCully Street bridge. Installing the cables on the existing bridge is not a feasible option due to conflicts with the existing utilities on the bridge. In addition, this alternative would potentially impact the waterway by adding piles. The McCully Street route would require approximately 4,700 feet of underground construction and longer project completion schedule, and would require an easement for the new independent bridge structure.

The greater distance of the McCully Street route would lead to prolonged and increased construction impacts on neighborhood residents and recreational canal users. These construction impacts include construction noise, fugitive dust, sedimentation from temporary stockpiles, potential archaeological and cultural impacts, potential major utility crossings, traffic disruptions to a major entry/exit point to Waikīkī, temporary on-street parking removal, and disruption to recreational canal users. The long open trenching distance required for this route also raised concerns regarding the presence of and impact to buried archaeological and cultural artifacts.

The potential negative impacts from the alternative route option make this alternative less attractive than the under canal crossing alternative.

2.2.4 Alternative Route: New Bridge Crossing

An alternative to crossing beneath the canal is to construct a new bridge. The possibility of constructing a bridge over the canal to avoid impacts to the water was considered in various configurations in the past and reconsidered recently for this project. In the past, a vehicular bridge was proposed to extend University Avenue into Waikīkī. This proposal was met with strong community opposition, specifically related to concerns of increased traffic in Waikīkī that would result with any direct connection from the McCully-University area. Neighborhood Board members voted against the idea after "hearing community concerns about issues such as noise and crime."[1]

In 2013, the discussion of improving access into Waikīkī via a new bridge crossing was renewed. This time, a pedestrian bridge across the Ala Wai Canal at the end of University Avenue was proposed. This bridge could be multi-purpose and provide pedestrian and bicycle access as well as strategic utility access into Waikīkī. But as the pedestrian bridge concept was further brought into public review, community opposition again surfaced. This time, property values and traffic concerns were also expressed by condominium owners.[2] In a statement, Mike Formby, the director of the City's Department of Transportation Services (DTS), noted that there is no present funding for such a project and that any such structure "would have to be iconic in nature."[3] Following a McCully Neighborhood Board meeting that discussed the pedestrian bridge, DTS deputy director Mark Garrity stated that "any project like this would take a long time to plan."[4]

DLNR has requested Hawaiian Electric to remove its cables as soon as possible. However, this alternative does not have a definitive timeline. Hawaiian Electric must relocate the power cables before DLNR's next maintenance dredging which is expected to occur in 2018. Therefore, this is not a viable alternative.

1 Kubota, Lisa. "Board to explore idea of new bridge across Ala Wai Canal." Posted March 21, 2014. www.hawaiinewsnow.com/story/25043931/board-to-explore-idea-of-new-bridge-across-ala-wai-canal.

2 Ibid.

3 Ibid.

4 Web Staff. "Does Ala Wai Canal need another bridge?" Posted March 27, 2014. khon2.com/2014/03/27/does-ala-wai-canal-need-another-bridge/

CHAPTER 3
AFFECTED ENVIRONMENT

This chapter reviews the affected environment and identifies potential impacts and mitigation measures.

3.1 LAND USE AND LAND TENURE

3.1.1 Regional Land Use

The project area is located on the northern side of Waikīkī in Honolulu, Oʻahu, Hawaiʻi. Waikīkī includes residential condominiums and apartment buildings, hotels, transient residences, visitor-oriented commercial and recreational establishments, and public facilities. Waikīkī is the primary visitor destination in Hawaiʻi with a de facto population in 2010 of 96,859.[1]

The Ala Wai Canal serves as a diversion drainage channel and sediment deposition basin. It separates the highly-populated Waikīkī from the adjacent, mixed-use neighborhoods of Ala Moana, McCully-Mōʻiliʻili, and Kapahulu. Three bridges cross the canal at Ala Moana Boulevard, Kalākaua Avenue, and McCully Street. Ala Wai Neighborhood and Community Parks serve residents of this area.

3.1.2 Existing Land Use

The project area encompasses the section of Ala Wai Canal fronting Ala Wai Elementary School, the school itself, a portion of Ala Wai Neighborhood Park and Ala Wai Community Gardens, the Hawaiian Electric Waikīkī substation, and the adjacent local streets, including University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street (see Figure 3-1). The Tax Map Keys (TMK) for the affected properties are: (1)2-7-036:001, 2-7-036:007, and 2-6-017:064.

[1] The de facto population includes residents and visitors staying in Waikīki. Also, some 26,085 persons worked regularly in Waikīkī, most of whom lived outside the area (U.S. Census decennial census data, in Hawaiʻi State Department of Business, Economic Development and Tourism [DBEDT]. *2014 Hawaiʻi State Data Book,* Table 1.20. Posted at dbedt.hawaii.gov/economic/databook/db2014/.)

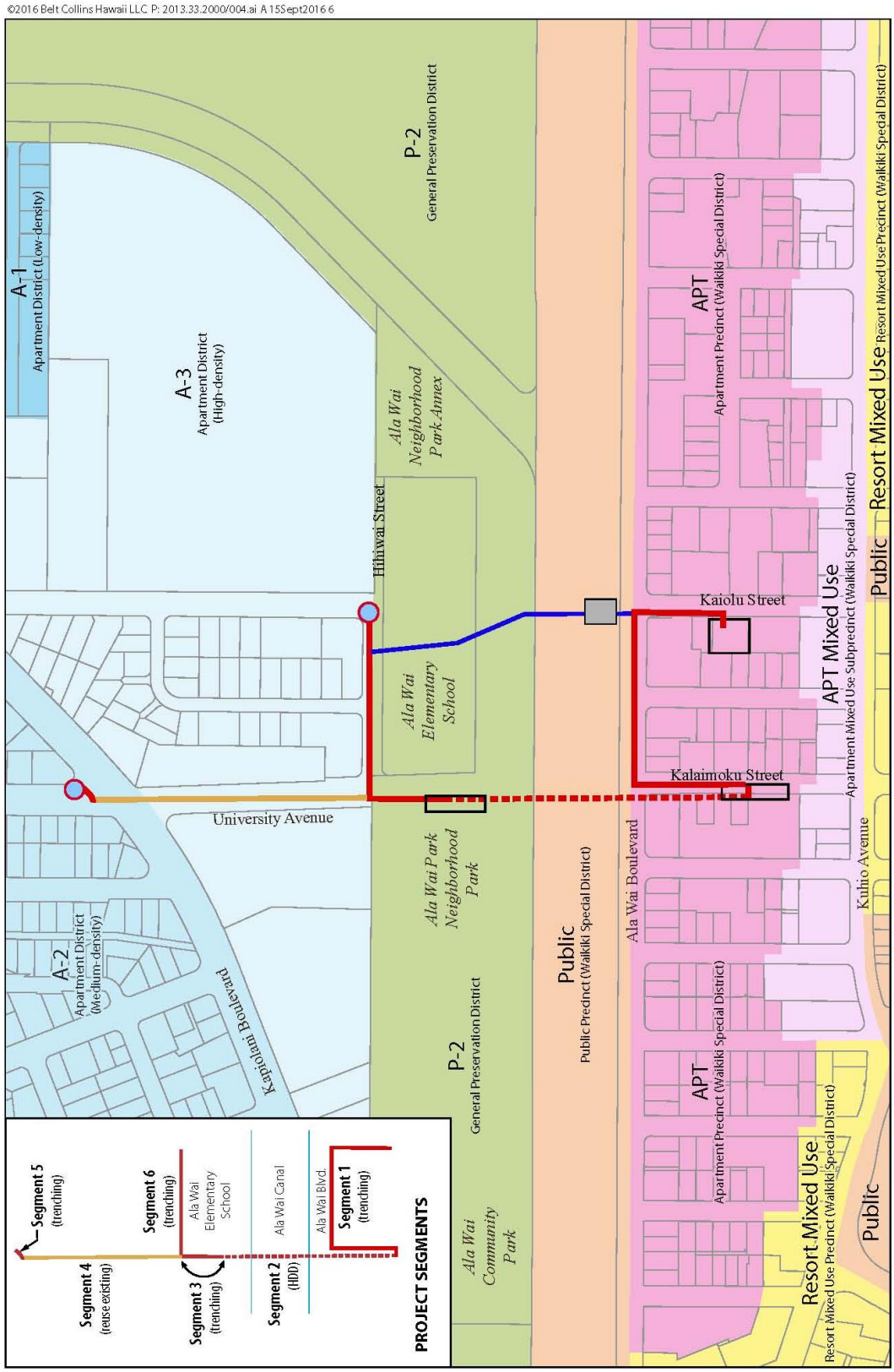


Figure 3-1
ZONING MAP
Ala Wai 46kV UG Cable

The Ala Wai Canal is owned by the State of Hawai‘i (State). The Board of Land and Natural Resources (BLNR) has jurisdiction over use of the canal and the Department of Land and Natural Resources (DLNR) has maintenance responsibility. The Ala Wai Neighborhood Park and Ala Wai Community Gardens are owned by the State but adhere to an Executive Order granting use to the City and County of Honolulu (City). The affected streets are all City rights-of-way and are maintained by the City. DLNR owns the land where Ala Wai Elementary School is located and the school is operated by the State's Department of Education (DOE) via an executive order.

Ala Wai Neighborhood Park and Ala Wai Community Gardens are maintained by the City's Department of Parks and Recreation (DPR). On the makai side of Ala Wai Canal, along Ala Wai Boulevard, there is a tree-lined paved promenade, which is a popular site for walking and jogging. This promenade is owned by the City and is maintained by the Department of Facility Maintenance (DFM).

3.1.3 Surrounding Land Uses

Land uses surrounding the project site include: high-rise residential condominiums, rental apartments, and single-family dwellings to the north; Ala Wai Community Park to the west; ‘Iolani School to the northeast; Ala Wai Community Dog Park (Ala Wai Neighborhood Park Annex), Ala Wai Elementary School, and Ala Wai Golf Course to the east; and Waikīkī and the Pacific Ocean to the south.

Residential condominium buildings occupy most of the area adjacent to the cable route in Waikīkī. Ala Wai Boulevard serves both through traffic and local traffic; parking along the roadway supplements the very limited parking on the nearby residential streets.

Upland of the Ala Wai Canal, land use is primarily residential, parks and schools. The neighborhood of McCully-Mō‘ili‘ili is a mix of residential types including high-rise residential condominiums, rental apartments, and single-family dwellings. Educational facilities in the surrounding area include elementary, middle, and high schools, notably ‘Iolani School and Ala Wai Elementary School.

Ala Wai Community Park is adjacent to Ala Wai Neighborhood Park, fronting Kapi‘olani Boulevard and McCully Street. The Ala Wai Neighborhood Park Annex, including a dog park, is located to the east of Ala Wai Neighborhood Park and the Community Gardens, makai of ‘Iolani's track and field. Both parks are owned by the State but also adhere to an Executive Order to the City. They are both maintained by the DPR. Further east of the project site is a popular municipal golf course. Ala Wai Golf Course fronts the Ala Wai Canal and Kapahulu Avenue.

3.1.4 Potential Impacts and Mitigation Measures

Installation of new power cables and removal of existing cables would not change current land uses in the project area. These underground utilities are designed to serve the existing land uses. A possible effect might be a restriction on the land uses

immediately above the proposed duct system alignment. It is recommended that no structures be constructed over the duct system and that they be accessible for utility maintenance purposes. The proposed project location within the City rights-of-way, would minimize the chance that structures would be built over the duct system. For the portion of the duct system within the Ala Wai Neighborhood Park and the Ala Wai Canal, an easement from the State Board of Land and Natural Resources (BLNR) will be required. Once a new easement is obtained, the existing easement at the current cable location will be extinguished.

In the short term, temporary project impacts are expected during the project's construction phase. Full use of the affected properties may be temporarily hindered by site preparation, trenching, stockpiling, utility installation, backfilling, site cleaning, and restoration. Those sections of the project area that occur through existing streets will experience temporary traffic delays from possible lane closures, rerouting, and parking prohibitions. Certain areas of the Ala Wai Neighborhood Park and the Ala Wai Canal may be temporarily closed during construction and site preparation.

To mitigate these potential impacts, Hawaiian Electric will prepare traffic control plans and submit it to the City's Department of Planning and Permitting (DPP) Traffic Review Branch for review and approval. The plan will show the limits of construction, lane closures, traffic movements, flag person (if needed), hours of operation, and provisions for access to the adjacent parcels should the access points become blocked. The contractor will perform work within the roadways during off-peak traffic hours. See Section 3.9.2 of this chapter for detailed mitigation measures.

Hawaiian Electric has previously engaged in outreach with community stakeholders including: the Department of Education for the Ala Wai Elementary School, ʻIolani School, McCully/Mōʻiliʻili Neighborhood Board, Waikīkī Improvement Association, Waikīkī Business District Improvement Association, Department of Parks and Recreation, Area Elected Officials, cultural descendants, Oʻahu Island Burial Council, and the condo resident managers in the surrounding areas. Hawaiian Electric also conducted two informational meetings in January 2017 after the Draft Environmental Assessment was published. The meetings were opportunities to update the public about the project and answer any questions or concerns. Scheduling discussions with the surrounding schools and recreational stakeholders will be ongoing. Stakeholders will be notified of closures through media resources, online notices, and direct contact once the construction schedule is finalized.

3.2 GEOLOGY, SOILS AND TOPOGRAPHY

3.2.1 Geology

The island of Oʻahu consists of two basaltic shield volcanoes: the Koʻolau volcano to the east and the Waiʻanae volcano to the west. Millions of years of erosion and sea level change have further shaped the island and its subsurface composition to the

O'ahu we are familiar with today.[2] The geology of the Waikīkī and McCully-Mō'ili'ili area consists of sedimentary deposits.[3]

The project area is located on an alluvial plain and sits atop fill composed of marine deposits. This fill is described as "brown to white permeable marine mud containing shells, coral, and other calcareous marine organisms dredged from the ocean floor and used to fill up salt marshes and other low lands."[4] The alluvial plain of sedimentary deposits continues upland and stretches east and west of the project area.

South of the project area, the geology transitions from fill composed of marine deposits to unconsolidated marine calcareous sediments. Waikīkī and the coastline are described as unconsolidated marine calcareous sediments. This material is "chiefly cream-colors and light-tan, very permeable beach sand consisting of grains of worn coral, coralline algae, and shells with appreciable amounts of foraminifers and other calcareous marine organisms."[5] Typically ocean or brackish water is abundant in this sand.

When the Ala Wai Canal was constructed in the late 1920's, the excavated lagoonal material was used for fill on both the mauka and makai sides of the canal.

3.2.2 Soils

The U.S. Department of Agriculture's Soil Conservation Service, now known as the Natural Resources Conservation Service, classifies the soil at the project area as mixed fill land, with zero to three percent slopes.[6] The typical profile of mixed fill land includes a thin top layer (0 to 6 inches) of gravelly sandy loam and a second layer (6 to 60 inches) of fine sandy loam before reaching lithic bedrock. Mixed fill land consists of materials dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources.[7] This soil type occurs in urban areas, near Pearl Harbor and in Honolulu adjacent to the ocean.

2 Stearns, H., & K. Vaksvik. 1935, Reprinted March 2001. *Geology and Ground-Water Resources of the Island of O'ahu, Hawai'i*. Prepared for U.S. Geological Survey. Pg. 98.

3 Stearns, H., & K. Vaksvik. 1938, Reprinted March 2001. *Geologic and Topographic Map of the Island of O'ahu, Hawai'i* Bulletin 2, Plate 2. Prepared for U.S. Geological Survey.

4 Stearns, H., & K. Vaksvik. 1938, Reprinted March 2001. *Geologic and Topographic Map of the Island of O'ahu, Hawai'i* Bulletin 2, Plate 2. Prepared for U.S. Geological Survey.

5 Ibid.

6 U.S. Department of Agriculture, Natural Resource Conservation Service, Survey Area Data: Version 9, September 25, 2014.

7 Foote et al. 1972. Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.

3.2.3 Topography

The project area is relatively level at an approximate elevation of three feet above mean sea level (msl).[8] Over the project area's approximate half mile length, the elevation ranges from zero feet above msl to about three feet above msl. The slope across the project area is approximately 0 to 3 percent.[9]

3.2.4 Potential Impacts and Mitigation Measures

The proposed action would not adversely impact the integrity of the project area's geology, soil, or topography. Both cable installation and removal will disturb the soil at the project area, but the disturbed locations will be restored to its original condition once construction is completed.

Soil will be excavated as part of both the directional drilling and trenching components of cable installation. Excavated soil will be tested for chemicals of potential concern, including petroleum hydrocarbons, Resource Conservation and Recovery Act (RCRA) eight metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), and polychlorinated biphenyls (PCBs) using appropriate Environmental Protection Agency (EPA) SW-846 methods to determine if the soil is suitable for reuse.[10] Suitable soil will be reused to fill trenches of the new cables. Any remaining soil that cannot be reused will be characterized using the toxicity characteristic leaching procedure (TCLP) to determine if the soil is suitable for disposal as non-hazardous waste at PVT Landfill in Nanakuli for disposal. Any soil failing the TCLP testing will need to be handled as hazardous waste and disposed at a permitted facility on the U.S. mainland. With the exception of possible erosion during construction, no mitigation is required in regard to geology, soils, and topography. BMPs would be employed during construction to control runoff, erosion, and dust.

3.3 HYDROLOGY

3.3.1 Water Resources

Ala Wai Canal is located on the southeastern side of the island of Oʻahu, where the climate is relatively dry, mild, and seasonably uniform. The project area receives

8 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 7.

9 U.S. Department of Agriculture, Natural Resource Conservation Service, Survey Area Data: Version 9, September 25, 2014.

10 State of Hawaiʻi, Department of Health, Hazard Evaluation and Emergency Response Office. October 2011. *Guidance for the Evaluation of Imported and Exported Fill Material, Including Contaminant Characterization of Stockpile.* Pg. 3

about 25 inches of rainfall per year.[11] Substantially greater rainfall occurs in the upper reaches of the Ala Wai watershed.[12]

3.3.2 Surface Water

Ala Wai Canal is located within the Ala Wai watershed. The canal receives storm water from five sub-watersheds: Makiki, Mānoa, Pālolo, Ala Wai Canal, and Waikīkī. The Ala Wai watershed encompasses approximately 10,378 acres.[13] Storm water has been recognized as a source for irrigation. Storm water also recharges ground water supplies and ensures proper water cycle. The project will not increase impervious surfaces.

Ala Wai Canal is a two-mile long, man-made, unlined drainage channel constructed between 1921 and 1928. The channel was originally dredged to combine the meandering flow of several streams into one straight outlet to the ocean.[14] The canal width ranges from approximately 150 to 250 feet wide, and is widest between the McCully Street Bridge and the Mānoa-Pālolo Drainage Canal (MPDC). According to the 1992 EIS completed by Edward Noda and Associates, "the original depths of the Ala Wai Canal were approximately 10 to 20 feet below msl behind Waikīkī, 10 to 13 feet below msl between the confluence with Makiki Stream and Ala Moana Boulevard Bridge, and 25 feet below msl beyond the Ala Moana Boulevard Bridge. However, sedimentation has decreased canal depths over time." The canal's average cross-sectional depths range from three to eight feet below msl with spot depths ranging from one to 12 feet below msl.[15]

Both the MPDC and Makiki Stream flow into the Ala Wai Canal. The MPDC, which collects water from Mānoa Stream and Pālolo Stream, feeds into the Ala Wai Canal approximately a quarter mile upstream (east) of the project area. The MPDC is lined in the upstream area and unlined above its confluence with the Ala Wai Canal.[16] Large amounts of silt accumulate in the unlined section of the MPDC, reducing its depth to about 2 feet below msl.[17]

Makiki Stream feeds into the Ala Wai Canal approximately a half-mile downstream (west) of the project area. Makiki Stream is approximately 3.5 miles long and its

---

11 Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

12 Belt Collins Hawaii. October 1998. *Final Environmental Assessment, Ala Wai Canal Dredging, Honolulu, O'ahu, Hawai'i.* Prepared for City and County of Honolulu, Department of Transportation Services and Department of Design and Construction. Pgs. 2-9.

13 U.S. Army Corps of Engineers (USACE). August 2015. *Draft Ala Wai Canal Project, O'ahu, Hawai'i Feasibility Study with Integrated Environmental Impact Statement*. Pg. 6.

14 Ibid., pgs. 5–10.

15 Edward K. Noda and Associates, and KRP Information Services. April 1993. *Ala Wai Improvement Environmental Assessment.* For the Department of Land and Natural Resources. Pg. 2-1

16 USACE. August 2015. *Draft Ala Wai Canal Project, O'ahu, Hawai'i Feasibility Study with Integrated Environmental Impact Statement*. Pgs. 5-10.

17 Ibid.

tributaries include Kanahā Stream, Kanealole Stream, Moleka Stream, and Maunalaha Stream.[18] In 1930, Makiki Stream was modified for flood protection: Ala Wai Canal to King Street was channelized with concrete rubble masonry walls on both banks.[19]

The Ala Wai Canal empties into Māmala Bay and the Pacific Ocean at the Ala Wai Boat Harbor, approximately 0.8 miles from the project area. The boat harbor connects to Māmala Bay via a channel that was dredged through the reef platform when the harbor was built in 1935.[20]

3.3.3 Water Quality

Water quality in the Ala Wai Canal is determined by its source waters (nearshore ocean water, groundwater, streams), mixing, and tidal exchange, and input from the accumulated sediment via resuspension and regeneration.[21] As the collecting point for the Makiki, Mānoa, Pālolo and Kapahulu sub-watersheds, the canal accumulates sediments, nutrients, some heavy metal contamination, and solid waste trash. The results of these contaminations are reflected in discoloration of the water due to phytoplankton growth, suspended sediments, and trash.

The State Department of Health (DOH) classifies the Ala Wai Boat Harbor as a Class A embayment that should be protected "for recreational purposes and aesthetic enjoyment."[22] The Ala Wai Canal is classified as Class 2 waters. Class 2 waters are protected "for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping and navigation."[23] The nearest coastal shoreline, Waikīkī Beach, is located approximately 0.65 miles south of the project area.

The DOH is required by §305(b) of the Clean Water Act (CWA) to biennially submit a list of impaired waters defined by CWA §303(d) to Congress. The U.S. Environmental Protection Agency (EPA) may approve Total Maximum Daily Load (TMDL) for specific receiving waters that do not meet water quality standards due to specific pollutants. The list is updated when new data justifies additional TMDL or delisting of specific receiving water segments or pollutants. A TMDL was assigned to the Ala Wai Boat Harbor in 1996 for pathogens, metals, total suspended solids and

18 Townscape, Inc. & Dashiell, Eugene P. July 2003. *Final Report Ala Wai Watershed Analysis*. Prepared for Department of Land and Natural Resources and U.S. Army Corps of Engineers. Pg. 10.

19 City and County of Honolulu. November 2014. *Flood Insurance Study, Volume 1 of 4, page 39.*

20 USACE. August 2015. *Draft Ala Wai Canal Project, Oʻahu, Hawaiʻi Feasibility Study with Integrated Environmental Impact Statement*. Pgs. 5-10.

21 Edward K. Noda and Associates. 1992. *A Management Plan for the Ala Wai Canal Watershed.* For the Department of Land and Natural Resources. Honolulu.

Edward K. Noda and Associates, and KRP Information Services. April 1993. *Ala Wai Canal Improvement Environmental Assessment.* For the Department of Land and Natural Resources. Honolulu. Pg. 2-10

22 State of Hawaiʻi. 2015. *Hawaii Administrative Rules, Title 11, Chapter 54, Water Quality Standards.* Updated November 14, 2015.

23 Ibid.

pesticides. As of the date of the 2014 annual report to the EPA, no other TMDLs have yet been established for the Ala Wai Boat Harbor tributary area. Water quality data for monitoring stations for other sections of the Ala Wai Canal between the Ala Moana Boulevard Bridge ranging to the Diamond Head end and the Mānoa and Pālolo Stream tributaries all show non-attainment of at least one water quality parameter, but there is currently insufficient data to establish TMDLs for the Ala Wai Canal sections upstream of the harbor.

3.3.4 Groundwater

Groundwater accounts for almost 99 percent of Hawaii's domestic water and about 50 percent of all freshwater used in the state.[24] The Ala Wai watershed area contributes to both the Nu'uanu Aquifer and the Pālolo Aquifer. According to the State of Hawai'i Commission on Water Resource Management, the Pālolo Aquifer generates a groundwater sustainable yield of 5 million gallons per day (MGD) and Nu'uanu Aquifer generates 14 MGD. The larger Honolulu groundwater system generates a sustainable yield of 50 MGD.[25]

BWS has established a No-Pass Line on O'ahu to demarcate the boundary between non-potable brackish and potable fresh groundwater. Groundwater beneath areas that are seaward of the line are considered to be of lower value as a drinking water source. After DOH was assigned primacy by EPA for Underground Injection Control regulations, DOH also accepted responsibility to control activities that could impact potable aquifers landward of the No Pass Line. The No Pass Line in the project area is the seaward side of the Ala Wai Canal.

3.3.5 Potential Impacts and Mitigation Measures

The proposed project is not expected to adversely affect the hydrology of the project area. Trenching may encounter non-potable caprock aquifer groundwater in the Waikīkī segments of work that is below the No Pass Line. Trenching on the McCully/Mō'ili'ili side will be above the No Pass Line and will not be deep enough to affect groundwater. Directional drilling through the marine muds may encounter groundwater, but the relatively low permeability of the mud will prevent impact to the aquifers beneath. Similarly, directional drilling should result in no discharge into the canal. City permitting agencies will require that the project employ BMPs to control potential discharges from all construction activities. Cable removal will be monitored and BMPs will be in place, such as silt screens, to prevent turbid water discharges. Other BMPs should minimize the use of potable water and protect storm drains from runoff. Erosion, siltation, and pollution should be minimized by implementing BMPs. Construction debris, petroleum products, and drilling fluids should be monitored and prevented from entering the Canal. Site work should be scheduled during periods of minimal rainfall.

24 Gingerich, Stephen B. and Delwyn S. Oki. 2000. Ground Water in Hawai'i. Obtained from www.higp.hawaii.edu/~scott/GG104/Readings/Gingerich_Oki_2000.pdf.

25 State of Hawai'i Commission on Water Resource Management. 2016. dlnr.hawaii.gov/cwrm/groundwater/

Temporary impacts of construction activities may include re-suspension of bottom sediment in the Ala Wai Canal, increase in canal traffic, and inconvenience to recreational users of canal waters. Long-term impacts of the proposed project will be positive, as a clear canal way will facilitate maintenance dredging to maintain designed depths.

3.4 ARCHAEOLOGICAL AND CULTURAL RESOURCES

3.4.1 Pre-Consultation for Archaeological and Cultural Resources

Hawaiian Electric conducted two meetings with a group of identified cultural descendants of the Waikīkī Ahupuaʻa and Cultural Surveys Hawaiʻi (CSH) prior to archaeological groundwork. Hawaiian Electric sent out over 60 invitations to the identified Waikīkī Ahupuaʻa descendants to these meetings in order to request their insight and feedback. The first meeting with this group was held on July 8, 2015. This meeting shared the Area of Potential Effect (APE) and gave Hawaiian Electric the opportunity to address any concerns. CSH shared previous archaeological studies in the area and the potential of additional archaeological discoveries. The second meeting, held on October 28, 2015, presented plans to the descendants for the archaeological inventory survey (AIS) that were agreed upon by the State Historic Preservation Division (SHPD). The plan was to excavate five test units assisted by a backhoe and excavate five shovel test pits (STPs). The descendants concurred with this strategy and archaeological groundwork was performed in January 2016.

3.4.2 Archaeological Resources

The AIS was performed by CSH in order to observe and document any historic properties located within the project area. The AIS consisted of literature review, subsurface testing, lab analysis, fieldwork results, historic property descriptions and applicable mitigation recommendations. Historic properties are assigned State Inventory of Historic Properties (SIHP) numbers once they are identified and acknowledged by SHPD. According to HAR §13-284-2, historic properties are defined as "any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old."[26] The AIS performed by CSH did not discover any new historic properties, however, two previously identified properties were observed SIHP # 50-80-14-5796,[27] an original wetland surface circa Pre-Contact to historic 1920s and SIHP # 50-80-14-9757,[28] the Ala Wai Canal circa historic 1921 to 1928.

---

26 State of Hawaiʻi. 2002. *Hawaii Administrative Rules, Title 13, Chapter 284, Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-42, HRS, Projects.*

27 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*. Pg, 104.

28 Ibid., pg. 119.

Based on historical research and maps, the makai (seaward) section of the project area is located within former agricultural fields.[29] Studies show that the sediment had various agricultural changes from traditional Hawaiian farming practices (taro, bananas and sugarcane) during pre-Contact to post-Contact historic farming practices (rice and bananas).[30] The area was predominately a wetland, known as the Waikīkī wetlands until the 1920s land reclamation.[31] The wetland SIHP#-5796 was first documented in 2000 by Celeste C. LeSuer and her team during an AIS of the King Kalākaua Plaza.[32] The wetland was characterized as "agricultural wetland sediments, non-agricultural wetland sediments, peat sediments, pond sediments and pond berms dating from the pre-Contact period to the early 1900s."[33] The AIS for this project confirmed the presence of the former wetlands SIHP#-5796 in seven of the ten test excavations during subsurface testing and collection of data.[34] The study has concluded a high likelihood of encountering the wetland deposits throughout the majority of the makai (seaward) portion of the project area.

The Ala Wai Canal SIHP #-9757 was built by Walter F. Dillingham founder of Hawaiian Dredging Company in the 1920s for the purpose of changing the land usage.[35] Health concerns by the public prompted by the island's mosquito dilemma were the most influential for the development of the canal.[36] A proposal to drain and fill the Waikīkī wetlands was recommended by the Board of Health of the Territory of Hawaii in order to eliminate the mosquito breeding areas.[37] The proposal also listed other benefits for the construction of the canal like controlling the runoff from Mānoa and Pālolo valleys away from Waikīkī beach and attracting recreational use.[38] After the completion of the canal's development in 1928, it was characterized as "a 2-mile long man-made waterway of variable depth and width located in the Waikīkī district of Honolulu."[39] The canal spans from Kapahulu Avenue to Kalākaua Avenue and ending at the Ala Wai Boat Harbor. Minor adjustments to the width and depth have also been ongoing since its completion.

Waikīkī's wetlands served farming and cultivation purposes until the dredging of the Ala Wai Canal started in 1921.[40] Most of the farmers lost their land or had major

---

29 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 28.

30 Ibid., pg. 118.

31 Ibid., pg. 28.

32 Ibid., pg. 50.

33 Ibid., pg. 104.

34 Ibid., pg. 114.

35 Ibid., pg. 119.

36 National Register of Historic Place Registration Form. Oct 1990. OMB No. 10024-0018.

37 Ibid.

38 Ibid.

39 Ibid.

40 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*. Pg. 32.

property damage because of the land reclamation events.[41] The property owners were required to pay a very high price for the filling in of their land, which resulted in foreclosures.[42] Over six hundred acres of ponds and wetland fields in Waikīkī were drained and then filled with dredged sediment and other localized or imported fill sediment.[43] The project's AIS also confirmed the presence of the land reclamation events through observation of the hydraulic dredge sediment documented in the stratigraphy of the test excavations.

The Ala Wai Canal SIHP#-9757 became a border that separated the Waikīkī district from the Makiki, Mōʻiliʻili and Ala Moana areas.[44] This prepared Waikīkī and the surrounding districts for urbanization and soon after roadways and neighborhoods were constructed. The construction of the canal was one of the major events that changed Hawaiʻi's economic industry from agriculture to tourism. The Ala Wai Canal is formally recognized as significant by the Hawaiʻi Register of Historic Places due to its impact to Hawaiʻi's economy and culture.[45] In 1992, the Ala Wai Canal was recommended eligible to the National Register of Historic Places.[46] (see Appendix A)

3.4.3 Cultural Resources

A cultural impact assessment (CIA) study was conducted by CSH in compliance with HRS Chapter 343 which constitutes "information gathering about the cultural practices and cultural features that may be affected by actions, and promotes responsible decision-making."[47] Information for the CIA was gathered from various resources and consultation methods that include: cultural and historical documents and sources, library research from various institutions including in-house, historic maps, historic photographs, and Land Commission Awards (LCAs). CSH mailed community consultation letters to interested parties with association to the project area or the greater Waikīkī Ahupuaʻa. These community contacts include: cultural descendants, current or former residents, academic professionals, Native Hawaiian Organizations (NHOs), SHPD, State Office of Hawaiian Affairs (OHA) and the Oʻahu Island Burial Council (OIBC). As a result of CSH's consultation outreach efforts, the CIA concluded with three interviews (two in person, one by phone) and a brief chain of email responses with a cultural descendant.

41 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 40.

42 Ibid.

43 Ibid., pg. 32.

44 National Register of Historic Place Registration Form. Oct 1990. OMB No. 10024-0018.

45 Martel, Thomas III & Hallett Hammatt January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*. Pg. 119.

46 National Register of Historic Place Registration Form. Oct 1990. OMB No. 10024-0018.

47 State of Hawaiʻi. 1974. *Hawaiʻi Revised Statutes, Chapter 343, Environmental Impact Statement*.

CSH interviewed Ms. Andrea Feeser via telephone. She resides in South Carolina and is a professor at Clemson University.[48] She is the co-author of *Waikīkī: A History of Forgetting and Remembering* and was a professor at the University of Hawai'i (UH) at Mānoa.[49] Ms. Feeser spoke about the dramatic changes of Waikīkī from pre-contact to historical times and mentioned that the effects had much influence for the book. The book addresses the origination of the land before post-contact influences changed its usage. The name, Waikīkī, literally means "spouting water"[50] which derives from the numerous streams and other water resources in the area. Background research confirms the archaeological finding of an agricultural and aquacultural history. The marshlands and many sources of running water via streams and aquifers made Waikīkī prime real estate for taro cultivation. The landscape of Waikīkī during pre-contact was described as populated with "many villages, royal housing, heiau, fishponds, and taro patches."[51] Ms. Feeser recalls "parts of an ancient stream called, Pi'inaio Stream, still flows below Dori Apartments located at 443 Kuamo'o Street."[52] She advised CSH to research the Pi'inaio Stream as a main water source that likely caused the saturation of the Waikīkī marshlands.[53]

Mrs. Paulette Ka'anohi Kaleikini is a recognized cultural descendant of the Waikīkī Ahupua'a. CSH exchanged email correspondences with Mrs. Kaleikini and could not secure a site meeting due to other commitments. She was able to share some of her thoughts which included a confirmation of the Waikīkī Ahupua'a as "one large land mass" where many people lived.[54] According to Mrs. Kaleikini, her ancestors were granted land by the kings during the Great Māhele (land division of private property).[55] Prior to the Māhele, all lands were property of the kings and supervised by high chiefs in a feudal system. The Kuleana Act of 1850 distributed the *kuleana* properties conveyed as Land Commission Awards (individual land parcels) to the common people, as a result of the Māhele.[56] However, there were many people who did not receive land because they did not understand the LCA procedures.[57] CSH consulted an 1881 Hawaiian Government survey map by S.E. Bishop and was able to locate seven LCAs within the project area (see Table 3-1). The documented LCAs can give information of past land usage and inhabitation. Mrs. Kaleikini reiterated that

48 Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 136.

49 Ibid.

50 Pukui, Mary Kawena, Samuel H. Elbert and Esther T. Mo'okini. 1974. *Place Names of Hawai'i, Revised and Expanded Edition.* Honolulu, University of Hawai'i Press. Pg. 223.

51 Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 28.

52 Ibid., pg. 137.

53 Ibid.

54 Ibid., pg. 140.

55 Ibid., pg. 141.

56 Ibid., pg. 51.

57 Cachola, Jean Iwata. 1995. *Kamehameha III: Kauikeaouli.* Kamehameha Schools Press, Honolulu. From: www.ulukau.org/elib/cgi-bin/library?c=ks9&l=en.

the Native Hawaiians were usually buried close to their homes after death and noted two burial finds were located in proximity, but not within the project area.[58]

Ms. Feeser mentioned that the Paia family may have had their LCA near the project area and buried many of their family members near their home.[59] A newspaper article by The *Advertiser* reported that, "the Paia family home was in the path of the canal's construction which demanded sale of the property."[60] Mrs. Paia claimed that her chiefly ancestors were buried on the property which was her main reason to protest the sale of her land.[61] According to the *Advertiser*, the remains of her ancestors were disinterred and relocated.[62]

Table 3-1: Land Commission Awards in the Project Area Provided by CSH

LCA #	Claimant	ʻIli	Land Use
154:4	W. Sumner	Kuilei	Kalo patch makai in marsh
867:2	Nihopuu	Kālia	Enclosure with house lot, four loʻi and ʻauwai
1515:1	Kaihuolua	Kālia	Three loʻi
1758:2	Kalaeone	Kālia	Loʻi, paukū (small land section) stream
1765:2	Kahikiaele and Kamalie	Kālia	Loʻi
1775:2	Paoa	Kālia	Paukū ditch of stream taro
6235:1	C. Kapaakea	Kālia	Loʻi

Source: Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels). Pg. 55

The building of the Ala Wai Canal was a major turning point in Waikīkī's history. The Paia family's story revealed the life changing impact that it had on the people who once lived there. CSH interviewed Mrs. Barbara Makua who has lived in Waikīkī since her arrival to Oʻahu in 1956 and currently lives near the Ala Wai Canal.[63] Mrs. Makua's historical accounts of Waikīkī include her marriage to the legendary Waikīkī Beach Boy, Blue Makua and what was known as the "golden era of Waikīkī."[64] She lived in several apartment buildings around Waikīkī including the Ala Wai Terrace

58 Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 141.

59 Ibid., pg. 140.

60 Ibid., pg. 139.

61 Ibid.

62 Ibid.

63 Ibid., pg. 114.

64 Ibid., pg. 115.

which afforded her a front row view of the Ala Wai Canal.[65] She recalls watching fishermen situated on former fishing decks that protruded from the canal walls. Mrs. Makua mentions using the canal for recreation by catching Samoan crabs and sailing along the canal on their family boat.[66] Mrs. Makua's current residence shows a present reality of the canal that contains several types of pollutants. She would like to see the return of a stable ecosystem through repair and maintenance efforts for the canal.

Mrs. Makua notes that the Rosalei Apartments, located on Kaiʻolu Street and within the project area, has historic meaning to Waikīkī.[67] Mrs. Rosalie Stephenson is the namesake for the building and was a famous musical performer in Waikīkī. She entertained many guests and locals at various shows and was the lead singer for the Royal Hawaiian Band until Don the Beachcomber offered her a permanent contract.[68] The Rosalei apartment building, at the time, was an architectural breakthrough for Waikīkī that provided living space with a towering view of the Ala Wai Canal.[69] Today, the iconic building signifies the nostalgia of historic Waikīkī and serves as a reminder of the area's dramatic changes through history.

The ahupuaʻa land designation system is widely known as "pie-shaped" sections of land that spans from the top of the nearest mountain to the seashore. CSH conducted an interview with Mr. Jan Becket during a hiking expedition around Waʻahila Ridge State Recreation Park.[70] Mr. Becket is a retired Kamehameha School teacher who took interest in Native Hawaiian sites and has shared his knowledge of those sites as an author and photographer.[71] The site Mr. Becket discussed with CSH is located a fair amount of distance away from the project area, but it is important to note its existence and current state. The full interview summary can be found in CSH's CIA report located in Appendix C, and on pages 120–136. Mr. Becket had no comments specifically for the project area.

3.4.4 Potential Impacts and Mitigation Measures

Due to the horizontal directional drilling depth for the new underground cables below the Ala Wai Canal, it is unlikely that archaeological or cultural artifacts would be impacted, therefore, mitigation has not been recommended for this activity.

According to the AIS, the utility line excavations along the roadways are expected to have some impact on the "culturally modified wetland" (SIHP #-5796) property. CSH observed the depth of the wetland at about an average of 0.89 meters below surface

65 Ibid., pg. 117.

66 Ibid.

67 Ibid., pg. 116.

68 Ibid.

69 Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 116

70 Ibid., pg.120.

71 Ibid.

or about 2.9 feet below surface.[72] Open trenching for the project will be assisted by a backhoe within the Ala Wai Neighborhood Park and along the right-of-ways (ROWs) of the Ala Wai Boulevard, Kalaimoku Street, Kaiʻolu Street, Hihiwai Street and University Avenue. The AIS recommends an archaeological monitoring program to mitigate any impact on the existing historic property. The monitoring program will identify any additional historic properties during excavation work and record additional data for SIHP #-5796. The historical property has the potential to contribute more knowledge regarding the land use activities during the pre- and post-Contact periods.[73] The SHPD accepted the AIS and concurs with its mitigation recommendation for archaeological monitoring based on the potential impact to SIHP #-5796 and any unknown burial sites. See Appendix B for the final AIS report and AIS acceptance letter. An archaeological monitoring plan outlining the mitigative tasks will also need SHPD approval and review per requirements of HAR §13-279-4 before construction begins.

The CIA has noted four other historic properties located in the vicinity, but not within the project area: SIHP # 50-80-14-4890, an inadvertent burial of at least one individual; #-6680, ponded field sediment; #-6407, subsurface cultural layer; and #-4970, ʻauwai.[74] Although *iwi kūpuna* (Native Hawaiian burial) were not identified during the AIS, the CIA suggests that *iwi kūpuna* and other cultural resources are potential impacts based on the review into Waikīkī's history and interviews with the interested community members. In order to mitigate these impacts, precautions will be taken under the recommended archaeological monitoring program as approved by SHPD. All project construction personnel should be advised that encountering cultural finds, like human remains are possible. According to HAR §13-280-3,[75] groundwork activities should stop and SHPD should be informed if historic properties, other than human remains, are discovered during the project's construction. If human remains are discovered, all groundwork activities will stop and the area quarantined until further notice. HAR §13-300-40[76] states that the SHPD, Police Department and medical examiner's office should be notified. Cultural and lineal descendants of the area should be consulted for preservation efforts and proper protocol to mitigate the disturbance.

72 Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*. Pg. 124.

73 Ibid., pg. 118.

74 Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels).* Pg. 151

75 State of Hawaiʻi. 2002. Hawaii Administrative Rules, Title 13, Chapter 280, Rules Governing General Procedures for Inadvertent Discoveries of Historic Properties During a Project Covered by the Historic Preservation Review Process. Section 3, Procedures for inadvertent discoveries.

76 State of Hawaiʻi. 1996. Hawaii Administrative Rules, Title 13, Chapter 300, Rules of Practice and Procedure Relating to Burial Sites and Human Remains. Section 40, Inadvertent discovery of human remains.

The scope of work for this project does not propose a high impact to the structure of the Ala Wai Canal (SIHP #-9757), therefore, no further archaeological mitigation is recommended.

3.5 FLORA, FAUNA AND AQUATIC BIOLOGY

A terrestrial and aquatic biological resources survey was completed by SWCA Environmental Consultants (SWCA). The findings of this survey are summarized below. The SWCA report is included as Appendix D.

3.5.1 Flora

Vegetation in the project area occur generally on lands that have been altered or disturbed. During the pre-Contact and early post-Contact periods, natural vegetation at the project area would have consisted of coastal marshland species.[77] Now, the vast majority of the existing plants are introduced, with less than five percent being native to the islands.

SWCA conducted a pedestrian botanical survey on October 2, 2013, and again on January 28, 2016, to document all plant species and vegetation communities in the project area. No State- or federally-listed threatened, endangered, or candidate plant species, or rare native Hawaiian plants species were observed.

During the surveys, over 100 plant species were recorded in the study area. Of these, only seven species were native to the Hawaiian Islands. These species included naupaka (*Scaevola taccada*), hau (*Hibiscus tiliaceus*), milo (*Thespesia populnea*) hala (*Pandanus tectorius*), kīpūkai (*Heliotropium curassavicum*), ʻaeʻae (*Bacopa monnieri*), and *Cyperus polystachyos*. These indigenous species are common throughout the Hawaiian Islands.

A description of the predominant vegetation in each section of the project area is provided below. A list of all plant species observed by the project consultant is included in Appendix D of this EA.

UNIVERSITY AVENUE FROM HIHIWAI STREET TO KAPIʻOLANI BOULEVARD (DIAMOND HEAD SIDE). Vegetation along University Avenue is mostly a manicured lawn of hilo grass. Scattered non-native herbaceous weeds occur in the area including nodeweed (*Synedrella nodiflora*) and tick t-refoil (*Desmodium triflorum*).

HIHIWAI STREET (MAUKA SIDE). The northern side of Hihiwai Street is landscaped with narrow-leaved carpetgrass (*Axonopus fissifolius*) and a row of Alexandra palms (*Archontophoenix alexandrae*). Few other plant species are present in the area.

[77] Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*. Pg. 7.

ALA WAI ELEMENTARY SCHOOL. Vegetation on the school grounds include ornamental plants and manicured grasses, as well as some weedy non-native grasses and herbaceous plants common in disturbed coastal areas. The ornamental plants include a large monkeypod tree (*Samanea saman*), ti (*Cordyline fruticosa*), elephant's-ear plant (*Alocasia* sp.), red ginger (*Alpinia purpurata*), and red powderpuff (*Calliandra haematocephala*). Additional ornamental plants are present near the parking area toward Hihiwai Street, such as kou haole (*Cordia sebestena*), lantana (*Lantana camara*), and *Pseuderanthemum carruthersii* var. *carruthersii*. No native plant species were observed in the school grounds.

The lawn areas between the school buildings consist primarily of Bermuda grass (*Cynodon dactylon*), pitted beardgrass (*Bothriochloa pertusa*), hilo grass (*Paspalum conjugatum*), and swollen fingergrass (*Chloris barbata*).

ALA WAI NEIGHBORHOOD PARK PARKING LOT. Along the parking lot to the east (Diamondhead side) of Ala Wai Neighborhood Park, vegetation primarily consists of lawn grasses and weedy grass species. Other dominant species in the area include the herbaceous weeds *Modiola caroliniana* and khakiweed (*Alternanthera pungens*). Large trees planted in the parking lot area include several monkeypods (*Samanea saman*), some coconuts (*Cocos nucifera*), rainbow shower trees (*Cassia x nealiae*), and kou (*Cordia sebestena*).

ALA WAI COMMUNITY GARDEN. Vegetation in the area is dominated by edible crop plants and interspersed with weedy plants. Typical plants in the garden include papaya (*Carica papaya*), basil (*Ocimum* sp.), rosemary (*Rosmarinus officinalis*) and corn (*Zea mays*). One native plant, ʻaeʻae, was observed in the community garden. The most abundant weedy plants include dallisgrass (Paspalum dilatatum), pink wood sorrel (*Oxalis debilis*), morning glory (*Ipomoea obscura*), and Guinea grass (*Urochloa maxima*). The area between the garden and canal was devoid of vegetation.

KAIʻOLU STREET. The sidewalk area along this street includes manicured grasses with landscaped plantings. Trees consist of coconut, Macarthur palm (*Ptychosperma macarthurii*), octopus tree (*Schefflera actinophylla*), and the native hala. Hedge plants observed around buildings include croton (*Codiaeum variegatum*) and natal plum (*Carissa macrocarpa*).

KALAIMOKU STREET. Along Kalaimoku Street, to the construction staging area, the vegetation is characterized by manicured grasses with landscaped plantings. Larger trees in the area include coconut, fiddlewood (*Citharexylum spinosum*), Manila palm (*Adonidia merrillii*), and areca palm (*Dypsis lutescens*). Planted shrubs include hibiscus (*Hibiscus rosa-sinensis*) and bougainvillea (*Bouganvillea* sp.). Weedy roadside weeds, such as khakiweed, wood sorrel (*Oxalis corniculata),* and Asian pennywort (*Centella asiatica*) are also prevalent.

ALA WAI BOULEVARD FROM KALAIMOKU STREET TO KAI'OLU STREET. On the mauka (canal) side of Ala Wai Boulevard, groundcover consists primarily of a manicured

lawn interspersed with weedy grasses and weedy herbaceous species. Coconut trees (*Cocos nucifera*), ranging in height from 10 feet to 40 feet, are located at regular intervals along the boulevard. The most common grasses include smutgrass (*Sporobolus africanus*), dallisgrass, Carolina lovegrass (*Eragrostis Pectinacea*), Henry's crabgrass (*Digitaria ciliaris*), Bermuda grass, and St. Augustine grass (*Stenotaphrum secundatum*). Non-native weeds are widely scattered throughout the area.

On the makai side of the street, the vegetation consists of a lawn made up almost entirely of zoysia grass *(Zoysia tenuifolia*) as well as landscaped plantings with commonly grown ornamentals including croton, ti, and snowbush (*Breynia disticha* cv. 'Roseo-picta').

3.5.2 Fauna

SWCA conducted pedestrian fauna surveys on October 2, 2013, and January 28, 2016. The surveys were conducted during morning hours (9:00 a.m. to 11:00 a.m.) when wildlife is most likely to be active. Visual and auditory observations were included in the survey.

The project site is surrounded by residential areas where it is common to find people walking pet dogs. No other mammals were observed during the fauna pedestrian surveys. Mammals that could be expected in the project area but were not observed include cat (*Felis catus*), mongoose (*Herpestes javanicus*), rat (*Rattus* spp.), and mouse (*Mus musculus*). Although the Hawaiian hoary bat was not observed during the survey, there are several tree species within the survey area (coconut, kou, fiddlewood, manila palms, monkey pod, pandanus, and rainbow shower tree) that could be used by the Hawaiian hoary bat for roosting.[78]

The birds observed in the avifauna survey are species commonly found in Hawai'i's urban areas, gardens, and waterways. Of the 18 bird species documented, 6 are protected under the Migratory Bird Treaty Act (MBTA). Two migrant shorebirds, the wandering tattler (*Tringa incana*) and Pacific golden plover (*Pluvialis fulva*), were observed along Ala Wai Boulevard. Several ducks (*Anas* sp.), were seen swimming in the canal. While not observed, the black-crowned night heron (*Nycticorax nycticorax*) can be expected along the Ala Wai Canal.

The white tern (*Gygis alba*), which is listed by the State as threatened for the Island of O'ahu, was not observed in the avifauna survey but there are tree species within the project area (coconut, kou, fiddlewood, manila palms, monkeypod, pandanus, and rainbow shower trees) that could be used by the white tern for nesting and roosting.

[78] Acoustic surveys for the Hawaiian hoary bat were not conducted, but areas of suitable habitat for roosting and foraging were noted.

3.5.3 Aquatic Biology

Aquatic surveys were conducted by two SWCA biologists at the cable removal location in the Ala Wai Canal. In October 2013, benthic samples were obtained from eight locations by deploying an Ekman SS grab sampler across the canal; a kayak was used to access these eight locations. Four samples were collected along the walls of the canal and four samples were obtained from the middle of the canal. Incidental observations of aquatic species also occurred while conducting the pedestrian fauna survey.

Introduced tilapia (*Oreochromis/Sartherodon*) were the most observed and most abundant fish in the project area. Mosquitofish (*Gambusia/Poecilia*), another introduced species, were also observed. Small numbers of native marine fishes were observed in the area, including lai (*Scomberoides lysan*), juvenile giant barracuda (*Sphyraena barracuda*), and a small school of juvenile striped mullets (*Mugil cephalus*). Although not observed in the benthic sampling, pāpio (family Carangidae), bonefish or ʻoʻio (*Abula glossodonta*), and Hawaiian flagtail or āholehole (*Kuhlia sandvicensis*) have been documented in the Ala Wai Canal over the past two decades.[79]

The fauna of the Ala Wai Canal is largely dominated by introduced vertebrate and invertebrate species. The walls of the canal are covered with barnacles (*Balanus/Chthamalus* spp.). Large clumps of the introduced bryozoan (*Zoobotryon verticillatum)* were seen growing along the canal, interspersed with scattered clumps of the introduced sponge *Suberites zeteki*. The blue claw crab (*Thalamita crenata*) and the mangrove crab (*Scylla serrata*) were observed along the walls of the canal. Moon jellies (*Aurelia aurita*) of various sizes were seen on the surface of the canal.

The benthic samples obtained in this aquatic survey had few living organisms and all samples smelled strongly of hydrogen sulfide, indicating anoxic conditions. The canal sediment was mostly mud intermixed with barnacle shells near the walls of the canal, and mud with leaf litter and twigs near the center of the canal. Trash, such as aluminum cans, also came up with the dredge samples. Of the few living benthic organisms observed, amphipods (order *Amphipoda*) and fireworms (family *Amphinomidae*) were the most common. One speartail mudgoby (*Oxyurichthys lonchotus*) was found in the dredge sample collected near the wall of the canal along Ala Wai Boulevard. The speartail modgoby is a native indigenous brackish water goby; it is common along muddy bottoms such as the Ala Wai Canal and Honolulu Harbor.[80]

[79] Townscape, Inc. & Dashiell, Eugene P. July 2003. *Final Report Ala Wai Watershed Analysis*. Prepared for Department of Land and Natural Resources and U.S. Army Corps of Engineers Miller 1975.

[80] Personal communication with Arnold Suzumoto, Collection Manager – Ichthyology, Bishop Museum, October 2013.

Table 3-2: Inventory of Bird Species Observed in Project Area

Common Name	Scientific Name	Status	Protected by the MBTA	Year Observed
Cattle egret	*Bubulcus ibis*	NN	X	2013/2016
Common myna	*Acridotheres tristis*	NN		2013/2016
Common waxbill	*Estrilda astrild*	NN		2013/2016
Hawaiian duck-mallard hybrids*	*Anas* sp.	NN	X	2013/2016
House finch	*Haemorhous mexicanus*	NN	X	2013/2016
House sparrow	*Passer domesticus*	NN		2013/2016
Hwamei	*Garrulax canorus*	NN		2013
Japanese white-eye	*Zosterops japonicus*	NN		2013/2016
Java sparrow	*Padda oryzivora*	NN		2013
Northern cardinal	*Cardinalis cardinalis*	NN	X	2013
Pacific golden plover	*Pluvialis fulva*	N	X	2013/2016
Red-crested cardinal	*Paroaria coronata*	NN		2013/2016
Red-vented bulbul	*Pycnonotus cafer*	NN		2013
Red-whiskered bubul	*Pycnonotus jocosus*	NN		2013/2016
Rock dove	*Columba livia*	NN		2013/2016
Spotted dove	*Streptopelia chinensis*	NN		2013/2016
Wandering tattler	*Tringa incana*	N	X	2013
Zebra dove	*Geopelia striata*	NN		2013/2016
Total		**18**	**6**	

Notes:

N = Native, NN = Non-native permanent resident

* These were observations of ducks that were likely hybrids of the native Hawaiian duck (*Anas wyvilliana*) and the introduced mallard (*Anas platyrhynchos*).

3.5.4 Potential Impacts and Mitigation Measures

The proposed project is not expected to adversely impact flora, fauna, or aquatic biology in the project area. No federally listed threatened, endangered, or candidate species were identified in the terrestrial and aquatic biological resources survey completed by SWCA. The project area does not encompass any designated or proposed critical habitat for threatened or endangered species.

Overall, the vegetation in the project area is not considered unique. None of the seven native plant species observed are federally or state threatened or endangered plants, proposed listed plants, or candidate plants. Therefore, the proposed project is not expected to have a significant, adverse impact on botanical resources. If the

existing landscape is damaged as a result of project activities, then the damaged vegetation should be replaced.

Construction activities may temporarily displace some bird species at the project area but long term impacts are not expected. The six bird species federally protected under the MBTA are expected to find suitable foraging habitats in nearby areas. Temporary displacement is not expected to affect individual survival or the overall species populations.

Although not observed, one federally and state endangered mammal (Hawaiian hoary bat) and one state threatened bird (white tern) could be present in the project area based on available flora habitat. According to HAR §13-124-3(b),[81] "No person shall remove, damage, or disturb the nest of any indigenous wildlife except as provided in subsection (e) or as permitted by the department." Direct impacts to the Hawaiian hoary bats would occur if they were present in trees near the project area's noise receptors. According to SWCA, these bats are sensitive to sound. Trees should be inspected by a biologist if construction is scheduled to start during the hoary bats' roosting season which is between June 1 and September 15. Thermal imaging can be used to detect the presence of mammals located in trees. Other impacts to the bats would only occur if a juvenile bat (too small to fly but too large to be carried by a parent) were present in a tree that would be trimmed or cut down. To further minimize impact to the endangered Hawaiian hoary bat, woody plants greater than 15 feet tall should not be disturbed during the roosting season. However, the probability for the presence of the bats in urban areas is low.

Similarly, direct impact to white terns would only occur if a tree housing white tern eggs or flightless chicks is trimmed or removed during nesting or roosting period which is between January and June. While the proposed project is not expected to impact the existing trees in the project area, it is recommended that potential roosting trees are inspected by a biologist prior to any adjacent construction activities. The white tern was not observed during SWCA's survey, but it may occur within the project area.

Project personnel should be advised of any potential endangered or threatened species within the project area and best management practices should be followed. No trees are expected to be trimmed or cut down for this project.

[81] State of Hawai'i. 2015. Hawai'i Administrative Rules, Title 13, Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife, Injurious Wildlife, Introduced Wild Birds, and Introduced Wildlife. Section 3(b), Prohibited activities.

3.6 PUBLIC HEALTH AND SAFETY

3.6.1 Flood Hazards

The Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Agency indicate that the proposed project area is designated Zone AO, Zone A, and Zone X.[82] The majority of the project area, both mauka and makai of the Ala Wai Canal, is in Zone AO, with average flood depths of two feet. The northern portion of the project area, near University Avenue and Hihiwai Street, and the Ala Wai Canal itself, is designated Zone A. In Zone A, flood hazards are possible but no base flood elevation has been determined. Areas designated Zone X have been determined to be outside of the 0.2 percent annual chance floodplain.

In August 2015, a Draft Environmental Impact Statement (DEIS) was released for the Ala Wai Canal Project. The purpose of this project is to reduce flood risk within the Ala Wai Watershed. The DEIS states:[83]

> *"A high risk of flooding exists within the Ala Wai Watershed because of aging and undersized flood conveyance infrastructure. … The risk of flooding is exacerbated by the flashy nature of the streams in the watershed, with heavy rains flowing downstream extremely quickly due to steep topography and relatively short stream systems."*

In addition, overtopping of the Ala Wai Canal has flooded Waikīkī several times in the past. The *Ala Wai Canal Project DEIS* notes that overtopping of the canal occurred during the storms of November 1965 and December 1967 and during the passage of Hurricane Iniki in 1992.[84]

3.6.2 Climate Change and Sea Level Rise

In 2014, the Hawai'i State legislature passed the Hawai'i Climate Adaptation Initiative Act (Act 83, 2014).[85] The purpose of the act is to address the effect of climate change by implementing a climate adaption plan. Studies supporting this plan projected sea level to rise one foot by 2050 and three feet by 2100. Rising sea levels will increase the probability of coastal flooding and erosion which could damage coastal infrastructure.[86] The Hawai'i State Legislature also passed a law (SB 2745) in 2012 that amends the State Planning Act to include climate change as one of

[82] State of Hawai'i, Department of Land and Natural Resources. Flood Hazard Assessment Report. Updated November 2014. gis.hawaiinfip.org/FHAT/

[83] USACE. August 2015. *Draft Ala Wai Canal Project, O'ahu, Hawai'i Feasibility Study with Integrated Environmental Impact Statement*. Pg. 1-2.

[84] Ibid.

[85] State of Hawai'i. 2017. Hawai'i Climate Adaptation Portal. Obtained from climateadaptation.hawaii.gov/initiative/

[86] Keener, V. W., Marra, J. J., Finucane, M. L., Spooner D., & Smith, M.H. (Eds). (2012). *Climate Change and Pacific Islands: Indicators and Impacts. Report for the 2012 Pacific Islands Regional Climate Assessment (PIRCA).* Washington, DC: Island Press

the priority guidelines. This project addresses its consistency with the guidelines in Chapter 4, Section 4.2.4.

The existing underground electrical infrastructure in low land areas are currently subject to potential inundation on a regular basis. Underground cables are usually installed either at or around the water table which can be tidally-influenced especially near the shoreline. Although sea level rise is projected to affect underground infrastructure in low land areas, it is not expected to have an effect on the underground cables throughout their lifespan.

3.6.3 Tsunami Evacuation Zone.

The Tsunami and Extreme Tsunami Evacuation Zone Maps were prepared for the City by the Department of Emergency Management. These maps were last updated in April 2015. Given the project's proximity to the coastline, the project area is located in both the Tsunami Evacuation Zone and the Extreme Tsunami Evacuation Zone.[87] The Tsunami Evacuation Zone calls for evacuation in the event of any tsunami warning. The Extreme Tsunami Evacuation Zone calls for evacuation in the event of an extreme tsunami warning. Extreme tsunamis are an unlikely event, in which waves may move significantly inland.

3.6.4 Earthquakes

In Hawai'i, earthquakes tend to be concentrated in volcanically active areas, primarily around the island of Hawai'i. On O'ahu, the occurrence of earthquakes is generally related to tectonic activity along seafloor fractures and faults, such as the Diamond Head Fault, which extends along the seafloor northeast of O'ahu.[88] Several earthquakes ranging in magnitude from 4.0 to 5.0 have been historically documented along the Diamond Head Fault.[89] While the seismic risk on O'ahu is relatively low compared to more volcanically active areas, the sedimentary layer that underlies Honolulu, particularly along the shoreline, is more prone to heightened ground motion than adjacent areas of bedrock.[90]

In 1997, the Uniform Building Code (UBC) seismic risk ranking for O'ahu was upgraded from 1 to 2A, indicating a higher risk of seismicity than previously thought.[91] UBC's seismic provisions contain six seismic zones, ranging from 0 to 4.

87 City and County of Honolulu, Department of Emergency Management. Tsunami Evacuation Zones. Updated April 2015, www.honolulu.gov/rep/site/dem/dem_docs/tsunami_evac/etez_final/Waikiki_map_1_waikiki.pdf

88 Furumoto, A.S., E. Herrero-Bevera and W.M. Adams. 1990. *Earthquake risk and hazard potential of the Hawaiian Islands*. Hawai'i Institute of Geophysics.

89 Fletcher, C.H., E.E. Grossman, Richmond, B.M., and A.E. Gibbs. 2002. *Atlas of Natural Hazards in the Hawaiian Coastal Zone.* U.S. Geological Survey. Prepared in cooperation with University of Hawai'i, State of Hawai'i Office of Planning, and National Oceanic and Atmospheric Administration (NOAA).

90 Ibid.; Furumoto, A.S., E. Herrero-Bevera and W.M. Adams. 1990. *Earthquake risk and hazard potential of the Hawaiian Islands*. Hawai'i Institute of Geophysics.

91 U.S. Geological Survey (USGS) Hawaiian Volcano Observatory. *Hazards in Hawai'i*. hvo.wr.usgs.gov/earthquakes/hazards. Accessed March 4, 2016.

Zone 0 has no chance of severe ground shaking, while zone 4 has a 10 percent chance of severe shaking in a 50-year interval. Ground shaking is quantified in terms of g-force, the earth's gravitational acceleration. The UBC seismic assessment for the state of Hawai'i has not been updated since 1997.

3.6.5 Hurricanes

Hurricane season in Hawai'i typically begins in June and lasts through November. Storms can originate in the Central Pacific and the Eastern Pacific near the coasts of southern Mexico and Central America. Some hurricanes arrive near the Hawaiian Islands region but most weaken to tropical storms. They take a northwesterly path over cooler waters and less favorable atmospheric conditions.

The 2015 *Ala Wai Canal Project DEIS* notes past hurricane impacts to the Ala Wai Watershed from Hurricane Iwa in 1982 and Hurricane Iniki in 1992. Impacts from these hurricanes were limited to flooding of oceanfront hotel garages below ground by storm surges and road closures fronting these hotels. Post-hurricane studies have not documented if there were storm surge impacts to the Ala Wai Canal. Since the mouth of the canal is protected from surge by the Ala Wai Boat Harbor breakwaters and revetments, surge impacts are assumed minimal.[92]

3.6.6 Electromagnetic Fields (EMFs)

Electric fields are a result of the voltage or electric potential of an object. They are generated by devices that operate on electricity. An appliance does not need to be in operation to create an electric field; an electric field is established as soon as it is plugged into an outlet. Magnetic fields, on the other hand, are created when an electrical current flows through a conductor. Magnetic fields are present only when an electrical device is in operation or a wire is transmitting electricity. Both electric and magnetic fields are strongest at the source and become exponentially weaker with increased distance from the source. Electric fields can be blocked by walls and objects, while magnetic fields are not as easily blocked and can pass through walls and objects.

There are both natural and manmade sources of EMFs. Power lines, electrical wiring, electrical equipment (such as generators), and home appliances all produce EMFs. At the project site, the two existing cables that traverse the canal are a source of EMFs. Other power lines, electrical wiring, and electrical equipment in the vicinity of the project site are also existing sources of EMFs. In this project, the proposed replacement cables will be a source of EMFs. Construction equipment will be a temporary source of EMFs.

92 USACE. August 2015. *Draft Ala Wai Canal Project, O'ahu, Hawai'i Feasibility Study with Integrated Environmental Impact Statement*. Hydrologic and Hydraulic Climate Change Scenarios Appendix A4, p.5

3.6.7 Hazardous and Regulated Materials

The underground ducts from the manhole near the Ala Wai Canal, through Ala Wai Elementary School, the community gardens, and to the Hihiwai Street manhole are transite korducts, which is an asbestos-cement product. The transite korducts are encased in a concrete jacket which is the industry standard for underground electric installations. The cables within the ducts will be removed and the ducts will either be left in place inside the concrete jacket, or removed by reaming with the use of a fluid to capture the material for disposal. Any voids remaining in the concrete jacket will be filled with grout.

3.6.8 Potential Impacts and Mitigation Measures

The proposed project is not expected to adversely affect public health or safety. The project will not increase the risk of flood hazards, tsunamis, earthquakes, or hurricanes. With regards to EMFs, hazardous and regulated material, the proposed project is not expected to adversely affect or increase exposure. The project will aid the State in minimizing the risk of flooding in the Ala Wai Canal area by allowing DLNR to dredge the canal more efficiently.

FLOOD HAZARDS, TSUNAMIS, EARTHQUAKES, HURRICANES. The underground location of the cables will minimize the impact from severe storm events on the cables, the surrounding environment, and public health and safety. In the case of unpredicted tsunamis or flooding during construction operations, construction activities would cease and equipment and materials would be secured in support areas; BMPs would be followed to ensure the safety of construction workers and community members who live near the project area.

ELECTROMAGNETIC FIELDS. Health concerns regarding EMFs came into focus following a 1979 report on the possibility of an association between EMFs and childhood leukemia.[93] Many studies have been done since then to verify the results or to identify other health concerns regarding EMFs. According to a publication by the National Grid, these health reviews have, in general, failed to definitively conclude that EMFs cause any long-term, adverse effects on health.[94]

Currently there are no federal, state, or county standards for powerlines related to EMFs. In Hawai'i, DOH has a policy of "prudent avoidance" as written in a 1994 statement:[95]

> *"The Department of Health, in response to continuing but inconclusive scientific investigation concerning electric and magnetic fields (EMF) from low-frequency power sources, recommends a "prudent avoidance" policy.*

[93] Wertheimer, N. and E. Leeper. 1979. *Electrical Wiring Configurations and Childhood Cancer*. In American Journal of Epidemiology, 109: 3.

[94] National Grid. November 2009. *Electric and Magnetic Fields*. Downloaded from www.nationalgridus.com.

[95] State of Hawai'i, Department of Health. January 19, 1994. *DOH Policy Relating to Electric and Magnetic Fields from Power-Frequency Sources.*

> *"Prudent avoidance" means that reasonable, practical, simple, and relatively inexpensive actions should be considered to reduce exposure.*
>
> *A cautious approach is suggested at this time concerning exposure to electric and magnetic fields (EMF) around low-frequency sources, such as electric appliances and power lines. The existing research data on possible adverse health effects, including cancer, are inconclusive and not adequate to establish or quantify a health risk. For example, the biological mechanisms that might underlie any apparent relationship between EMF and cancer, it is a very small increase. Other epidemiological studies suggest that there is no increased risk.*
>
> *The Department of Health will continue to collect and evaluate information on possible health hazards associated with electric and magnetic fields. If adequate data ever become available to establish what level may be harmful, appropriate standards will be established."*

At the project area, no increase in EMF is expected as a result of the proposed cable replacement. The existing lines will be removed, so the EMFs are expected to remain at pre-construction levels long term.

The underground placement of the proposed 46kV sub-transmission lines will also help to minimize EMF exposure at the project site. The placement of the lines within underground ducts uses the ground and concrete encasement to block electric fields radiating from the line source. While the ground and concrete encasements do not block magnetic fields, the close placement of multiple electrical cables within the same underground ductbank causes the magnetic fields from each cable to partially neutralize each other.

HAZARDOUS AND REGULATED MATERIALS: The underground ducts from the manhole near the Ala Wai Canal, through Ala Wai Elementary School, the community gardens, and to the Hihiwai Street utility pole are transite korducts, which is an asbestos-cement product. These transite korducts are encased in a concrete jacket which is the industry standard. The cables within the duct will either be removed and the ducts will be reamed or drilled using a drilling fluid to control airborne particles, and vacuumed out to remove the duct, or left in place inside the concrete jacket. If the transite korducts are removed, the space where the duct was will be filled with grout. Debris destined for disposal from the removal of the existing cable and ducts will be characterized or tested to determine proper disposition. Demolition wastes are to be disposed of at the PVT Landfill. If any hazardous waste is created, this waste will only be disposed of at a permitted hazardous waste disposal facility.

3.7 AIR QUALITY

3.7.1 Existing Conditions

As required by the Clean Air Act (CAA), the Environmental Protection Agency (EPA) has established the National Ambient Air Quality Standards (NAAQS) for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), lead (Pb), and particulate matter (PM). The NAAQS are described in Title 42 of the U.S. Code (USC) §7409 and Title 40 of the Code of Federal Regulations (CFR), Part 50.

The NAAQS includes primary and secondary standards for ambient air quality. Primary standards set limits to protect public health. This includes protecting "sensitive" populations such as asthmatics, children, and the elderly.[96] Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The secondary standards for lead and ozone are the same as the primary standards.

In Hawai'i, the Clean Air Branch (CAB) of the DOH is responsible for air pollution control. CAB conducts engineering analysis and permitting, performs monitoring and investigations, and enforces the federal and state air pollution control laws and regulations. Hawai'i has an ambient air standard for hydrogen sulfide (H_2S), in addition to the pollutants identified above. Relative to the project area, the nearest air quality monitoring station is located on the roof of the DOH building, Kīna'u Hale. This station monitors for CO, SO_2, PM_{10} and, $PM_{2.5}$. Kīna'u Hale is on Punchbowl Street, approximately 3 miles northwest of the project area.

The State's Annual Summary: 2014 Air Quality Data Summary, released in September 2015, confirms the State was in attainment of almost all of the NAAQS. Exceptions include exceedances of the NAAQS for SO_2 and PM_{10} due to exceptional volcanic events on Hawai'i Island. The 2014 report notes the EPA considers the volcano a natural, uncontrollable event. The State is requesting exclusion of these NAAQS exceedances from their attainment/non-attainment determination. Between 2010 to 2014, readings taken at Kīna'u Hale did not exceed Federal and State standards for CO, SO_2, PM_{10} or, $PM_{2.5}$.[97]

There are no major air pollution generators in the vicinity of the project area. Air pollution generated by existing uses at the project area is limited to vehicles accessing the area and the infrequent use of motorized vessels in the Ala Wai Canal.

[96] U.S. Environmental Protection Agency (EPA). National Ambient Air Quality Standards (NAAQS). www3.epa.gov/ttn/naaqs/criteria.html

[97] State of Hawai'i Department of Health. 2014. *Annual Summary: 2014 Air Quality Data Summary.* Pages 38–43.

Table 3-3: Air Quality Standards

Air Pollutant	Averaging Time	Standards		
		Hawai'i State Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide (CO)	1-hour	9 ppm	35 ppm	-
	8-hour	4.4 ppm	9 ppm	-
Lead (Pb)[1]	3-months	1.5 µg/m^3	1.5 µg/m^3	0.15 µg/m^3
Nitrogen Dioxide (NO_2)	1-hour[2]	-	100 ppb	-
	Annual	0.04 ppm	53 ppb	53 ppb
Ozone (O_3)	8-hour	0.08 ppm	0.070 ppm	0.070 ppm
$PM_{2.5}$	24-hour	-	35 µg/m^3	35 µg/m^3
	Annual		12 µg/m^3	15 µg/m^3
PM_{10}	24-hour	150 µg/m^3	150 µg/m^3	150 µg/m^3
	Annual[3]	50 µg/m^3	-	-
Sulfur Dioxide (SO_2)	1-hour[4]	-	75 ppb	-
	3-hour	0.5 ppm	-	0.5 ppm
	24-hour	0.14 ppm	-	-
	Annual	0.03 ppm	-	-
Hydrogen Sulfide (H_2S)	1-hour	0.025 ppm	-	-

Notes:

Source: Clean Air Branch, Department of Health, State of Hawai'i. Updated November 19, 2015. *Federal and State Ambient Air Quality Standards.* Available at: health.hawaii.gov/cab/files/2013/05/naaqs_nov_2015.pdf

ppb = parts per billion by volume

ppm = parts per million by volume

µg/m3 = micrograms per cubic meter of air

1 Due to almost non-detectable levels, ambient air monitoring for lead was discontinued in October 1997 with EPA approval. However, since 2003 lead continues to be measured as part of the Air Toxics monitoring program.

2 Effective January 22, 2010.

3 Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard effective December 17, 2006. However, the State still has an annual standard.

4 Effective June 2, 2010.

3.7.2 Potential Impacts and Mitigation Measures

Short-term air quality impacts would occur as part of the proposed project's construction activities. BMPs will be employed to minimize air emissions from equipment and dust during construction activities, such as frequent watering to control dust. No adverse air impacts are anticipated during construction activities.

After construction is complete, the project area will return to its existing conditions with no long-term impacts. No further mitigation is needed.

3.8 NOISE

3.8.1 Existing Conditions

The Ala Wai Canal divides the project area into binary sections (mauka/upland and makai/seaward) that serve urban and residential types of zoning districts. See Section 3.1.1. for more information about the land use zoning for the project area. These zoning district categories determine the "maximum permissible sound level" outlined by HAR §11-46-4 which allows varying sound levels without a noise permit. According to the State Department of Health (DOH) Community Noise Control, HAR §11-46-2, the definition of zoning districts is "the land use districts established by rules or ordinances adopted by council, legislature, county, or state government agencies."[98] The zoning district for the project area is classified based on the guidelines outlined by HAR §11-46-3 below:

(1) Class A zoning districts include all areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.

(2) Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.

(3) Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial, or similar type.

The project area is classified into Class A and Class B zoning districts as they represent multipurpose land usage in both categories. The majority of the mauka (upland) side of the project is classified as a Class A zoning district that has high-rise condominiums, apartment complexes, a public park, and schools. The makai (seaward) side of the project area is classified as a Class B zoning district that combines apartments and high-rise condominiums with tourism development. HAR §11-46-4d explains that "the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level." Table 3-4 illustrates the maximum permissible sound levels (HAR §11-46-4) in dBA (decibels adjusted) according to the zoning districts.

Table 3-4: Maximum Permissible Sound Levels in dBA

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

[98] State of Hawai'i. 1996. *Hawai'i Administrative Rules, Title 11, Chapter 46, Community Noise Control*

Ambient Noise

Ambient noise is generally known as "background noise" which can be described as sounds that are existing in the area. Traffic noise, car alarms, nearby conversation, birds, waves, air conditioning, etc. can be described as background noise. Traffic noise is most likely the largest contributor to the higher ambient noise levels in most urban areas like Waikīkī. Major roadways like Kapiʻolani Boulevard, University Avenue and the Ala Wai Boulevard connect side-streets through the central areas of Waikīkī, McCully, and Mōʻiliʻili. It is possible that the ambient noise could muffle some of the construction noise along the busier roadways. Ambient noise is oftentimes used to calculate acceptable levels of noise for specific areas.

3.8.2 Potential Impacts and Mitigation Measures

During construction, noise may impact the residents surrounding the project area or within close proximity to the project area. However, noise from construction will be short-term. Once construction is completed, noise will return to ambient levels. The underground electrical ductline system will have no long-term effects on noise levels.

HAR §11-46-7 states that "a permit may be granted by the director to operate any excessive noise source which emits or may emit noise levels in excess of the maximum permissible sound levels." The project is expected to obtain a noise permit which will allow the use of construction equipment and machines that would exceed the maximum permissible sound level for a prolonged period of time.

A noise permit may require action by the contractor to incorporate noise mitigation into the construction plan. The contractor should use best management practices (BMPs) to mitigate noise, such as using mufflers on diesel and gasoline engines, maintaining properly tuned and balanced machines, and scheduling etc. The DOH noise permit does not regulate the noise levels that are excessive from the construction site, but rather limits the time for excessive construction noise. Specifically, HAR §11-46-7 states that:

1. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels for the hours before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday;

2. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels for the hours before 9:00 a.m. and after 6:00 p.m. on Saturday; and

3. No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays.

The project's schedule is expected to distribute the construction work into several phases that could help lessen exposure to louder equipment to shorter time periods.

A noise variance would need to be obtained from the DOH to allow construction operations to exceed maximum permissible noise levels and operate outside of permitted operating times such as nighttime work. DOH will require the contractor to prove that nighttime work is in the public interest, that it does not substantially endanger public health or safety, and that appropriate measures for the attenuation of excessive noise will be taken. Property owners and residents in the neighborhood must be notified of the variance application through public notice procedures. A public hearing may be requested where the neighboring residents and businesses can discuss construction noise impacts. If a public hearing is held, a letter stating the purpose of the project and indicating the time and place of the public meeting must be delivered to all affected residences and property owners.

3.9 CIRCULATION AND TRAFFIC

3.9.1 Existing Conditions

Ala Wai Boulevard is a major one-way arterial for northwest bound traffic for the Waikīkī district. Kalaimoku Street, Kaiʻolu Street and Hihiwai Street are collector streets for neighborhood traffic. Kalaimoku Street and Kaiʻolu Street are two-lane, one-way roadways heading northbound with on-street parking and sidewalks on both sides of the road. University Avenue is four lanes with two lanes headed south bound and two lanes headed north bound with turning lanes, and bike paths and sidewalks on both side of the street. Hihiwai Street is a two-lane roadway with on-street parking on the mauka side and drop-off and pick-up lane on the makai side. Sidewalks are also available on both sides of the road. Hihiwai Street is mauka of and adjacent to Ala Wai Elementary School. Ala Wai Elementary School has an estimated enrollment of about 426 students. The southeast end of Hihiwai Street at Lāʻau Place is also the location of the primary exit for the lower campus (grades K–6) of ʻIolani School that has a total enrollment of approximately 540 students. Drop off and pick up for the upper campus (grades 7–12) is on Kamoku Street side of ʻIolani School in the parking lot fronting the upper campus. The intersection of the southwest end of University Avenue and the northwest end of Hihiwai Street is also the access point to the parking area that serves recreational users of the Ala Wai Neighborhood Park and the Ala Wai Community Gardens.

3.9.2 Potential Impacts and Mitigation Measures

The open trench construction portion of the proposed project will impact:

- The one-way Ala Wai Boulevard arterial;
- The Hihiwai Street, Kalaimoku Street, Kaiʻolu Street collector streets; and
- Through traffic to and from the collector streets of University Avenue, Lauiki Street, Kamoku Street, and Launiu Street.

DPP will approve the Traffic Control Plans only if the following BMPs are incorporated to maintain existing pedestrian and vehicular access:

- A suitable pedestrian pathway along all roadways shall be maintained at all times;
- All traffic lanes shall be maintained for commuters during peak-hour vehicular traffic between the hours of 6:30 a.m. to 8:30 a.m. and 3:30 p.m. to 6:30 p.m.;
- Driveway access shall be unimpeded during the preceding peak hour periods and work shall stop to allow driveway access as required during all other times;
- Construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.) to minimize any possible disruption to traffic on the local streets;
- For work sites near a school, deliveries should be avoided during school dismissal periods for the safety of the students and pedestrians.

The trenchless construction portion of the proposed project will impact:

- Kalaimoku Street;
- Parking for the Ala Wai Neighborhood Park, the Ala Wai Community Gardens and Ala Wai Neighborhood Annex.

The trenchless construction portion of the work is estimated to take approximately six to eight weeks. Some of the trenchless construction equipment cannot be moved from the staging area in Kalaimoku Street. This can be mitigated by temporarily disallowing parking adjacent to the staging area and narrowing lane widths with traffic control devices to provide a safe pedestrian pathway; maintaining all lanes during peak hour traffic of 6:30 a.m. to 8:30 a.m. and 3:30 p.m. to 6:30 p.m.; and providing driveway access at all times. A portion of the southwest parking lot near the Ala Wai Neighborhood Park will also be used for construction staging for the duration of this period of work. After the trenchless horizontal borehole has been drilled beneath the canal, a construction staging area will be required within the park to assemble and to pull the conduits and cables through the borehole. During this period, both the northwest and southwest parking lots for the parks and community gardens will be impacted. A Street Usage Permit (SUP) is also required to temporarily shut down the roadways and restrict parking. DTS will review the application for the SUP and issue the permit once approved.

Traffic control plans will be prepared for the project to show vehicular and pedestrian movement near the construction zones for both the directional drilling and open trenching. These plans will identify, but not be limited to, lane closures, flagmen, policemen, redirecting travel lanes, pedestrian crossings, and installation of barriers around the construction zones. Special permits may need to be obtained to allow temporary closure of the bicycle lanes and divert the bicyclists onto the sidewalks in Waikīkī. Alternatively, the traffic control plans can include temporary

bike lanes during construction. All access driveways to the work sites should be designed and constructed with the highest pedestrian and bicycle safety measures. During construction and upon completion of the project, any damages/deficiencies to University Avenue, Hihiwai Street, Kalaimoku Street, Kaiʻolu Street and Ala Wai Boulevard right-of-ways shall be corrected to City standards and accepted by the City.

Hawaiian Electric will continue to keep the community, schools, and recreational users of the park and canal informed of the project details and potential impacts. Hawaiian Electric will coordinate its construction schedule with the DPR, Ala Wai Elementary School, ʻIolani School, as well as the impacted community members and organizations in order to minimize the impact of the proposed action on the use of the roadways and parking.

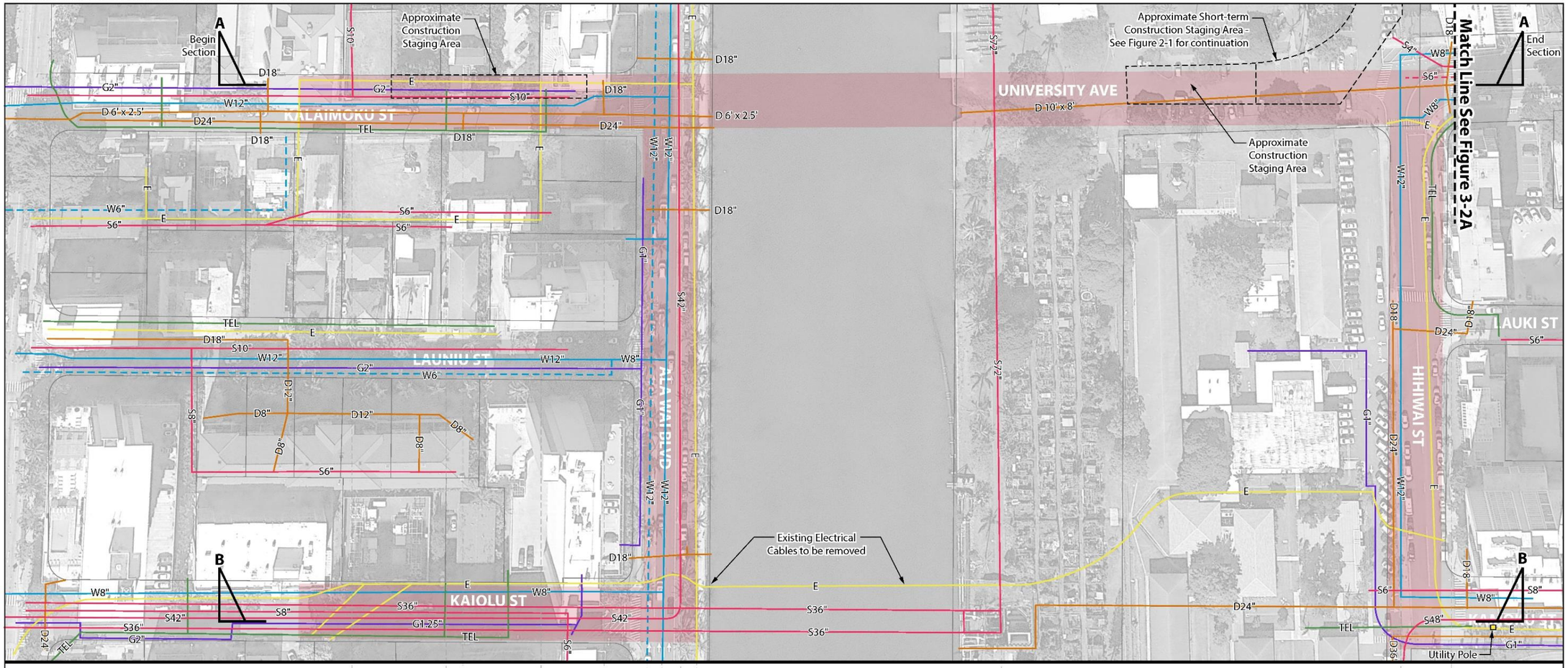
3.10 INFRASTRUCTURE

Existing utilities within the proposed area of work is shown in Figure 3-2 and Figure 3-2A.

3.10.1 Water

There are existing water mains owned by BWS within the public roadway ROW. The proposed alignments for the open trench-constructed subsurface electrical duct banks are generally parallel to the water mains. The proposed alignment for the directionally-drilled duct banks cross perpendicular to and beneath the existing water mains. The proposed electrical duct banks will be constructed in accordance with BWS standards for minimum clearance, thus are anticipated to have no impact to existing water utilities.

©2017 Belt Collins Hawaii LLC P: Ala Wai 46kV UG Cable: 2013.33.2000/011.ai A 1Feb2017 2



BELT COLLINS

NORTH

0 25 50 100
SCALE IN FEET

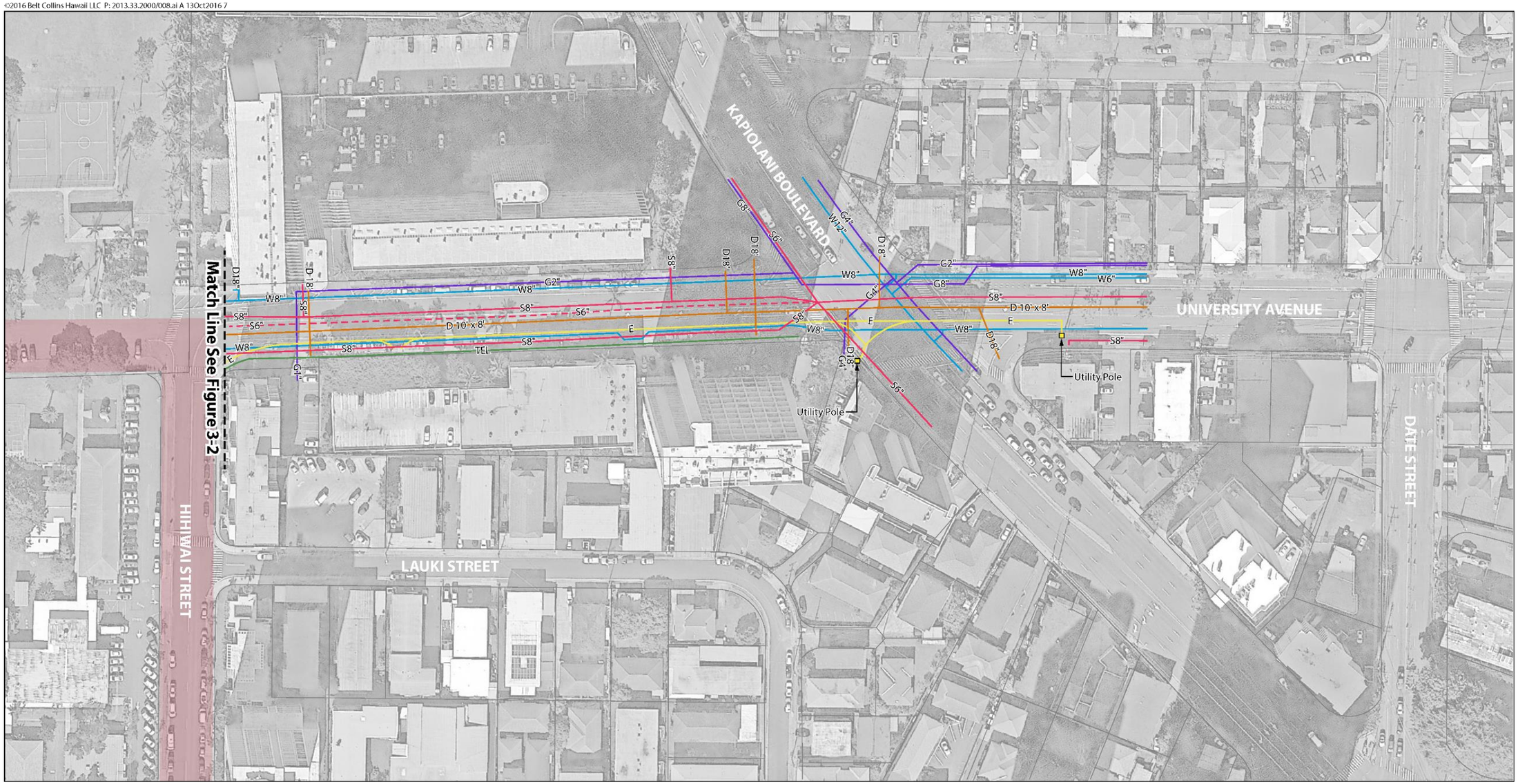
LEGEND

- Gas
- Sewer
- Abandoned Sewer
- Water
- Abandoned Water
- Drain
- Hawaiian (Telcom)
- Electric
- Proposed 46kV alignment/Profile Area of Work

Note: Numeral represents utility pipe diameter.

Figure 3-2
UTILITIES PLAN AND PROFILE
Ala Wai 46kV UG Cable

©2016 Belt Collins Hawaii LLC P: 2013.33.2000/008.ai A 13Oct2016 7



LEGEND

- G2" Gas
- S6" Sewer
- S6" Abandoned Sewer
- W8" Water
- W8" Abandoned Water

Note: Numeral represents utility pipe diameter.

- D8" Drain
- TEL Hawaiian (Telcom)
- E Electric
- Proposed 46kV alignment/Profile

BELT COLLINS

NORTH

0 25 50 100
SCALE IN FEET

Figure 3-2A
UTILITIES PLAN AND PROFILE, CONTINUED
Ala Wai 46kV UG Cable

3.10.2 Sewer

There are existing sewer mains owned by the City's Department of Environmental Services (ENV) within the public roadway ROW. The proposed alignments for the open trench-constructed subsurface electrical duct banks are generally parallel to the sewer mains. The proposed alignment for the directionally-drilled duct banks cross perpendicular to and beneath the existing 42-inch diameter sewer force main in Ala Wai Boulevard and the existing 72-inch diameter sewer force main located parallel to the northeast bank of the Ala Wai Canal. The proposed electrical duct banks will be constructed in accordance with ENV standards for minimum clearance, thus are anticipated to have no impact to existing sewer utilities.

A letter from OEQC was received during the draft EA comment period stating concern for two 36-inch sewer lines near Hawaiian Electric's existing cables and concrete panels that are proposed for removal. Figure 3-2, Profile Section B, shows a profile of the existing cables and concrete panels within the accumulated sediment of the Canal which is no deeper than -16 msl. The 36-inch sewer lines are shown in profile passing below the Canal bottom at around -30 msl.

The Beachwalk Buffer Zone is centered on the original Force Main 1 sewer that previously failed. Per the City DPP WWB, any project that is within this zone will be sent by them to DDC for review that the proposed alignment, profile and construction method would not cause undue vibration or disruption of the force main. See Figure 3-3.

3.10.3 Electricity, Telephone, and Cable TV

Hawaiian Electric, Hawaiian Telecom, and Oceanic Time Warner Cable have sub-surface duct banks for electrical power, telephone, cable TV and internet communications within the public roadway ROW. The proposed alignment of the electrical duct banks will parallel or cross beneath the existing electrical power and communication line duct banks, thus are anticipated to have no impact to existing electrical power and communication line duct banks.

3.10.4 Fuel and Utility Gas Lines

Hawai'i Gas has utility distribution lines for synthetic natural gas within the public roadway ROW. There are no fuel lines within the project area. The proposed alignment of the electrical duct banks will parallel or cross beneath the existing utility gas lines, thus are anticipated to have no impact to the existing gas lines.

3.10.5 Drainage

DFM maintains drainage pipes and culverts within the public roadway ROW and between the southwest terminus of University Avenue and the Ala Wai Canal. The proposed alignment of the electrical duct banks will parallel or cross beneath the existing drainage pipes and culverts, thus are anticipated to have no impact to the drainage pipes and culverts.

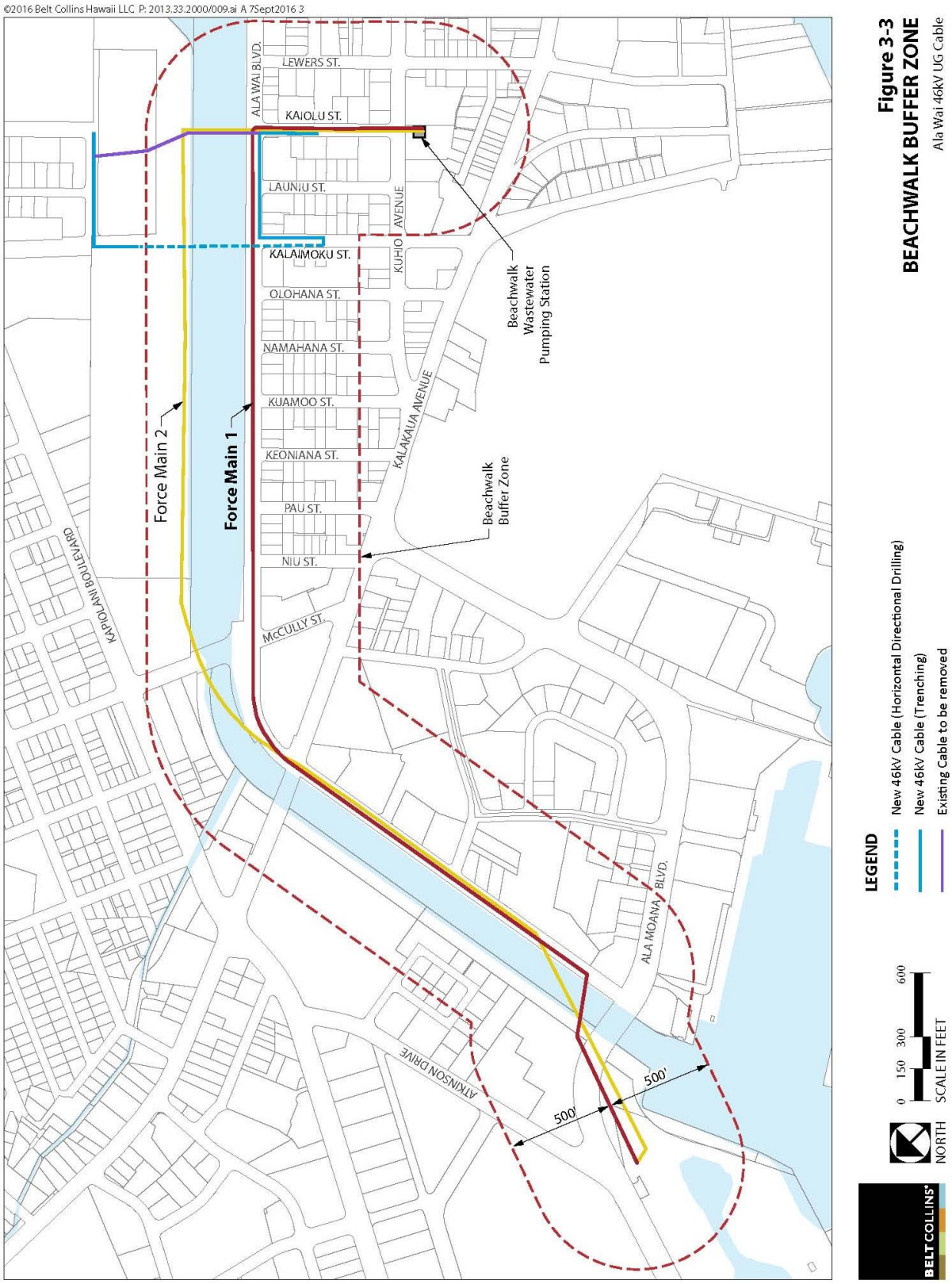


Figure 3-3
BEACHWALK BUFFER ZONE
Ala Wai 46kV UG Cable

3.10.6 Potential Impacts and Mitigation Measures

The proposed project is not anticipated to have any long-term or short-term impacts to existing infrastructure utilities. DPP will require adequate spacing between the proposed electrical duct banks and the other utilities to minimize the potential for damaging adjacent utilities during excavation. All utilities and construction contractors that do excavation are required by State law to participate in the Hawai‘i One Call Center and to provide notification in advance of any proposed excavation work. Hawai‘i One Call Center staff will review maps, conduct subsurface field surveys and mark the location of all existing utilities before the contractor is allowed to commence with any excavation work. Hawaiian Electric has been in consultation with other utility proprietors to ensure that the design for the cable installation and removal of the existing cables will avoid impact to the existing infrastructure. Final drawings will be submitted to the City for approval prior to construction.

Approved BMPs fronting all affected drainage facilities should be installed to control storm water runoff during construction. A National Pollutant Discharge Elimination System (NPDES) permit will be obtained for this project. A NPDES permit must be obtained for the discharge of any pollutants by a point source into waters of the U.S/State waters. Point sources include construction sites, industrial facilities, and municipal systems. Most commonly, NPDES permits are obtained for construction activities resulting in discharges to water bodies (e.g., disturbance of 1 acre or more of total land area during construction activities resulting in discharges composed entirely of storm water runoff, discharges of construction dewatering effluent, or discharges of hydrotesting waters).

3.11 PUBLIC SERVICES AND FACILITIES

3.11.1 Police, Fire, and Emergency Services

Police services on the island of O’ahu are provided by the Honolulu Police Department (HPD). HPD’s headquarters are located in downtown Honolulu, at 801 South Beretania Street. The island is divided into eight patrol districts; the project site spans both District 6 (Waikīkī), and District 7 (East Honolulu, Sectors 1 & 2). University Avenue, Hihiwai, and Kamoku Street are within District 7. Ala Wai Boulevard, Kalaimoku, and Kai‘olu Streets are within District 6. The administrative offices for both districts are located at the downtown HPD headquarters. Waikīkī is regularly patrolled by officers posted at the Waikīkī Substation, located at 2425 Kalākaua Avenue.

Fire protection services for the island of O’ahu are provided by the Honolulu Fire Department (HFD). HFD would provide emergency service to the project area from its McCully-Mō‘ili‘ili Fire Station (No. 29), located approximately 0.3 miles north of the project area. Support could also come from the Waikīkī Fire Station (No. 7), which is located approximately 1.6 miles east of the project area on Kapahulu Avenue.

Ambulance services are provided throughout Oʻahu by the City's Department of Emergency Medical Services (EMS). The City has 20 ambulance units and two Rapid Response Vehicles covering the island's two districts. The project area is located within Oʻahu's District 2. The nearest EMS ambulance unit is based at the Waikīkī Fire Station, approximately 1.6 miles away from the project area. HFD also co-responds with first responder emergency services.

3.11.2 Medical Centers

Nearby emergency medical facilities include Straub Hospital and Kapi'olani Medical Center for Women and Children. Straub Hospital is a full-service hospital, located approximately 2.5 miles from the project area, in the Ward/Kaka'ako neighborhood. Kapi'olani Medical Center for Women and Children is located in lower Makiki, approximately 1.6 miles from the project area. Kapiʻolani Medical Center specializes in care for women and children and offers a full array of medical services, including pediatric emergency services and intensive care facilities. Queen's Medical Center, considered to be the primary trauma hospital on the island, is approximately 3.2 miles from the project area.

3.11.3 Parks and Recreation Areas

ALA WAI CANAL. The canal was constructed in the 1920s and designed to serve as a drainage way. Over the years, it has become an important sediment deposition basin that reduces the discharge of sediments into the nearshore coastal waters of Waikīkī. The canal also serves numerous recreational purposes. Current recreational use of the canal and its banks includes sightseeing, walking, jogging, biking, canoe paddling, kayaking, fishing, and crabbing. The use of motorized vessels is permitted in the canal provided that they do not cause a disturbance to area residents.[99] Several canoe clubs, kayak organizations, and high school teams practice in the Ala Wai Canal, where the flat water is ideal for training and its outlet to the ocean allows for long distance training.

ALA WAI NEIGHBORHOOD PARK. Ala Wai Neighborhood Park provides open space and recreational facilities for the residents of McCully-Mōʻiliʻili and Kapahulu neighborhoods. The park includes basketball and volleyball courts, two playground structures, a softball field, canoe hālau, park trail for jogging and biking, and a public restroom facility. The canoe hālau is used by several canoe clubs, kayak organizations, and high schools throughout the year.

ALA WAI COMMUNITY GARDEN. The Ala Wai Community Garden occupies the eastern portion of Ala Wai Neighborhood Park. It is part of the City's larger Community Recreational Gardening Program. Ala Wai Community Garden includes 154 garden plots (sized 12 by 15 feet) that are available to community members upon application.

[99] State of Hawaiʻi. 2014. *Hawaiʻi Administrative Rules, Title, 13, Chapter 231, Operation of Boats, Small Boat Harbors, and Use Permits for All Navigable Waters. Subchapter 4, Special Area Rules, Section 77, Ala Wai Canal.*

ALA WAI DOG PARK (NEIGHBORHOOD PARK ANNEX). The Ala Wai Dog Park opened in September 2014. The fenced dog park occupies approximately 0.8 acres and is located to the southeast of the project site: adjacent to ʻIolani's track and field and Ala Wai Elementary School's basketball courts. The dog park fronts both the Ala Wai Canal and the MPDC.

ALA WAI COMMUNITY PARK. Ala Wai Community Park, which borders Ala Wai Neighborhood Park, provides additional open space and recreational facilities for the neighborhoods of McCully-Mōʻiliʻili and Kapahulu. Ala Wai Community Park includes several sport fields (baseball and softball with a soccer field overlay), a park trail for jogging and biking, a canoe hālau, playground, a community center, and public restroom and shower facilities. The canoe hālau is used by various canoe and kayak clubs and high school groups throughout the year. The community center includes a ceramics room, meeting rooms, and a multipurpose room that are used by a variety of community members and groups.

ALA WAI BOULEVARD PROMENADE. Makai of Ala Wai Canal, the tree-lined promenade along Ala Wai Boulevard is a popular site for walking and jogging.

3.11.4 Schools

The project area is located within the Department of Education's (DOE) Honolulu District and Kaimukī Complex. School age children residing near the project area attend Ala Wai Elementary School, Washington Intermediate School, and Kaimuki High School. Ala Wai Elementary School, which is the closest school to the project area, is a pre-kindergarten to fifth grade public school of 426 students. ʻIolani School is located next to the project area and Ala Wai Elementary School. ʻIolani is a kindergarten to twelfth grade private college preparatory school with approximately 1,900 students total.

Vehicle access to Ala Wai Elementary School is by Hihiwai Street. Vehicles dropping off or picking up ʻIolani students for the upper campus is on Kamoku Street through the visitor parking lot. The lower campus uses a loop route that emerges from the campus at the Hihiwai Street/Kamoku Street intersection.

3.11.5 Solid Waste

Solid waste services for the island of O'ahu are provided by the City's Department of Environmental Services. Solid waste services include drop-off facilities, curbside collection, and recycling. Most residential and general commercial trash is disposed at H-POWER, the City's waste-to-energy plant, which is located at Campbell Industrial Park. H-POWER processes over 600,000 tons of waste annually, producing approximately 10 percent of Oʻahu's electricity.[100] The island's two landfills, Waimānalo Gulch Sanitary Landfill and PVT Landfill, are located on the Waiʻanae

[100] City and County of Honolulu Department of Environmental Services. 2005. *How the City Manages Our Waste.* Obtained from www.opala.org/solid_waste/archive/How_our_City_manages_our_waste.html

Coast, approximately 30 miles west of the project area. Noncombustible construction and demolition debris and industry waste go directly to the PVT Landfill.

Solid waste at Ala Wai Neighborhood Park is collected by DFM. Solid waste at the adjacent Ala Wai Community Park is also managed by DPR. There is no recycling pick up at Ala Wai Neighborhood or Community Park. Solid waste and recycling for Ala Wai Elementary School is managed by the Department of Accounting and General Services, Central Services Division's Grounds Maintenance Program.

3.11.6 Potential Impacts and Mitigation Measures

The proposed action is not expected to generate an increase in demand for police, fire, emergency response, medical services, schools, parks, or recreation areas. Special off-duty police officers will be hired as required to assist with traffic control during construction. Hawaiian Electric will work with stakeholders in the Hihiwai Street and Kamoku Street area, particularly to address issues related to peak school traffic hours on weekday mornings and early afternoons. These and nearby City streets may experience temporary traffic delays from lane closures, rerouting, and parking prohibitions during construction. Ingress and egress at Ala Wai Elementary School and ʻIolani School may also be temporarily affected by this work.

In the short-term, the proposed action would temporarily affect surrounding park and recreation areas and their users. Full use of Ala Wai Neighborhood Park, Ala Wai Community Garden, Ala Wai Canal, and Ala Wai Boulevard Promenade may be temporarily hindered by construction staging, site preparation, trenching, stock piling, utility installation, back filling, site cleaning, and restoration. Hawaiian Electric has initiated consultation with DPR administration and the onsite Ala Wai Community Park staff. Hawaiian Electric has also met with the Community Gardens Coordinator and will continue to work with the DPR and park user groups in advance of the planned construction. Hawaiian Electric regularly engages in community outreach with park users and community members at neighborhood board meetings in Waikīkī and McCully-Mōʻiliʻili. The affected areas of the park and recreation areas will be restored to their original or better condition once the project is completed.

Cable removal may also disrupt day-to-day operations at Ala Wai Elementary School and the Community Gardens. Part of the proposed project includes removing the existing cables that currently cross under the Ala Wai Elementary School and a small section of the Ala Wai Community Garden. Hawaiian Electric proposes to deactivate these cables, remove them from their conduits, and the ducts will either be left in place inside the concrete jacket, or removed by reaming with the use of a fluid to capture the material for disposal. Any voids remaining in the concrete jacket will be filled with grout. Hawaiian Electric has already initiated early consultation with both Ala Wai Elementary School and ʻIolani School. Hawaiian Electric intends to continue consultation with both schools as the proposed project nears construction.

During construction, solid waste generated from construction activities would go either to a recycler or to a licensed debris landfill, such as the PVT Landfill. Excavated soil will be tested for chemicals of potential concern using appropriate Environmental Protection Agency (EPA) SW-846 methods to determine if the soil is suitable for reuse.[101] Suitable soil will be reused to fill trenches of the new cables. Any remaining soil that cannot be reused will be characterized using the toxicity characteristic leaching procedure (TCLP) to determine if the soil is suitable for disposal as non-hazardous waste at PVT Landfill in Nanakuli for disposal. Any soil failing the TCLP testing will need to be handled as hazardous waste and disposed at a permitted facility on the U.S. mainland. The impact on the area's solid waste facilities is anticipated to be minor.

Hawaiian Electric will coordinate its construction schedule with the DLNR, DPR, Ala Wai Elementary School, 'Iolani School, as well as the impacted community members and organizations in order to minimize the impact of the proposed action on the use of and access to the schools, Ala Wai Neighborhood Park, Ala Wai Community Garden, and the Ala Wai Canal.

3.12 VISUAL AND AESTHETIC RESOURCES

3.12.1 Existing Conditions

The general setting of the Ala Wai Canal is beautiful, and even stunning from certain vantage points. The description of the canal accompanying its nomination to Hawai'i Register of Historic Places notes that:

> *"The Ala Wai Canal provides an important aesthetic dimension to the Waikīkī neighborhood with its open space and tranquil waters."*[102]

The Ala Wai Canal and surrounding park areas provide views of Diamond Head and the Ko'olau mountain range, including Tantalus, Mānoa Valley, St. Louis Heights, and Pālolo Valley. At the project area, the ocean is less visible due to urban development. Although the tall structures of Waikīkī tend to block views of the ocean from Ala Wai Neighborhood and Community Park, these buildings form a visually distinct skyline, which is in itself a significant component of Waikīkī's visual landscape.

3.12.2 Potential Impacts and Mitigation Measures

Hawaiian Electric proposes to replace a utility pole on Hihiwai Street. The replacement pole is not expected to have any long-term aesthetic or visual impacts

[101] State of Hawai'i, Department of Health, Hazard Evaluation and Emergency Response Office. October 2011. *Guidance for the Evaluation of Imported and Exported Fill Material, Including Contaminant Characterization of Stockpile.* Pg. 3

[102] Edward K. Noda & Associates, Inc. and KRP Information Services. April 1993. *Environmental Assessment and Negative Declaration, Ala Wai Canal Improvement.* Page 2-13.

because the proposed action is replacing an existing structure. Visual impacts along the Ala Wai Canal due to construction staging, trenching, and directional drilling will be limited to views of the canal itself, and will not impact views of the Koʻolau Mountains or of Diamond Head. These temporary visual impacts, during cable installation will last approximately 5 months, and during cable removal will last approximately 3 months and will not be substantial.

3.13 SOCIO-ECONOMIC SETTING

3.13.1 Existing Conditions

The proposed project is located in a dense urban zone surrounded by residential buildings, recreational facilities, and schools. Approximately 9,000 people reside in the immediate area of the project, in three census tracts (CTs), CT 20.06 in Waikīkī, and CTs 22.01 and 22.02 mauka of the Ala Wai Canal. (See Figure 3-4 for the Census geography.)[103] The Waikīkī area as a whole (CTs 18.03, 18.04, 18.07, 19.01, 19.03, 19.04, 20.03, 20.04, 20.05, and 20.06) has a current resident population of approximately 21,500 residents. The roadways in the project area are used daily by people living throughout urban Honolulu.

Socio-economic conditions in the area immediately surrounding the project are assessed to learn whether the community is likely to be especially vulnerable to impacts of construction, or whether the community might be seen as disproportionately affected by the project, in comparison to more powerful or prosperous areas.[104]

[103] The American Community Survey data for 2010 to 2014 combined survey data collected annually from samples. While it is not a comprehensive survey of all residents, like the decennial census, it is the most current source for data about residents. All dollar values are expressed as 2014 dollars.

[104] Federal agencies are mandated to examine whether minority and low income communities suffer greater negative impacts than others due to those agencies' projects (per Executive Order 12898, Environmental Justice in Minority Populations and Low Income Populations). Hawai'i environmental laws do not include this provision, but the question of "environmental justice" may arise in public discussion. Accordingly, the U.S. Census data examined in this section addresses the question.



SOURCE: DBEDT, US Census Bureau, Created by Hawaii Statewide GIS Program, Hawaii Office of Planning

BELT COLLINS

Figure 3-4
HONOLULU CENSUS TRACTS IN AMERICAN COMMUNITY SURVEY
Ala Wai 46kV UG Cable

Figure 3-4: Honolulu Census Tracts in American Community Survey

As shown in Table 3-5, the population of the Waikīkī CT 20.06 and the mauka tract 22.02 is older than the City and County average. In the Waikīkī tract, half the residents were born in states other than Hawai'i; in the two mauka tracts, nearly half the population is Hawai'i-born (Table 3-6). In all three tracts, the share of the population born outside the United States is about 30 percent or higher, well above the share found in the City and County population.

Table 3-5: Age Characteristics, City and County of Honolulu and Project Area

Population	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
TOTAL Population	975,690	2,115	3,622	3,303
Under 5 years	63,691	18	150	158
5 to 9 years	57,223	31	98	10
10 to 14 years	58,239	56	293	95
15 to 19 years	57,388	143	97	121
65 to 74 years	76,422	285	265	438
75 to 84 years	46,211	137	252	161
85 years and over	25,220	39	116	95
Median age (years)	37.2	45.4	36.9	50.4

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_honcnty_ct_5yr_15to29.xls.

Table 3-6: Race and Migrant Characteristics, City and County of Honolulu and Project Area

Population: Race (alone or in combination)	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
White	37.9%	47.8%	24.7%	40.2%
Black or African American	4.0%	2.6%	1.0%	0.7%
American Indian and Alaska Native	2.1%	5.8%	3.9%	0.6%
Asian	60.9%	40.4%	68.7%	57.6%
Native Hawaiian and Other Pacific Islander	23.7%	10.3%	17.9%	13.7%
Some other race	2.5%	3.5%	0.4%	0.0%
Average Number of Race Identifications/Person	1.31%	1.10	1.17	1.13
Hispanic (of any race)	8.9%	5.8%	2.5%	5.2%
Place of Birth				
Hawaii	53.5%	13.6%	45.2%	42.7%
Other state	23.5%	51.1%	18.7%	23.8%
US Island	3.6%	2.6%	1.5%	3.7%
Foreign born	19.4%	32.8%	34.7%	29.9%

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_hon cnty_ct_5yr_15to29.xls.

Households in the project area are small, as shown in Table 3-7, and household incomes are somewhat lower than the City and County median. Table 3-8 shows that, in the Waikīkī tract, the share of young people living below the poverty line is high. However, the number of youths in question is quite small. For the population as a whole, the incidence of poverty is much higher than the City and County average in this tract, but not in the two mauka tracts.

Table 3-7: Household Characteristics, City and County of Honolulu and Project Area

Housing and Households	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
TOTAL housing units	339,830	1,866	1,899	1,791
Occupied housing units	310,141	1,256	1,678	1,710
Vacant housing units	29,689	610	221	81
Households by Type				
TOTAL households	310,141	1,256	1,678	1,710
Households with one or more people under 18 years	106,347	92	359	230
Households with one or more people 65 years and over	99,009	356	460	517
Average household size	3.03	1.68	2.14	1.86
Median household income (dollars)	$73,581	$47,041	$45,075	$63,554

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_hon cnty_ct_5yr_15to29.xls.

Table 3-8: Share of the Population Below the Poverty Level

Percentage of People Whose Income in the Past 12 Months is Below the Poverty Level	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
All People	9.8%	17.3%	11.0%	3.8%
Under 18 years	13.0%	50.3%	1.2%	4.3%
18 to 64 years	9.3%	15.6%	12.2%	3.6%
65 years and over	7.0%	11.9%	16.0%	4.5%

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_hon cnty_ct_5yr_15to29.xls.

Unemployment is lower among residents of the project area than for the City and County as a whole (Table 3-9). Commuting times are shorter than for the City and County as a whole, and the share of workers relying on private automobiles to go to and from work is lower. In the Waikīkī tract, a quarter of the resident workers walk to work.

Table 3-9: Employment and Commuting

	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
Employment Status				
Population 16 years and over	519,554	1,996	6,053	3,030
In labor force	480,618	1,263	2,137	2,112
Civilian labor force	480,618	1,187	2,13	2,089
Percent unemployed	5.9%	5.7%	3.7%	3.0%
Commuting to Work				
Workers 16 years and over	480,392	1,195	2,046	1,977
Car, truck, or van – drive alone	64.2%	41.8%	50.4%	60.0%
Car, truck, or van – carpooled	14.7%	9.5%	12.3%	9.5%
Public transportation (excluding taxicab)	8.4%	14.2%	13.2%	14.0%
Walked	5.2%	25.9%	4.1%	8.3%
Other means	4.0%	6.9%	10.5%	4.6%
Worked at home	3.5%	1.6%	9.5%	3.7%
Mean travel time to work (minutes)	27.6	18.4	19.1	24.0

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_hon cnty_ct_5yr_15to29.xls.

Table 3-10 shows that a slightly higher share of the population in the Waikīkī tract has physical disabilities than for the City and County population as a whole. For the entire project area, the incidence of disabilities is much the same as for the larger island population.

Table 3-10: Disability Status of the Population

Disability Status of the Civilian and Noninstitutionalized Population	City and County of Honolulu	CT 20.06 Ala Wai-Olohana Street	CT 22.01 Kamoku Street-Iolani School	CT 22.02 Ala Wai Park-Lauiki Street
TOTAL Civilian Noninstitutionalized Population	926,743	2,039	3,622	3,280
With a disability	10.6%	12.1%	10.7%	8.6%
Under 18 years	212,474	149	596	300
With a disability	3.2%	0.0%	2.3%	0.0%
18 to 64 years	569,717	1,429	2,393	2,286
With a disability	7.5%	10.9%	6.5%	5.3%
65 years and over	144,552	461	633	694
With a disability	33.8%	19.5%	34.8%	22.9%

SOURCE: U.S. Census, American Community Survey, five-year data profiles for 2010–2014 posted at files.hawaii.gov/dbedt/census/acs/ACS2014/ACS2014_5_Year/acs_hi_2014_geographic_5_yr/acs14_hon cnty_ct_5yr_15to29.xls.

The demographic and economic characteristics noted here serve to characterize the project area as not an area with a distinctively low income or racial minority population.

Table 3-11: Construction-Related Jobs and Wages

All $ Values are for Millions of Dollars	Proposed Action
Construction Cost	
TOTAL Cost	$29.0
Jobs	
Direct Jobs[1]	106
Indirect and Induced Jobs[2]	151
TOTAL Jobs	257
Wages	
Direct Jobs[3]	$6.7
Indirect and Induced Jobs[3]	$7.4
TOTAL Wages	$14.2

Notes

Construction cost estimate by Hawaiian Electric

(1) Average employment per $ million construction cost:

Jobcount, natural resources and construction, 2015	34,900
Construction share of that jobcount, 2015	85%
Annual average construction jobcount	29,700
General Excise Tax base, construction 2015	$8,112,237,975
Construction jobs/million spent	3.66

(2) Indirect and induced jobs estimated based on Input-output Model of Hawai'i Economy maintained by DBEDT (analysis of 2012 data)

Heavy and civil engineering construction

Type II multiplier 2.42

(3) Wages based on Bureau of Labor Statistics OES survey, 2015:

Average annual wages, construction, Honolulu, 2015	$63,280
Average wages, all occupations, Honolulu, 2015	$49,320

Sources:

DBEDT, 2012 State Input-Output Study. (2016a) Tables posted at dbedt.hawaii.gov/economic/reports_studies/2012-io/

DBEDT, State of Hawai'i Data Book 2015 (2016b). Posted at dbedt.hawaii.gov/economic/databook/db2015/

DLIR, Current Employment Statistics for 2015. Posted at https://www.hiwi.org/vosnet/gsipub/documentview.aspx?enc=HS0QiuwvQnHQhPZJT8GXJg==

DLIR, Occupational Employment Statistics for 2015, Posted at https://www.hiwi.org/admin/gsipub/htmlarea/uploads/OESwages-2015.xls

Table 3-12: Tax Revenues Associated with Construction

All $ Values are for Millions of Dollars	Proposed Action
Construction Cost Estimate[1]	$29.0
Construction cost, minus excise taxes	$2707
Construction-related wages[2]	$14.2
Excise Taxes to State[3]	
On construction	$1.17
On spending by workforce[4]	$0.37
Excise Taxes to City and County of Honolulu[3]	
On construction	$0.15
On spending by workforce[4]	$0.05
Income Taxes	
Corporate[5]	$0.05
Personal[6]	$0.70
Total Revenues from Construction Spending	
State of Hawai'i	$2.29
City and County of Honolulu	$0.20

Notes

1 In millions of 2015 dollars

2 estimated from average industry wages, as discussed in text

3 The State collects General Excise Tax (4%) and, on O'ahu, an additional tax for transit (0.5%). Act 247 of 2005 directs the State to retain 10% of the County surcharge for administration costs. Hence the State share of excise taxes is 4.05%, while the City share is 0.45%. Excise taxes on construction calculated on pre-tax total.

4 Excise tax is calculated on disposable income, estimated as 62.6% of wages (from historical spending rates).

5 corporate income tax estimated (from historical rates) as 0.17% of revenues (data from 2002).

6 Personal income tax estimated as 6.1% of taxable income (from 2013 data)

Sources:

Cost and wage estimates from last table.

Hawai'i State Department of Taxation, Individual Income Tax Statistics, Tax Year 2013. (2015). Posted at files.hawaii.gov/tax/stats/stats/indinc/13indinc.pdf

Hawai'i State Department of Taxation, Hawai'i Income Patterns, Businesses: 2002. (2006). Posted at files.hawaii.gov/tax/stats/stats/businc/02businc.pdf

3.13.2 Potential Impacts and Mitigation Measures

The proposed project is expected to have short term impacts during construction. Trenching and drilling will create noise and dust, and limit both parking and circulation on local roadways. These impacts will be mitigated through best management practices, traffic control plans that take into account the movement of residents and students to and from the schools mauka of the Ala Wai Canal, and scheduling construction to limit impacts on residents and schools. These measures are expected to reduce social impacts of construction.

Economic impacts of the proposed action will arise due to construction spending. These can be estimated on the basis of recent average data, as shown in Table 3-11. The direct construction workforce will amount to approximately 106 full time jobs over the construction period. Not all those jobs would be on-site: jobs in offices and base yards typically account for about 20 percent of construction jobs. The total employment impact includes indirect jobs (due to purchases by the contractors) and induced jobs (due to purchases by the workforce). The total job impact comes to 257 person-years of employment, over a construction period of about two years. The annual average job impact amounts to approximately 128 person-years. (Jobs in construction last only during the construction period; indirect and induced jobs are similarly temporary.)

Taxes associated with construction spending can also be estimated on the basis of historical data, as shown in Table 3-12. The total tax revenues for the State would amount to approximately $2.29 million; the City would receive approximately $200,000.

CHAPTER 4
FEDERAL, STATE, AND COUNTY LAND USE AND ENVIRONMENTAL POLICES

This section addresses the compliance of the Proposed Action with applicable federal, state, and county policies and programs.

4.1 FEDERAL LAWS

While this EA is written according to HRS Chapter 343 and its implementing rules, it is also intended to provide preliminary information to U.S. Army Corps of Engineers (USACE) for a Department of the Army (DA) permit.

4.1.1 Rivers and Harbors Act of 1899, Section 10

The Rivers and Harbors Act is the oldest federal environmental law in the United States. This Act makes it illegal to discharge refuse matter of any kind into the navigable waters of the U.S. without a permit. Section 10 of the Rivers and Harbors Act makes it illegal to excavate, fill, or alter the course, condition, or capacity of any port, harbor, channel, or other navigable water without a permit. Although many activities covered by the Rivers and Harbor Act are regulated under the CWA, the Rivers and Harbors Act retains independent vitality. The Act is administered by USACE.

The proposed project will involve activities within navigable waters of the U.S., namely the Ala Wai Canal. Section 3.3 of this EA describes the water resources at the project site. A DA Permit (Nationwide Permit [NWP] #12) from the USACE will be required for this project to adhere to Section 10 of the Rivers and Harbors Act.

4.1.2 Migratory Bird Treaty Act of 1918

The purpose of the MBTA is to protect migratory birds and birds native to the United States. The MBTA prohibits the unregulated "taking" of covered species, which is defined as "hunting, pursuing, killing, possessing or transporting any migratory bird, nest, egg or part thereof." The MBTA extends to all bird species native to the United States, even those that are not migratory. Over 1,000 species are currently protected. The MBTA is administered by the U.S. Fish and Wildlife Service (USFWS).

The biological resource survey conducted for this EA, which included terrestrial flora and fauna surveys as well as aquatic surveys, identified six bird species in the project

area that are protected under the Migratory Bird Treaty. As described in Section 3.5, the project is unlikely to have any adverse impact on these protected species.

4.1.3 Coastal Zone Management Act of 1972

The federal Coastal Zone Management Act of 1972 establishes a program for management, development, and protection of the nation's coastal zone. The program is administered by the National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resource Management. States are authorized to develop and implement their own Coastal Zone Management (CZM) Programs.

The Hawai'i CZM Program is administered by the Office of Planning, under the State Department of Business, Economic Development and Tourism (DBEDT). HRS Chapter 205A-1 establishes that all lands within the State are within the CZM area. The individual counties of the State are responsible for identifying and establishing the Special Management Areas (SMA) and shoreline setback areas of their jurisdiction. Discussions of the project's relationship to the State's CZM Program and the City's SMA are provided respectively, in Sections 4.2.9 and 4.3.4 of this chapter.

4.1.4 Endangered Species Act of 1973

USFWS enacted the Endangered Species Act (ESA) of 1973 to protect critically imperiled species and the ecosystems upon which they depend from extinction. The ESA's provisions encompass plants and invertebrates as well as vertebrates. The USFWS and the NOAA administer the ESA.

Section 7 of the ESA requires that federally-funded projects not jeopardize species listed as threatened or endangered, or adversely modify designated critical habitats. While this project is not federally funded, the State regulations protecting endangered and threatened species (HRS Chapter 195D) do apply. A biological resource survey was conducted for this EA, which included terrestrial flora and fauna surveys as well as aquatic surveys, (described in Section 3.5). The survey did not observe any federally-listed threatened, endangered, or candidate species on the project site and found that most flora and fauna on the site were introduced species.

4.1.5 Section 1424(E) of the Safe Drinking Water Act of 1974

The project site is located within the Southern Oahu Basal Aquifer (SOBA). According to the Safe Drinking Water Act of 1974 (amended in 1986 and 1996), Section 1424(e), EPA can prohibit federal funding for projects located in areas that overlie a sole source aquifer, if such projects threaten that aquifer. For federal-aided projects that could affect the SOBA, a water quality assessment must be prepared and submitted to the EPA for review. The proposed project is not receiving federal funding so this condition does not apply.

4.2 STATE POLICIES AND STATUTES

4.2.1 State Land Use Law

The State Legislature adopted the State Land Use Law in 1961 to protect Hawaii's valuable lands from development that resulted in only short-term gains for a few and long-term losses to the income and growth potential of the State's economy. Accordingly, the Legislature established an overall framework of land use management. HRS Chapter 205 placed all lands within the state in one of four land use districts: Urban, Agricultural, Conservation, or Rural (the Rural District was added in 1963) and established the State Land Use Commission (LUC) to administer the designated land use districts.

The State Land Use District Maps, which designates the location of the various land use districts, identify the project site in the Urban District. The existing and proposed uses for the project site are permitted in the designated Urban District. As such, the proposed action would take place in an urban environment where development and foreseeable growth are anticipated and planned.

4.2.2 Hawai'i State Plan

In 1978, the State Legislature adopted the Hawai'i State Planning Act (Planning Act) as HRS Chapter 226 to establish direction and provide long-range planning for the State. The Planning Act consists of a series of broad goals, objectives, and policies that serve as guidelines for the State's future long-term growth and development. The Planning Act provides a basis for determining priorities and allocating limited resources. It also seeks to improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities. Furthermore, the Planning Act establishes a system for plan formulation and program coordination to provide for an integration of all major state and county activities.

The Planning Act is divided into three sections: Part I: Overall Theme, Goals, Objectives and Policies; Part II: Planning Coordination and Implementation; and Part III: Priority Guidelines. The Planning Act also called for the creation of 12 functional plans to set specific objectives, establish policies, and implement actions for a particular field of activity.

Part I of the Planning Act identifies the overall themes of the Hawai'i State Plan: (1) individual and family self-sufficiency; (2) social and economic mobility; and (3) community or social well-being. These themes are considered "basic functions of society" and are goals toward which government must strive.[1] Objectives and policies focus on general topic areas, including population, economy, physical environment, facility systems, and socio-cultural advancement.[2]

[1] State of Hawai'i. 1978. *Hawai'i Revised Statutes, Chapter 226, Hawai'i State Planning Act.*

[2] Objectives and policies of the State Plan are listed in HRS Chapter 226-5 through 226-27.

The proposed project supports and is consistent with the following applicable State Plan objectives and policies:

HRS §226-11: PHYSICAL ENVIRONMENT—LAND-BASED, SHORELINE, AND MARINE RESOURCES. The proposed project is not expected to adversely affect the State's land-based, shoreline, or marine resources. A biological resource survey was conducted for this EA, which included terrestrial flora and fauna surveys as well as aquatic surveys. The project area does not encompass any designated or proposed critical habitat for threatened or endangered species. No federally listed threatened, endangered, or candidate species were observed in the project area. Similarly, no rare native Hawaiian plant species were observed. A discussion of biological resources is included in Section 3.5 of this EA.

Temporary impacts of construction activities may include an increase in Ala Wai Canal traffic and inconvenience to recreational users of canal waters. But long-term impacts of the proposed project on environmental resources will be positive, as a clear canal way will facilitate maintenance dredging to maintain channel depth for recreational users.

HRS §226-12: PHYSICAL ENVIRONMENT—SCENIC, NATURAL BEAUTY, AND HISTORIC RESOURCES. The proposed project is not expected to adversely affect the State's scenic resources, natural beauty, or historic resources. Hawaiian Electric will be replacing two electric poles on the McCully/Mōʻiliʻili side of the project area. The poles will be approximately 56 ½ feet above ground. Short term visual impacts along the Ala Wai Canal would result from construction staging, trenching, and directional drilling. These temporary visual impacts would be limited to views of the canal itself, and would not impact views of the Koʻolau Mountains or of Diamond Head.

An archaeological inventory survey and a cultural impact assessment were prepared as part of this EA. The archaeological inventory survey identified two previously recorded historic properties, SIHP No. 50-80-14-5796 (original wetland surface) and SIHP No. 50-80-14-9757 (Ala Wai Canal) within the project area. No additional subsurface resources were identified during the archaeological inventory survey. The proposed project is not expected to adversely affect the archaeological and cultural resources identified in the project area. A discussion of archaeological and cultural resources is included in Section 3.4 of this EA.

HRS §226-13: PHYSICAL ENVIRONMENT—LAND, AIR, AND WATER QUALITY. The proposed project is not expected to adversely affect the State's land, air, or water quality. Both cable installation and removal will disturb the ground at the project site, but the area will be restored to its original condition once construction is completed. Short term impacts on air and water quality are anticipated during construction. Cable removal may temporarily disturb bottom sediment in the Ala Wai Canal but no long-term water quality impacts are anticipated (see Section 3.3.3 of this EA). BMPs will be employed during construction to control runoff and discharges, erosion, dust, and emissions from vehicles. Excavated soil and sediment

will be tested using the TCLP to ensure it is free of contaminants. BMPs would be employed to dispose of any contaminated material.

HRS §226-18: FACILITY SYSTEMS—ENERGY. The proposed project meets the State's energy objective to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand. Hawaiian Electric has committed to removing four sub-transmission lines and twelve concrete panels from the bottom of the Ala Wai Canal to allow future maintenance dredging of the canal by DLNR without interruption. The proposed cable relocation project would maintain electric system reliability.

4.2.3 State Functional Plans

The purpose of the State Functional Plans is to supplement the policies and procedures of the Hawai'i State Plan in further detail. The 12 State Functional Plans were designed in the early 1980s and adopted by the Hawai'i State Legislature. Committees were developed for each functional plan that involve community leaders who are appointed by the governor. These committees hold a forum to discuss the matters within their functional plan that relates to budget, executing actions and implementing a timeframe. The 12 functional plans include: Agriculture, Conservation Lands, Employment, Energy, Health, Higher Education, Historic Preservation, Housing, Recreation, Tourism, Transportation, and Water Resources Development. This project coincides with the polices of the State Functional Plans. The project will help Hawaiian Electric maintain their electric system reliability for the Waikīkī and McCully/Mō'ili'ili areas and allow for proficient maintenance of one of Hawai'i's recreational waterways.

4.2.4 Hawai'i State Plan, HRS Chapter 226 Part III – Priority Guidelines

Part III of the Hawai'i State Planning Act establishes overall priority guidelines to address areas of statewide concern.[3] There are seven major areas of focus that include: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation. This project is consistent with the economic and climate change guidelines. See Table 4-1 for a review of the project's consistency with the Priority Guidelines.

[3] State of Hawai'i. 2015. *Hawai'i Revised Statues, Chapter 226-101, Purpose*

Table 4-1: Hawai'i State Plan – HRS Chapter 226, Part III

SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
226-101	**Purpose.** Establishes overall priority guidelines to address areas of statewide concern.	
226-102	**Overall direction.** The State shall strive to improve the quality of life for Hawaii's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.	
226-103	**ECONOMIC PRIORITY GUIDELINES**	
(b)	Priority guidelines to promote the economic health and quality of the visitor industry:	
(1)	Promote visitor satisfaction by fostering an environment which enhances the aloha spirit and minimizes inconveniences to Hawai'i's residents and visitors.	C
(2)	Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.	C
(3)	Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.	C
(4)	Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.	C
CONFORMANCE DETERMINATION: The action supports HRS Section 226-103 by relocating the cables to a deeper depth under the Ala Wai Canal. This will allow regular facility maintenance and repair of the Canal that will help preserve it as a historic resource that provides recreational practice to visitors and residents.		
226-104	**POPULATION GROWTH AND LAND RESOURCES PRIORITY GUIDELINES.**	NA
226-105	**CRIME AND CRIMINAL JUSTICE. PRIORITY GUIDELINES IN THE AREA OF CRIME AND CRIMINAL JUSTICE.**	NA
226-106	**AFFORDABLE HOUSING. PRIORITY GUIDELINES FOR THE PROVISION OF AFFORDABLE HOUSING.**	NA
226-107	**QUALITY EDUCATION. PRIORITY GUIDELINES TO PROMOTE QUALITY EDUCATION.**	NA
226-108	**SUSTAINABILITY PRIORITY GUIDELINES**	NA
226-109	**CLIMATE CHANGE PRIORITY GUIDELINES** Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:	
(4)	Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;	C
(5)	Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;	C
(6)	Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;	C
(7)	Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;	C

Table 4-1: Hawai'i State Plan – HRS Chapter 226, Part III

SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
(9)	Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and	C
(10)	Encourage planning and management of the natural and built environments that effectively integrate climate change policy.	C
CONFORMANCE DETERMINATION: The action supports HRS Section 226-109 by relocating the cables to a deeper depth under the Ala Wai Canal. This will allow regular facility maintenance and repair of the Canal that will help mitigate the potential for flooding in the area. The cables that will replace the existing cables are also designed to withstand inundation.		

4.2.4.1 *State Conservation Functional Plan*

4.2.4.1.1 Objective of the Plan

The State Conservation Functional Plan emphasizes conservation of Hawai'i's environmental resources such as shorelines, watershed areas, and marine life. The plan focuses on environmental awareness and access to inland and shoreline areas for public and educational purposes.

4.2.4.1.2 Relevance to Proposed Project

The proposed project has relevance to the State Conservation Functional Plan because it will allow better access to the Ala Wai Canal for regular dredging maintenance. The Ala Wai Canal is heavily used for public recreational purposes and regular maintenance of the canal could help stabilize the ecology surrounding the area. The canal is also a recognized State Historic Property which does require regular site preservation efforts by the State.

4.2.4.2 *State Energy Functional Plan*

4.2.4.2.1 Objective of the Plan

The State Energy Functional Plan reviews Hawai'i's dependency on imported fossil fuel and the search for local alternative energy resources. The plan focuses on Hawai'i's critical need for alternate resources and provides two objectives: (1) local alternate resources that are capable of supporting Hawai'i's energy needs and (2) reduce Hawai'i's dependency on imported energy. The plan outlines and evaluates actions that would help increase conservation awareness and use of alternative energies through education. The plan reviews each alternative with the goals to keep fuel costs low and to ensure efficient public service.

4.2.4.2.2 Relevance to Proposed Project

The proposed project has relevance to the State Energy Functional Plan because it will replace cables installed in 1990 with new cables. The new electrical cables will maintain electric system reliability for the Waikīkī and McCully/Mō'ili'ili customers.

4.2.4.3 *State Historic Preservation Functional Plan*

4.2.4.3.1 Objective of the Plan

The State Historic Preservation Functional Plan focuses on the preservation of Hawai'i's history through education and research. The demographic continues to change rapidly over time which can displace Hawai'i's unique history. The goal of the plan is to spread public awareness and identity with history through education. These goals can be achieved by protecting Hawai'i's unique diversity, its tropical setting, ancestral roots, and boosting economic value. Guidelines to preserve historic properties were established by providing the tools needed to inventory each property. New laws were enacted to govern the treatment and protection of historic properties, artifacts, and human remains.

4.2.4.3.2 Relevance to Proposed Project

The proposed project has relevance to the State Historic Preservation Functional Plan because the Ala Wai Canal is recognized by the State as a historic property. Hawaiian Electric has complied with the SHPD/DLNR throughout the EA process and is aware of the project area's cultural sensitivity. An archaeological inventory survey and a cultural impact assessment were conducted for the project. These studies revealed cultural and archaeological interest within the area, which will be mitigated accordingly. Refer to Section 3.4 for an in-depth discussion of archaeological and cultural resources.

4.2.4.4 *State Recreation Functional Plan*

4.2.4.4.1 Objective of the Plan

The State Recreation Functional Plan divides the State's existing recreational areas of need into six locations: (1) ocean and shoreline recreation; (2) mauka, urban, and other recreation opportunities; (3) public access to the shoreline and mauka recreation areas; (4) resource conservation and management; (5) management of recreation programs, facilities, and areas; and (6) wetlands protection and management. The purpose of State Recreation Functional Plan is to provide adequate recreational resources, locate and protect land for recreational purposes, provide amenities and education, and maintain accessibility to recreational areas for public use.

4.2.4.4.2 Relevance to Proposed Project

The proposed project has relevance to the State Recreation Functional Plan because it will allow regular maintenance of one of O'ahu's major recreational waterways. The Ala Wai Canal serves many recreational uses such as fishing, kayaking, and canoe paddling. Maintenance dredging will give the public safe access and ensure conservation efforts of a recreational resource.

4.2.4.5 *State Tourism Functional Plan*

4.2.4.5.1 Objective of the Plan

The State Tourism Functional Plan focuses on balancing the economic potential of tourism with protection of the well-being of Hawai'i's residents. Hawai'i's unique demographic of residents has presented an awareness of culture and respect for cultural customs. The plan has recognized the need to preserve the cultural uniqueness and presented a list of six focus areas: (1) impact of tourism growth upon the community; (2) land development that is applicable to both residents and visitors; (3) environmental and cultural impact; (4) maintain a co-existing respect between residents and visitors; (5) create employment opportunities and advancement through training programs; and (6) promote marketing.

4.2.4.5.2 Relevance to Proposed Project

The proposed project has relevance to the State Tourism Functional Plan because it will improve maintenance efforts for the Ala Wai Canal while maintaining electric system reliability for the Waikīkī and McCully/Mō'ili'ili areas. The canal is a popular waterway resource that both residents and tourists can appreciate.

4.2.5 State Environmental Policy

The State Environmental Policy under HRS Chapter 344 establishes an environmental policy that: (1) encourages productive and enjoyable harmony between people and their environment; (2) promotes efforts that will prevent or eliminate damage to the environment and biosphere; (3) stimulates the health and welfare of humanity; and (4) enriches the understanding of the ecological systems and natural resources important to the people of Hawaii.

Hawaiian Electric recognizes its responsibility to protect the State's island environment. The proposed project is consistent with the State Environmental Policy as follows:

- HRS 344-4 (2)(D) *Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas.*
- HRS 344-4 (3)(A) *Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard.*
- HRS 344-4 (4)(A) *Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses.*
- HRS 344-4 (7)(A) *Encourage the efficient use of energy resources.*

The proposed project supports the preservation and maintenance of park and recreation areas at Ala Wai Neighborhood Park. By removing the existing cables that traverse the Ala Wai Canal, the proposed project will facilitate future canal maintenance dredging, which maintains channel depth for recreational users. The

replacement cables will also maintain reliability of Hawaiian Electric's electric system.

Biological resource surveys were conducted at the project area to ensure no endangered species on the project area would be adversely impacted by the proposed project. The survey did not observe any federally-listed threatened, endangered, or candidate species on the project area and found that most flora and fauna on the site were introduced species. BMPs will be employed during construction to protect the open space areas of Ala Wai Neighborhood Park and the Ala Wai Canal. For instance, the construction area will be blocked off from pedestrians and vehicles to allow for continued use of areas outside the construction zone.

4.2.6 Section 401 Water Quality Certification

A Section 401 Water Quality Certifications (WQC) is a statement which asserts that a proposed discharge resulting from an activity will not violate applicable water quality standards. Under Section 401 of the CWA, the DOH Clean Water Branch (CWB) is responsible for issuing or denying Section 401 WQCs for any project that requires a federal license or permit that may result in a water pollutant discharge to State surface waters. Since the proposed project will involve navigable waters of the U.S. and requires a DA permit (NWP #12) from USACE, a Section 401 WQC will also be required if USACE determines there will be a discharge. The Section 401 WQC is regulated under HAR Chapter 11-54, Water Quality Standards.

4.2.7 Stream Channel Alteration Permit

The Stream Channel Alteration Permit (SCAP) is administered by the DLNR Commission on Water Resource Management. As outlined in HAR Chapter 13-169-50, no stream channel shall be altered until a SCAP is issued by the commission. In this context, channel alteration means to "obstruct, diminish, destroy, modify, or relocate a stream channel; to change the direction of flow of water in a stream channel; to place any material or structures in a stream channel; or to remove any material or structures from a stream channel."[4]

The proposed project will not require a SCAP because the work is outside of the stream channel and involves routine streambed and drainageway maintenance activities. According to HAR §13-169-50, routine streambed and drainageway maintenance activities and maintenance of existing facilities are exempt from obtaining a SCAP permit.

4.2.8 Hawai'i Water Pollution Law

The Hawai'i Water Pollution Law,[5] which provides a comprehensive regulatory program for discharges[6] of pollution to the waters of Hawai'i, establishes the

[4] State of Hawai'i. 1988. *Hawai'i Administrative Rules, Title 13, Chapter 169, Protection of Instream Uses of Water.*

[5] State of Hawai'i. 2010. *Hawai'i Revised Statues, Chapter 342D, Water Pollution.*

National Pollutant Discharge Elimination System (NPDES) permit program required under the CWA, as amended. Permits covered under this program are issued by CWB. The CWB is responsible for reviewing and approving project compliance with HRS Chapter 342D (Water Pollution), HAR Chapter 11-55 (Water Pollution Control), and HAR Chapter 11-54 (Water Quality Standards). Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

The proposed project could generate discharges of stormwater runoff from its construction site to State surface waters and as a result would require a NPDES General Construction Permit.

4.2.9 HRS Ch. 6E, Historic Preservation

HRS Chapter 6E-42 (a) states that "[b]efore any agency or officer of the State or its political subdivisions approves any project involving a permit, license, certificate, land use change, subdivision, or other entitlement for use, which may affect historic property, aviation artifacts, or a burial site, the agency or office shall advise the department and prior to any approval allow the department an opportunity for review and comment on the effect of the proposed project on historic properties, aviation artifacts, or burial sites, consistent with section 6E-43, including those listed in the Hawaii register of historic places." HAR Chapter 13-284 outlines the rules governing procedures for Historic Preservation Review to comment on Chapter 6E-42, HRS, projects.

An archaeological inventory survey was conducted and accepted for this project in accordance with HAR Chapter 13-276, "Rules Governing Standards for Archaeological Inventory Surveys and Reports." Section 3.4 discusses the results of the AIS, reviews that have already occurred, the mitigation measures identified by the consultant for the proposed project, and the steps to be taken to implement those measures.

4.2.10 Hawaii Coastal Zone Management Program

The Hawaii CZM Program was promulgated in 1977 in response to the federal CZM Act of 1972. The areas encompassed by the CZM include all lands and waters of the State, including the northwestern Hawaiian Islands. The State CZM Program has issued blanket approval for USACE's NWPs. Because of the recent changes in the NWPs that became effective on March 19, 2017, the proposed project can be authorized by a USACE NWP (NWP #12). The CZM conditions for NWP #12 does not apply to this project therefore CZM review is not required.

Below is an assessment of the proposed project in relation with the objectives and policies of the State's CZM program.

[6] Discharge definition: It includes, but is not limited to, allowing the following pollutants to enter State waters: solid waste, sewage, chemicals, biological material, rock/sand/dirt, construction debris, fugitive dust, spray paint, industrial wastes, concrete, sealant, epoxy, heat, agricultural waste, and washing/cleaning effluent.

4.2.10.1 *Recreational Resources*

The proposed project will not interfere with, nor obstruct public efforts to meet the CZM objective and policies relating to providing coastal recreational opportunities accessible to the public.

Project construction will limit access temporarily to recreational space at Ala Wai Canal and Ala Wai Neighborhood Park. Over the long term, the project will remove electric lines that could hinder dredging of the Ala Wai Canal. As a result, it will contribute to sustaining this recreational resource.

4.2.10.2 *Historic Resources*

Studies, including an AIS and a CIA, have been conducted to investigate and identify archaeological and cultural resources that might be affected by the proposed action. With the mitigation measures described in Section 3.4.4 no impacts on archaeological or cultural resources are anticipated.

4.2.10.3 *Scenic and Open Space Resources*

The proposed action is located within existing road ROWs and Ala Wai Neighborhood Park. This project would not interfere with nor obstruct public efforts to meet the CZM objective and policies relating to the protection, preservation, and restoration or improvement of the quality of coastal scenic and open space resources. However, during construction, there will be limited access to areas around the construction zone. When construction is completed, the park will be returned to the existing recreational open space.

4.2.10.4 *Coastal Ecosystems*

The proposed project would be located inland of the shoreline and will not adversely affect valuable coastal ecosystems, including offshore reefs.

4.2.10.5 *Economic Uses*

The CZM economic objective and policies provide for public or private facilities and improvements important to the State's economy in suitable locations. The proposed project will maintain electric system reliability and support existing land uses, and accordingly would support this objective.

4.2.10.6 *Coastal Hazards*

The proposed project is located inland of the shoreline. No construction will occur where coastal hazards are anticipated. Two electric poles will be replaced with poles that are 56.5 feet above ground. Consequently, there is no risk to the proposed project from coastal hazards.

4.2.10.7 *Managing Development*

The proposed project will not interfere with public efforts to improve the development review process, communication, and public participation in the management of coastal resources and hazards.

4.2.10.8 *Public Participation*

The proposed project is engaged in public participation by virtue of the publication and public comment/response process for this EA. Through this State environmental review process, information and public awareness are generated on the project and its affected environment.

4.2.10.9 *Beach Protection*

The proposed project will not interfere with public efforts to protect beaches for public use and recreation.

4.2.10.10 *Marine Resources*

The proposed project will not obstruct public efforts to implement the State's ocean resources management plan.

4.3 COUNTY POLICIES AND STATUTES

4.3.1 O'ahu General Plan

The City's General Plan, which was last amended in 2002, is comprised of 11 sections relating to: Population; Economic Activity; Natural Environment; Housing; Transportation and Utilities; Energy; Physical Development and Urban Design; Public Safety; Health and Education; Culture and Recreation; and Government Operations and Fiscal Management. In regards to energy, Objective A is "to maintain an adequate, dependable, and economical supply of energy for O'ahu residents." The proposed project advances this objective.

4.3.2 Primary Urban Center Development Plan (PUC DP)

The *Primary Urban Center Development Plan* (2004), which encompasses the proposed project area, is one of eight regional plans based on the O'ahu General Plan that establish more detailed policies to shape growth in the urban core of the island. The Development Plan (DP) identifies five major vision elements:

1. Honolulu's natural, cultural, and scenic resources are protected and enhanced.
2. Livable neighborhoods have business districts, parks and plazas, and walkable streets.
3. The PUC offers in-town housing choices for people of all ages and incomes.
4. Honolulu is the Pacific's leading city and travel destination.
5. A balanced transportation system provides excellent mobility.

The proposed project addresses the first and second elements, including the following specific actions named in the plan as implementing that element:

- Siting transmission lines to minimize environmental impact (Policy 4.3.2)
- Siting transmission lines that avoid adverse impacts on scenic and natural resources (Guidance 4.3.3)

The DP's electrical power policies note "[p]lanning and building of new or relocated transmission lines should take into consideration system and cost concerns, and the impacts on the environment. Options to place utility lines underground should be considered and priorities should be established." The DP further provides guidance that "in planning new or relocated substations or transmission lines, the selection of the site or route of such facilities should avoid or mitigate adverse impacts on scenic and natural resources" (PUC DP 2004, 4.3.2, 4.3.3). The proposed project will place the electrical lines underground.

4.3.3 City Land Use Ordinance

The City's *Land Use Ordinance (LUO)* establishes zoning regulations, which regulate the use of land and provide for appropriate controls and review of proposed land uses. The LUO is designed to accomplish the goals and objectives in the O'ahu General Plan and Primary Urban Center Development Plan.

The project area involves work in public lands and rights-of-way in three different zones: P-2 General Preservation District, Public Precinct, and Apartment Precinct. Preservation districts are intended to preserve and manage major open space lands and lands of scenic and other natural resource value. Public Precinct districts are designated for public uses; Ala Wai Boulevard is in the Public Precinct zone. Apartment districts allow for a range of apartment densities and a variety of living environments, with the predominant use designed to be multi-family dwellings.

4.3.3.1 *Waikīkī Special District*

The Waikīkī Special District is intended to achieve 14 objectives in regards to land use, urban form, landscaping, recreation, open space, cultural and historic resources, architectural design, lighting, transportation, and views and aesthetics.

Below-grade infrastructure improvements are deemed exempt from the requirement for a Waikīkī Special District permit. The proposed project will include below-grade work and repair and replacement of existing structures in the Waikīkī Special District. Exempt activities and uses must still conform with applicable objectives and standards of the special district.

- Promote a Hawaiian sense of place at every opportunity.
- Guide development and redevelopment in Waikīkī with due consideration to optimum community benefits. These shall include the preservation, restoration,

maintenance, enhancement and creation of natural, recreational, educational, historic, cultural, community and scenic resources.

- Support the retention of a residential sector in order to provide stability to the neighborhoods of Waikīkī.
- Provide for a variety of compatible land uses which promote the unique character of Waikīkī, emphasizing mixed uses.
- Support efficient use of multimodal transportation in Waikīkī, reflecting the needs of Waikīkī workers, businesses, residents, and tourists. Encourage the use of public transit rather than the private automobile, and assist in the efficient flow of traffic.
- Provide for the ability to renovate and redevelop existing structures which otherwise might experience deterioration. Waikīkī is a mature, concentrated urban area with a large number of nonconforming uses and structures. The zoning requirements of this special district should not, therefore, function as barriers to desirable restoration and redevelopment lest the physical decline of structures in Waikīkī jeopardize the desire to have a healthy, vibrant, attractive and well-designed visitor destination.
- Enable the city to address concerns that development maintain Waikīkī's capacity to support adequately, accommodate comfortably, and enhance the variety of worker, resident and visitor needs.
- Provide opportunities for creative development capable of substantially contributing to rejuvenation and revitalization in the special district, and able to facilitate the desired character of Waikīkī for areas susceptible to change.
- Encourage architectural features in building design which complement Hawaii's tropical climate and ambience, while respecting Waikīkī's urbanized setting. The provision of building elements such as open lobbies, lanais, and sunshade devices is encouraged.
- Maintain, and improve where possible: mauka views from public viewing areas in Waikīkī, especially from public streets; and a visual relationship with the ocean, as experienced from Kalakaua Avenue, Kalia Road and Ala Moana Boulevard. In addition, improve pedestrian access, both perpendicular and lateral, to the beach and the Ala Wai Canal.
- Maintain a substantial view of Diamond Head from the Punchbowl lookouts by controlling building heights in Waikīkī that would impinge on this view corridor.
- Emphasize a pedestrian-orientation in Waikīkī. Acknowledge, enhance and promote the pedestrian experience to benefit both commercial establishments and the community as a whole. Walkway systems shall be complemented by adjacent landscaping, open spaces, entryways, inviting uses at the ground level,

street furniture, and human-scaled architectural details. Where appropriate, open spaces should be actively utilized to promote the pedestrian experience.

- Provide people-oriented, interactive, landscaped open spaces to offset the high-density urban ambience. Open spaces are intended to serve a variety of objectives including visual relief, pedestrian orientation, social interaction, and fundamentally to promote a sense of "Hawaiianness" within the district. Open spaces, pedestrian pathways and other ground level features should be generously supplemented with landscaping and water features to enhance their value, contribute to a lush, tropical setting and promote a Hawaiian sense of place.

- Support a complementary relationship between Waikīkī and the convention center.

The project is intended to allow proper dredging maintenance of the Ala Wai Canal, and hence contributes to the continuing revitalization of the Special District.

4.3.3.2 *Diamond Head Special District*

The Diamond Head Special District (DHSD) is designed to preserve existing prominent views of Diamond Head and to preserve and enhance the park-like character of the slopes of Diamond Head, including Kapiolani Park.

The DHSD establishes a “core” area within which regulations and permitting process are stricter than in the non-core area. The project area is not located within the core.

Some of the significant public views of Diamond Head of concern in the Special District regulations are along Ala Wai Boulevard from McCully Street to Kapahulu Avenue. The proposed project will temporarily affect a segment of Ala Wai Boulevard during construction, but will not have any enduring impact. The Ala Wai Neighborhood Park and Ala Wai Elementary School are within the district, but any view impacts will be short-term.

4.3.4 Special Management Area (SMA)

Although the SMAs originated under the federal CZM and Hawai‘i CZM Programs, the counties in Hawai‘i regulate and administer the SMAs in their respective jurisdictions. On O‘ahu, the SMA is administered by DPP. The proposed project area is outside of the SMA boundary and would not be subject to the City’s SMA rules and regulations.

4.3.5 Summary of Required Permits And Approvals

Table 4-2 provides a summary of the permits and approvals applicable for the proposed utility replacement project.

Table 4-2: List of Required Permits

Construction Activity	Required Permit/Approvals	Approving Agency
Utility Line Activities for installation and removal	DA Permit (NWP #12)	USACE
Utility Line Activities – Cable and Concrete Panel Removal	Blanket 401 Water Quality Certificate	Department of Health, Clean Water Branch
All construction activities	National Pollutant Discharge Elimination System (NPDES) General Permit	Department of Health, Clean Water Branch
Noise	Noise Permit/Variance	Department of Health, Indoor Radiation and Health Branch
Grading, grubbing and Stockpiling	Grading, Grubbing, and Stockpiling Permit	Department of Planning and Permitting
Trenching in City Street Right-of-Way	Trenching Permit	Department of Planning and Permitting
All construction activities	Construction Plan Approval	Department of Planning and Permitting
Trenching, Staging, Stockpiling	Street Usage Permit	Department of Transportation Services

CHAPTER 5
DETERMINATION

This Environmental Assessment demonstrates that the proposed action will have no significant adverse impact on the environment and that an Environmental Impact Statement is not warranted. A Finding of No Significant Impact (FONSI) is determined for this proposed action.

CHAPTER 6
FINDINGS AND REASONS SUPPORTING DETERMINATION

The following findings and reasons indicate that the proposed action will have no significant adverse impact on the environment based on the 13 significance criteria provided in the Hawai'i Administrative Rules 11-200-12, and as a result supports the FONSI determination.

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

RESPONSE. The flora, fauna, archaeological, and cultural impact studies conducted for this proposed action indicate that with the implementation of identified mitigation measures there will be no significant adverse impacts on natural or cultural resources.

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

RESPONSE. The proposed action involves replacing and relocating existing sub-transmission cables. No uses are being displaced or curtailed by the proposed action.

3. *Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, Hawai'i Revised Statutes (HRS).*

RESPONSE. As demonstrated in this document, the proposed action is consistent with the State of Hawai'i's long-term environmental policies and guidelines as expressed in Chapter 344, HRS.

4. *Substantially affects the economic or social welfare of the community or state.*

RESPONSE. The proposed action will allow for proper maintenance dredging of the Ala Wai Canal, which will increase the depth of the waterway, reducing the potential for flooding and increasing opportunities for recreational activities. Moreover, the construction activity associated with the proposed action will create jobs and infuse business and personal income into the local economy. No negative effects on the social welfare of the local community are anticipated.

5. Substantially affects public health.

RESPONSE. The proposed action will not affect public health for the long term. Short-term noise, air, and water quality impacts may occur, but regulations of the State Department of Health (DOH) will be followed during construction to minimize impacts. The proposed action will be implemented in accordance with State and City standards.

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

RESPONSE. The proposed action involves replacing existing sub-transmission cables, and once complete, will not change the existing use of the project area or increase demand for public facilities. No increase in residential population or public facility demands are expected by this proposed action.

7. Involves a substantial degradation of environmental quality.

RESPONSE. The proposed action involves the installation of underground sub-transmission cables under areas of previously developed land that include city streets and parks. Required permits will be obtained and Best Management Practices (BMPs) will be employed during construction to control erosion, runoff, and disposal of any hazardous materials. Therefore, no degradation of environmental quality is expected.

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

RESPONSE. The proposed action involves the replacement of existing electrical facilities that are needed to maintain system reliability and meet current demand for electric power. The proposed project is not part of a larger action.

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

RESPONSE. The flora and fauna survey found no rare, threatened, or endangered flora or fauna resources in the project site. Construction activities may temporarily displace some bird species at the project site but long term impacts are not expected. Temporary displacement is not expected to affect individual survival or the overall species populations. Some of the trees in the area could provide habitat for the threatened White Tern, although no White Terns were observed. Trees are not expected to be trimmed or cut down for the project.

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

RESPONSE. During construction, the effects of dust, runoff and construction noise will be mitigated by establishing and following BMPs. Watering of dry soil will keep the dust from becoming airborne. Construction noise will be mitigated by mufflers on equipment, use of sound attenuation devices, and scheduling start and curfew times per DOH standards. Once construction is completed, no detrimental effects are expected from the proposed action.

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

RESPONSE. The proposed action is situated within the flood plain and is at a large distance from the shoreline and tsunami evacuation zone. During removal of the cables from the Ala Wai Canal, BMPs will be employed to mitigate water quality pollution. For installation, the cables will be underneath the waters in the Ala Wai Canal.

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

RESPONSE. The proposed action includes replacement of existing facilities and does not involve erecting additional power poles or overhead lines. However, two existing power poles will be replaced with poles that are 56.5 feet high. The proposed action will not affect scenic vistas or viewplanes identified in City or State plans.

13. Requires substantial energy consumption.

RESPONSE. The proposed action involves replacing existing electrical facilities. After construction is complete, activities at the project site will return to existing levels.

CHAPTER 7
COMMENTS

7.1 PRE-CONSULTATIONS

The agencies and interested parties contacted as part of the pre-consultation process are as follows:

FEDERAL AGENCIES

- U.S. Army Corps of Engineers, Pacific Ocean Division
- U.S. Department of the Interior, U.S. Fish and Wildlife Service

STATE LEGISLATURE

- Senator Les Ihara, State Senate District 10
- Senator Brickwood Galuteria, State Senate District 12
- Senator Brian Taniguchi, State Senate District 11
- Representative Scott Saiki, State House District 26
- Representative Tom Brower, State House District 22

STATE AGENCIES

- State of Hawai'i, Office of Planning
- State of Hawai'i, Department of Health (DOH)
    - Environmental Health Administration
    - Clean Water Branch
- State of Hawai'i, Department of Land and Natural Resources (DLNR)
    - Engineering Division
    - Division of Aquatic Resources
    - Division of Boating and Ocean Recreation
    - Division of Forestry & Wildlife
    - State Historic Preservation Division (SHPD)
    - Division of Water Resource Management
    - Office of Conservation and Costal Land

- Land Division – Oʻahu District
- Commission on Water Resource Management

- State of Hawaiʻi, Department of Education (DOE)
  - Ala Wai Elementary School
- State of Hawaiʻi, Business, Economic, Development and Tourism (DBEDT)
- State of Hawaiʻi, Department of Commerce and Consumer Affairs (DCCA)
  - Division of Consumer Advocacy (DCA)
- State of Hawaiʻi, Department of Commerce and Consumer Affairs (DCCA)
  - Public Utilities Commission (PUC)

CITY COUNCIL

- Councilmember Trevor Ozawa, Council District 4
- Councilmember Ann Kobayashi, Council District 5

CITY AGENCIES

- Department of Design and Construction (DDC)
- Department of Environmental Services (DES)
- Department of Planning and Permitting (DPP)
- Department of Parks and Recreations (DPR)
- Department of Facility Maintenance (DFM)
- Department of Transportation Services (DTS)
- Board of Water Supply (BWS)
- Police Department (HPD)
- Fire Department (HFD)

NEIGHBORHOOD BOARDS

- McCully/Mōʻiliʻili Neighborhood Board No. 8
- Waikīkī Neighborhood Board No. 9

AREA RESIDENTS

- ʻIolani School
- Kaimana Lanais Condominium
- Ala Wai Cove Condominium
- Ala Wai Skyrise Condominium
- Kapiʻolani Gardens Condominium

- Ala Wai Plaza Condominium
- Twin Towers Condominium
- Lanikea at Waikīkī Condominium
- La Casa Condominium
- Hale Moani Condominium
- 2121 Ala Wai Condominium
- Kaiolu Sunrise Condominium
- Four Paddle Condominium
- 411 Kaiolu Condominium
- The Promenade Condominium
- Aloha Towers Condominium
- Rosalei Limited Condominium
- Ariali Realty, Inc.
- Lai Fong, Inc.
- Ariali Realty, Inc.
- Pacific Living Trust
- Kapiʻolani Real Estate LLC
- WBL, Inc.
- NTP Lynn's Investment Corporation
- Mr. Juan Ramos, Resident
- Mr. and Ms. John and Donna Gayer, Resident
- Mr. and Ms. Robert and Audrey Au, Resident
- Francis Chen and Edna Trust, Fee Owner

OTHER INTERESTED PARTIES

- Waikīkī Improvement Association
- Waikīkī Community Center
- Ala Wai Watershed Association
- Waikīkī Surf Club
- Hawaiian Electric Company (HECO)

7.1.1 Responding Parties To Pre-Consultation

The agencies and interested parties that provided comments as part of the pre-consultation process are listed below. Copies of the pre-consultation comments, and the response letters are included in Appendix E-1 and E-2 of this document.

- ʻIolani School
- Department of Land and Natural Resources
  - Division of Forestry & Wildlife
  - Division of Boating and Ocean Recreation
  - Engineering Division
  - Division of Aquatic Resources
- City and County of Honolulu, Department of Design and Construction
- City and County of Honolulu, Department of Transportation Services
- City and County of Honolulu, Department of Planning and Permitting
- City and County of Honolulu, Department of Parks and Recreation
- City and County of Honolulu, Board of Water Supply
- City and County of Honolulu, Police Department
- City and County of Honolulu, Fire Department
- State of Hawaiʻi, Office of Planning
- State of Hawaiʻi, Department of Education
  - Ala Wai Elementary School
- State of Hawaiʻi, Department of Health
  - Clean Water Branch

7.2 DRAFT ENVIRONMENTAL ASSESSMENT CONSULTATION

The Draft EA was published on December 23, 2016 in the Office of Environmental Quality Control's *The Environmental Notice*. A 30-day review and comment period began to give the agencies and interested parties sufficient time to provide comments on the Draft EA. A listing of all the parties consulted during the Draft EA process are listed below.

FEDERAL AGENCIES

- U.S. Army Corps of Engineers (USACE), Honolulu District
- U.S. Fish and Wildlife Services (USFWS), Pacific Region

STATE LEGISLATURE

- Senator Les Ihara, State Senate District 10
- Senator Brickwood Galuteria, State Senate District 12
- Senator Brian Taniguchi, State Senate District 11
- Representative Scott Saiki, State House District 26
- Representative Tom Brower, State House District 22

STATE AGENCIES

- Department of Business, Economic Development, and Tourism (DBEDT)
  - Office of Planning
- Department of Commerce and Consumer Affairs (DCCA)
  - Division of Consumer Advocacy
- Public Utilities Commission (PUC)
- Department of Education (DOE)
  - Office of School Facilities and Support Services
  - Ala Wai Elementary School
- Department of Health (DOH)
  - Environmental Planning Office
  - Clean Air Branch
  - Clean Water Branch (CWB)
  - Solid and Hazardous Waste Branch
- Department of Land and Natural Resources (DLNR)
  - Division of Aquatic Resources (DAR)
  - Division of Boating and Ocean Recreation (DOBOR)
  - Engineering Division
  - Forestry and Wildlife
  - Office of Conservation and Coastal Lands (OCCL)
  - Land Division*
  - State Historic Preservation Division (SHPD)
    - Oʻahu Island Burial Council (OIBC)
- Department of Transportation (DOT)
- Hawaiʻi State Public Library
  - Main
  - Waikīkī
  - Waikīkī-Kapahulu

- Land Use Commission (LUC)
- Office of Environmental Quality Control
- Office of Planning
- University of Hawai'i (UH)
    - Environmental Center

CITY COUNCIL

- Councilmember Trevor Ozawa, Council District 4
- Councilmember Ann Kobayashi, Council District 5

CITY AGENCIES

- Board of Water Supply (BWS)
- Department of Design and Construction (DDC)
- Department of Environmental Services (ENV)
- Department of Facility Maintenance (DFM)
- Department of Parks and Recreation (DPR)
- Department of Planning and Permitting (DPP)
    - Planning Division
    - Engineering Review Branch
    - Policy Planning Branch
    - Site Development Division
- Department of Transportation Services (DTS)
- Honolulu Fire Department (HFD)
- Honolulu Police Department (HPD)
- Satellite City Hall No. 1, Ala Moana

NEIGHBORHOOD BOARDS

- McCully/Mō'ili'ili Neighborhood Board No. 8
- Waikīkī Neighborhood Board No. 9

AREA RESIDENTS

- Condo Master, Kaimana Lanais (TMK 2-7-13:023)
- Condo Master, Ala Wai Cove (TMK 2-7-13:11)
- Condo Master, Ala Wai Skyrise (TMK 2-7-13:008)
- Condo Master, Kapi'olani Gardens (TMK 2-7-19:001)
- Condo Master, Ala Wai Plaza (TMK 2-7-13:002)

- Condo Master, Twin Towers (TMK 2-6-16:001)
- Condo Master, Lanikea at Waikīkī (TMK 2-6-16:002)
- Property Manager, Pacific Living Trust (TMK 2-6-16:003)
- Mr. Juan I. Ramos (TMK 2-6-16:005)
- Condo Master, La Casa (TMK 2-6-16:009)
- Mr. and Ms. John and Donna Gayer (TMK 2-6-17:037)
- Mr. Wilson B. Lau, WBL Inc. (TMK 2-6-17:081, 2-6-17:010, 2-6-17:082, 2-6-17:011)
- Property Manager, N T P Lynn's Investment Corp (TMK 2-6-17:012, 2-6-17:014, 2-6-17:015, 2-6-17:023)
- Condo Master, Hale Moani c/o Ms. Candace Villarmia, Certified Hawai'i (TMK 2-6-17:016)
- Condo Master, 2121 Ala Wai (TMK 2-6-17:003)
- Mr. Robert and Ms. Audrey M. Au (TMK 2-6-17:065)
- Condo Master, Kaiolu Sunrise (TMK 2-6-17:060)
- Condo Master, Four Paddle (TMK 2-6-17:057)
- Property Manager, Kapi'olani Real Estate LLC (TMK 2-6-17:056)
- Condo Master, 411 Kaiolu, Hawaiiana Management Company (TMK 2-6-17:053)
- Ms. Mary E. Gabriel, Condo Master, The Promenade (TMK 2-6-17:006)
- Condo Master, Aloha Towers (TMK 2-6-17:005)
- Condo Master, Rosalei Limited (TMK 2-6-17:004)
- Condo Master, Ariali Realty Inc. (TMK 2-6-17:029)
- Fee Owner, Francis and Edna Chen Trust, Wheeler Family Trust (TMK 2-7-13:024)

OTHER INTERSTED PARTIES

- Ala Wai Watershed Association
- Hawaiian Electric
- 'Iolani School
- Office of Hawaiian Affairs
- Waikīkī Business Improvement District Association
- Waikīkī Community Center
- Waikīkī Improvement Association
- Waikīkī Surf Club

7.2.1 Responding Parties To Draft Environmental Assessment

The agencies and interested parties that provided comments as part of the Draft EA process are listed below. Copies of the Draft EA comments and the response letters are included in Appendix E-1 and E-2 of this document.

- U.S. Fish and Wildlife Services (USFWS), Pacific Region
- Department of Education (DOE)
  - Office of School Facilities and Support Services
- Department of Health (DOH)
  - Environmental Planning Office
  - Clean Water Branch (CWB)
- Department of Land and Natural Resources (DLNR)
  - Division of Aquatic Resources (DAR)
  - Engineering Division
  - Land Division
  - State Historic Preservation Division (SHPD)
- Office of Environmental Quality Control
- Office of Planning
- Board of Water Supply (BWS)
- Department of Design and Construction (DDC)
- Department of Facility Maintenance (DFM)
  - Engineering Review Branch
  - Policy Planning Branch
- Department of Transportation Services (DTS)
- Honolulu Fire Department (HFD)
- Honolulu Police Department (HPD)
- Waikīkī Surf Club

CHAPTER 8
REFERENCES CITED

Belt Collins Hawai'i. October 1998. *Final Environmental Assessment, Ala Wai Canal Dredging, Honolulu, O'ahu, Hawai'i.* Prepared for City and County of Honolulu, Department of Transportation Services and Department of Design and Construction.

Beauchan, Brittany, Victoria S. Creed and Hallett Hammatt. July 2016. *Final Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*

Cachola, Jean Iwata. 1995. Kamehameha III: Kauikeaouli. Kamehameha Schools Press, Honolulu. From: www.ulukau.org/elib/cgi-bin/library?c=ks9&l=en

City and County of Honolulu. November 2014. *Flood Insurance Study, Volume 1 of 4.*

City and County of Honolulu, Department of Emergency Management. Tsunami Evacuation Zones. Updated April 2015, www.honolulu.gov/rep/site/dem/dem_docs/tsunami_evac/etez_final/Waikiki_map_1_waikiki.pdf.

City and County of Honolulu Department of Environmental Services. 2005. *How the City Manages Our Waste.* Obtained from www.opala.org/solid_waste/archive/How_our_City_manages_our_waste.html

Edward K. Noda and Associates. 1992. *A Management Plan for the Ala Wai Canal Watershed.* Prepared for the Department of Land and Natural Resources.

Edward K. Noda & Associates, Inc. and KRP Information Services. April 1993. *Environmental Assessment and Negative Declaration, Ala Wai Canal Improvement.*

Fletcher, C.H., E.E. Grossman, Richmond, B.M., and A.E. Gibbs. 2002. *Atlas of Natural Hazards in the Hawaiian Coastal Zone*. U.S. Geological Survey. Prepared in cooperation with University of Hawai'i, State of Hawai'i Office of Planning, and National Oceanic and Atmospheric Administration.

Foote et al. 1972. *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*.

Furumoto, A.S., E. Herrero-Bevera and W.M. Adams. 1990. *Earthquake risk and hazard potential of the Hawaiian Islands*. Hawai'i Institute of Geophysics.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

Gingerich, Stephen B. and Delwyn S. Oki. 2000. *Ground Water in Hawai'i.* Obtained from www.higp.hawaii.edu/~scott/GG104/Readings/Gingerich_Oki_2000.pdf

Keener, V. W., Marra, J. J., Finucane, M. L., Spooner D., & Smith, M.H. (Eds). (2012). *Climate Change and Pacific Islands: Indicators and Impacts. Report for the 2012 Pacific Islands Regional Climate Assessment (PIRCA).* Washington, DC: Island Press

Kubota, Lisa. "Board to explore idea of new bridge across Ala Wai Canal." *Hawaii News Now.* March 21, 2014. www.hawaiinewsnow.com/story/25043931/board-to-explore-idea-of-new-bridge-across-ala-wai-canal.

Martel, Thomas III & Hallett Hammatt. January 2017. *Final Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu, TMK (1)2-6-017; 2-7-013, 014, and 036 (various parcels)*.

National Grid. November 2009. *Electric and Magnetic Fields*. Downloaded from www.nationalgridus.com.

National Register of Historic Place Registration Form. Oct 1990. OMB No. 10024-0018.

Pukui, Mary Kawena, Samuel H. Elbert and Esther T. Mo'okini. 1974. *Place Names of Hawai'i, Revised and Expanded Edition.* Honolulu, University of Hawai'i Press.

State of Hawai'i. 1974. *Hawai'i Revised Statutes, Chapter 343, Environmental Impact Statement*.

State of Hawai'i. 1978. *Hawai'i Revised Statutes, Chapter 226, Hawai'i State Planning Act.*

State of Hawai'i. 1988. *Hawai'i Administrative Rules, Title 13, Chapter 169, Protection of Instream Uses of Water.*

State of Hawai'i. 1996. *Hawai'i Administrative Rules, Title 11, Chapter 46, Community Noise Control*.

State of Hawai'i. 1996. *Hawaii Administrative Rules, Title 13, Chapter 300, Rules of Practice and Procedure Relating to Burial Sites and Human Remains. Section 40, Inadvertent discovery of human remains.*

State of Hawai'i. 2002. *Hawaii Administrative Rules, Title 13, Chapter 280, Rules Governing General Procedures for Inadvertent Discoveries of Historic Properties During a Project Covered by the Historic Preservation Review Process. Section 3, Procedures for inadvertent discoveries.*

State of Hawai'i. 2002. *Hawaii Administrative Rules, Title 13, Chapter 284, Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-42, HRS, Projects.*

State of Hawai'i. 2010. *Hawai'i Revised Statues, Chapter 342D, Water Pollution.*

State of Hawai'i. 2014. *Hawai'i Administrative Rules, Title, 13, Chapter 231, Operation of Boats, Small Boat Harbors, and Use Permits for All Navigable Waters. Subchapter 4, Special Area Rules, Section 77, Ala Wai Canal.*

State of Hawai'i. 2015. *Hawaii Administrative Rules, Title 11, Chapter 54, Water Quality Standards*. Updated November 14, 2015.

State of Hawai'i. 2015. *Hawai'i Administrative Rules, Title 13, Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife, Injurious Wildlife, Introduced Wild Birds, and Introduced Wildlife. Section 3(b), Prohibited activities.*

State of Hawai'i. 2015. *Hawai'i Revised Statues, Chapter 226-101, Purpose*

State of Hawai'i. 2017. Hawai'i Climate Adaptation Portal. Obtained from http://climateadaptation.hawaii.gov/initiative/

State of Hawai'i, Commission on Water Resource Management (CWRM). 2016. dlnr.hawaii.gov/cwrm/groundwater/

State of Hawai'i, Department of Business, Economic Development & Tourism (DBEDT). 2014. *2014 State of Hawaii Data Book.*

State of Hawai'i, Department of Health (DOH). January 19, 1994. *DOH Policy Relating to Electric and Magnetic Fields from Power-Frequency Sources.*

State of Hawai'i Department of Health. 2014. *Annual Summary 2014 Air Quality Data Summary*.

State of Hawai'i, Department of Health, Clean Air Branch. Updated November 9, 2015. *Federal and State Ambient Air Quality Standards.* health.hawaii.gov/cab/files/2013/05/naaqs_nov_2015.pdf

State of Hawai'i, Department of Health, Hazard Evaluation and Emergency Response Office (HEER). October 2011. *Guidance for the Evaluation of Imported and Exported Fill Material, Including Contaminant Characterization of Stockpile.*

State of Hawai'i, Department of Land and Natural Resources (DLNR). Flood Hazard Assessment Report. Updated November 2014. gis.hawaiinfip.org/FHAT/.

Stearns, H., & K. Vaksvik. 1935, Reprinted March 2001. *Geology and Ground-Water Resources of the Island of O'ahu, Hawai'i*. Prepared for U.S. Geological Survey.

Stearns, H., & K. Vaksvik. 1938, Reprinted March 2001. *Geologic and Topographic Map of the Island of O'ahu, Hawai'i.* Bulletin 2, Plate 2. Prepared for U.S. Geological Survey.

Townscape, Inc. & Dashiell, Eugene P. July 2003. *Final Report Ala Wai Watershed Analysis*. Prepared for State of Hawai'i Department of Land and Natural Resources and U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers (USACE). August 2015. *Draft Ala Wai Canal Project, O'ahu, Hawai'i Feasibility Study with Integrated Environmental Impact Statement*.

U.S. Department of Agriculture, Natural Resource Conservation Service. Survey Area Data: Version 9, September 25, 2014.

U.S. Environmental Protection Agency (EPA). National Ambient Air Quality Standards (NAAQS). www3.epa.gov/ttn/naaqs/criteria.html

USGS Hawaiian Volcano Observatory*. Hazards in Hawai'i*. hvo.wr.usgs.gov/earthquakes/hazards. Accessed March 4, 2016.

Web Staff. "Does Ala Wai Canal need another bridge?" *KHON2.* March 27, 2014. khon2.com/2014/03/27/does-ala-wai-canal-need-another-bridge/

Wertheimer, N. and E. Leeper. 1979. *Electrical Wiring Configurations and Childhood Cancer. In American Journal of Epidemiology.*

APPENDIX A

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM FOR THE ALA WAI CANAL

NPS Form 10-900
(Oct. 1990)

9757

OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name The Ala Wai Canal

other names/site number The Waikiki Drainage Canal

2. Location

street & number The Ala Wai Boulevard ☐ not for publication

city or town Honolulu ☐ vicinity

state Hawaii code HI county Honolulu code 003 zip code 96815

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☐ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State of Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

☐ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

5. Classification

Ownership of Property (Check as many boxes as apply)
☐ private
☐ public-local
☒ public-State
☐ public-Federal

Category of Property (Check only one box)
☐ building(s)
☐ district
☐ site
☒ structure
☐ object

Number of Resources within Property (Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
3 bridges		structures
		objects
		Total

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register

6. Function or Use

Historic Functions (Enter categories from instructions)
EXTRACTION: extractive facility = canal
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

Current Functions (Enter categories from instructions)
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

7. Description

Architectural Classification (Enter categories from instructions)
No style

Materials (Enter categories from instructions)
foundation
walls stone and concrete
roof
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] **B** Property is associated with the lives of persons significant in our past.
- [ ] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] **A** owned by a religious institution or used for religious purposes.
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
COMMUNITY PLANNING
AND DEVELOPMENT
SOCIAL HISTORY

Period of Significance
1921-1928

Significant Dates

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
Walter F. Dillingham, builder

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [X] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [ ] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [ ] State Historic Preservation Office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Name of repository: _____

10. Geographical Data

Acreage of Property 48.5 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	03	623625	2353500
2	03	620500	2354875
3	03	621025	2354750
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Erica Steele

organization N/A date May 12, 1992

street & number 3735 Diamond Head Circle telephone (808) 734-3225

city or town Honolulu state Hawaii zip code 96815

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name Department of Land and Natural Resources

street & number Kalanimoku Building telephone _____

city or town Honolulu state HI zip code 96813

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

The Ala Wai Canal
Honolulu County, HI

Description

People smile at her beauty, but sometimes they wrinkle their noses at her aroma.
Joggers sweat their way along her banks. Sunbathers perch on her concrete shores. Lovers watch the reflection of the moon on her surface. Ancient fishermen probe her murky depths for the tasty mullet.
She is the Ala Wai Canal - a delight to tourist and Islanders alike.
But she is much more than an open space next to the sky-crowding high rises. On any given day she is a health clinic, market, rendezvous and serious playground.

Ron Youngblood
November 27, 1969

The Ala Wai Canal is a 2-mile long man-made waterway of variable depth and width located in the Waikiki district of Honolulu. The canal is fed by the Manoa-Palolo drainage ditch which drains from the Manoa and Palolo valleys, as well as a number of smaller streams, drainage ditches and storm sewers which also drain into the canal. It forms the boundary of the Waikiki district, separating Waikiki from the Makiki, Moilili and Ala Moana areas of the city. Since its construction in 1928 the canal has been used for recreational purposes which include boating (motoring, rowing and canoe paddling) and fishing.

Constructed by the Hawaiian Dredging Company between 1921 and 1928, the canal was designed to drain low-lying wetlands in Waikiki and to provide fill that would reclaim over six hundred acres of land in the district. The canal was dredged by the "Kewalo" and consists of two straight segments joined at Kalakaua Avenue by a 45 degree elbow. The first segment of the canal, which opens to the ocean at the Ala Wai Boat Harbor, is 750 meters long and 50 meters wide. The second segment extends 2350 meters from Kalakaua Avenue to Kapahulu Avenue and is 76 meters wide.

There are three venues by which one can cross the waterway - the Ala Moana bridge, the Kalakaua bridge and the McCully bridge. When the Ala Wai Canal was originally constructed, only temporary bridges crossed it, to allow the dredge "Kewalo" to move freely about the area. Upon completion of the dredging, the Kalakaua bridge was built in 1929 by R.E. Woolley; it is a graceful multiple-arch reinforced concrete bridge. Subsequently, the McCully bridge and the bridge at Ala Moana Boulevard were added.

The length of the *makai* (ocean) side of the canal is spanned by a concrete tree-lined sidewalk, which is a popular site for jogging. Only a short stretch of the *mauka* (mountain) portion of the canal has a public walkway between the Kalakaua and Ala Moana bridges and on either side of the canal is a tranquil tree-lined footpath, the makai side of which is run by a graceful concrete arched railing. Sixteen stairwells which run the makai length of the

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 7 Page 2

The Ala Wai Canal
Honolulu County, HI

Description (continued)

canal drop down from the sidewalk to the canal's surface. These additions to the canal landscape were made after the completion of the canal.

A municipal golf course, an elementary school, and a park run along the mauka side of the canal and are among the many changes bordering that side of the canal since the original construction of the Ala Wai. In addition, several high-rise apartment buildings have also been built. The surrounding visual landscape of the canal has seen enormous changes as the Waikiki, McCully and Moilili districts have developed over the years: the landscape has been transformed from an agricultural area into a residential neighborhood and finally, into a congested maze of high-rise condominiums and hotels. These alterations have had a dramatic effect upon the overall integrity of the canal landscape.

Nonetheless, there have been no significant changes to the structure of the canal itself since its original construction. Over the years, the original retaining walls contructed of stone have necessitated some repairs. In 1950 work was done to prevent crumbling masonry from falling into the canal. A new concrete facing was placed in front of the original loose stone wall. In 1992 in ongoing work the Harbors Division (the State agency responsible for the canal) is currently reinforcing portions of the wall. Some portions of the wall are being replaced because of deterioration. The main concern for the integrity of the canal is the health of its waters due to problems of siltation and water pollution caused by the sediments deposited into the canal by streams and storm drains. The sediment has necessitated occasional draining. While the original depth of the canal at the time of its construction was 10 to 25 feet, in 1990 the average depth of the canal was between 6 and 10 feet. Because of this, the canal has been dredged twice since its original construction, once in 1966 and again in 1978. It would appear ready to be dredged again, considering the current very shallow depth of water in the canal.

Despite the problem of pollution the Ala Wai "water sports park" continues to be heavily used by Waikiki residents and visitors, with an estimated daily year-round use by some 4,000 people in 1986. Throughout its history the canal has been a popular site for boating and fishing, and its banks are frequented by joggers and walkers. The Ala Wai Canal has been considered "one of the best courses for crew races in the U.S." and has been used by visiting crew's for training, including the Yale Olympic crew on their way to the games in Melbourne, Australia in 1956. The canal is used regularly by local outrigger canoe clubs, and has been for many years. Until the 1970s numerous commercial boating operations operated along the Ala Wai. For many years fishing has been a popular activity along the banks of the Ala Wai; archival photos show fishermen's perches lining the sides of the canal. Today the perches are gone, though it is not uncommon to see people hanging a line into the Ala Wai's murky waters.

The Ala Wai Canal
Honolulu County, HI

Description (continued)

The Ala Wai Canal provides an important aesthetic dimension to the Waikiki neighborhood with its open space and tranquil waters. While the land surrounding the Ala Wai has undergone incredible change in the last 71 years, the environment at the canal has remained relatively constant.

Statement of Significance

The Ala Wai Canal is historically significant because of its pivotal role in the development of the Waikiki district, first as a residential neighborhood and soon after as a world-renowned resort area. The reclamation project in Waikiki, made possible by the dredging of the Ala Wai Canal, made a significant contribution to the eventual development of the State's tourism-based economy. Without the reclamation of wetlands and fishponds in Waikiki used for agriculture and aquaculture farming through 1920, Waikiki as we know it today, with its 75,000 visitors a day and the $70 million in property taxes it generates for the city, would not have been possible. The structure, which the original proposer of the canal, Lucius E. Pinkham envisioned as a great lagoon to be used for boating and recreational purposes, remains in the midst of so much change, relatively unchanged, and continues to be used regularly used by paddlers and fishermen.

Historical Background and Significance:

Since the 1500s, "Waiatite" was the seat of government for Hawaiian royalty on the island of Oahu. From that time forward Waikiki was also a documented rich and productive agricultural region, until 1921 when construction of the Ala Wai Canal began. For centuries large *loko* (fishponds) and taro *lo'i* (terraces) were fed by the many springs that flowed in Waikiki (literally, "spouting waters") and amply supplied the native Hawaiians living in the area with food. Only in the 1830s and 40s, due to a severe drop in the native population brought on by the introduction of Western diseases, did the wetlands and fishponds fall into an unproductive state. By the late 1800s and early 1900s the wetlands were again fruitful, and native Hawaiian farmers were joined by immigrant farmers who grew rice in the Waikiki area to sell to immigrant workers on the plantations.

Even after 1809, when Kamehameha I moved his court to Honolulu, Waikiki continued to be a favored haunt of Hawaiian royalty. The area was also increasingly popular with the growing number of *haole* (foreigners) living in Honolulu toward the turn of the century. As Waikiki's popularity began to grow, the value of the area could not go unnoticed for long and the community began to develop and change. The wetlands (referred to by many as "swamp lands") could, in the eyes of many in Honolulu, be put to better use than raising ducks and growing rice - but only if the land could be "reclaimed" (filled in).

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 8 Page 4

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Bath houses began to be established, the first in 1881. In 1903, the Honolulu Rapid Transit Company inaugurated a service between Honolulu and Waikiki, providing easier access to the area. By 1921, the year construction of the Ala Wai Canal began, five major hotels had been constructed in Waikiki. One project that had considerable influence was the reclamation of Fort DeRussy in the Waikiki area. In the first decade of the twentieth century, the U.S. Department of War acquired 73 acres of land in Waikiki; from 1909 to 1911 the Quartermaster Corps was assigned the task of filling "a portion of the fish ponds which covered most of the fort (Fort DeRussy)." This was the first reclamation of land in the area.

Increased public concern over the mosquito problem and the potential spread of contagious and infectious diseases in Hawaii was one of the most important factors leading to the construction of the Ala Wai and the Waikiki Reclamation Project. The mosquito was accidentally introduced to Hawaii in 1826, and the Waikiki wetlands provided an ideal breeding ground for these insects. In 1909 W. C. Hodby, chief quarantine officer of the U.S. Public Health and Marine-Hospital Service, published a report entitled "The Outlook for Quarantinable Diseases in the Territory of Hawaii." In it he urged a "relentless and unceasing war against mosquitoes..." The Sanitary Commission, created by the Legislature in 1911 to address increasing concern over the danger of contagious and infectious disease introduced in Hawaii, reported that "certain swamps and low lands must be filled in order to protect our public health." With the construction of the Ala Wai Canal the mosquito-breeding wetlands were drained and filled, eliminating what many considered to be a potentially serious health hazard.

One final factor that led to the construction of the canal was the concern over the draining of wetlands on to the shores of Waikiki's beaches, at a time when bathing was becoming increasingly popular and there were a growing number of visitors to Hawaii's beaches. The proposed drainage canal would carry the runoff away from the Waikiki beaches.

The original proposal to build the Ala Wai Canal was put forward in 1906 by Lucius E. Pinkham, then president of the Board of Health of the Territory of Hawaii. In a report to the board, Pinkham recommended the reclamation of the Waikiki district of the city of Honolulu, proclaiming that the lands in Waikiki were in a deleterious and unsanitary condition. He proposed to fill in what he termed swamp lands to create an "attractive and charming" residential neighborhood . This reclamation of 625 acres would be accomplished by the construction of a "great lagoon" that would yield the necessary fill material and "create a quite marvelously beautiful, unique district, a Venice in the midst of the Pacific." He envisaged that the canal would be used for boating, providing an ideal course for racing. Thus while the canal would serve a recreational purpose upon its completion, the primary reason for its construction was to provide the necessary fill for adjacent lands and to drain runoff from the Manoa, Makiki and Palolo valleys away from Waikiki's beaches. While the proposal was shelved

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

for a number of years, upon his appointment as governor of the Territory by then-president Woodrow Wilson in 1913, Pinkham devoted much of the energy of his four-year term to the implementation of his Waikiki plan.

In 1917 under Act 102, S.L. 1917, $5,000 was appropriated to the Superintendent of Public Works to do a complete survey, map and plans for the area in Honolulu "between King Street and the sea beach, and between Kapahulu road and Sheridan street." This would become the complete area of the reclamation project in the 1920s.

Also in 1917, Act 231 was passed authorizing Governor Pinkham to appoint a commission to devise a plan for the reclamation and improvement of this area of land. The plan was to include a "main lagoon or canal" for drainage and "to receive and take care of the natural flood waters of said area."

Under Governor Pinkham, the legislature appropriated $100,000 for the excavation of the canal and passed Act 14, S.L. 1918 authorizing the Superintendent of Public Works to "acquire for public use, by condemnation, purchase, exchange or otherwise, all necessary lands and rights of way for the purpose of digging and constructing a portion of the drainage canal or lagoon..." Many of the lands in Waikiki were acquired by a practice of land condemnation. Under a 1896 law, Act 61, the Territory of Hawaii's Board of Health could judge whether any land was unsanitary and require the owners to take the necessary steps to improve the land. This usually meant filling the land. While this practice was no great hardship for property owners who were interested in developing their land for residential or commercial purposes, for wetland farmers it essentially meant the eradication of their livelihood. In addition, if under the law land owners were financially unable to fill the land, or unwilling, the government could undertake the improvement and cover the cost through a lien placed on the property. Through this process many wetland farmers in Waikiki lost their land and livelihood.

By June 1920, 85 percent of the land required for the building of the canal had been acquired and bids to dredge the canal were solicited. In December 1920, Lyman Bigelow, Superintendent of Public Works advertised for bids in the Honolulu Star-Bulletin. On December 23, 1920 the bids were opened and the contract for the project was awarded to the Hawaiian Dredging Company, owned by Walter F. Dillingham. Dillingham's bid was one of only two bids received by the Territory for the project.

In the same year under Act 220, S.L. 1921 a resolution was issued on October 14 declaring construction of the Waikiki Drainage Canal "necessary for the proper drainage and sanitation" of Waikiki and appropriating $600,000 for the canal. Act 221 confirmed the boundaries of the reclamation project and provided for a commission to plan for boulevards, streets and parks within the district.

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Two contracts were negotiated between the Territory of Hawaii and Hawaiian Dredging Company to contract for the construction of the canal. Unit 1, Job No. 2979 entitled, "Proposal for Dredging a Drainage Canal and Filling and Reclaiming Certain Unsanitary Lands at Waikiki" was the primary agreement which consisted of dredging a canal 60 feet wide some two miles inland from the "sea beach at Ala Moana Road up to and intercepting the Apuakehau Stream" and called for the construction of "a dyke 6 feet high and 10 feet wide at the top along the entire makai (south) side of this Canal." The contract for Unit 2, Job No. 2986, the "Second Unit of the Waikiki Reclamation and Sanitation Project at Waikiki" called for a canal to be dredged "from the sea beach at Ala Moana Road to a point about 500 feet toward the reef."

Construction was begun in 1921, and by January of 1922 Hawaiian Dredging Company had completed the first phase of the project, Unit 2, and was beginning work on Unit 1, Contract 2979. The hydraulic dredge "Kewalo" was used by Hawaiian Dredging Company to dredge the canal. Because of the size of the dredge it could not successfully operate in a width of 60 feet so the canal had to be cut to an approximate width of 150 feet.

By mid-1923 the "Kewalo" had cut its way almost 6,500 feet towards Kapahulu Road, cutting a channel approximately 135 feet wide and 10-20 feet deep. The Superintendent of Public Works, Lyman H. Bigelow, reported that the canal "has now intercepted Apuakehau Stream which flowed by the Outrigger Club and all the filthy waters which previously flowed on to this fine swimming beach have been diverted and now flow out to the sea by way of the canal."

By mid-1924 the canal was 150 feet wide and had been dredged "its entire length" to Kapahulu Road. In his annual report to the Governor in 1924, Bigelow stated that the canal had been excavated its entire length ending at Kapahulu Road. Due to a lack of funds the Diamond Head end of the canal, called for in Lucius Pinkham's original proposal, was put on hold until "some later date, when funds are made available." Pinkham had recommended that the canal should exit back out to the ocean at Kapiolani Park, with tides gates at the both entrances to be closed at high tide and "the waters thus forced through the lagoon to exit at the Ala Moana bridge." This portion of the canal was in fact never completed, though in 1967 the local Rotary club and other civic groups brought the idea up again - with no success.

In order to provide the additional fill material necessary to bring the Waikiki Reclamation Project to completion Act 248, S.L. 1923 was passed authorizing the widening of the canal by 100 feet.

The canal acquired its name in 1925 when the City Planning Commission requested that citizens of Honolulu submit suitable names for the renaming of the Waikiki drainage canal. Jennie Wilson, wife of Mayor Wilson, suggested the name Ala Wai, Hawaiian for "waterway."

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

The "Kewalo" headed back to McCully Street to begin dredging fill for the McCully tract, a vast area of pondfields and fishponds. By mid-1927 the filling of the McCully tract was completed and the canal was 250 feet wide almost to Kapahulu Road.

In 1928 the "Kewalo" exited the canal in and the construction of the Ala Wai was thus completed. That same year a supplement in the Honolulu Advertiser noted the dramatic increase in the value of land. According to V. Von Holt, president of the realty company Whitney & Von Holt, Ltd., land values had gone from $500 an acre for a piece of agricultural property prior to the construction of the canal to up to $4 a square foot for business property in 1928. With a great increase in available property, numerous residential development projects were undertaken in Waikiki. The number of visitors was also on the rise since the beginning of the reclamation project. Between 1921 and 1927, the number of visitors to Waikiki doubled from 8,000 to 17, 451 according to the Hawaii Visitors Bureau. In addition, in 1927 a total of 19,567 "one-day tourists" visited Hawaii's beaches as they travelled on cruise ships stopping in the islands. This same year the visitor's bureau launched its largest ever campaign to promote Hawaii and "put Waikiki and other attractions of the islands on the resort map," aggressively promoting Hawaii's "third industry" - tourism. Today tourism is the state's number one industry and Waikiki is at its core.

The Ala Wai Canal easily merits inclusion on the National Register of Historic Places, for local and state significance. This project allowed Waikiki to be transformed from an agriculturally productive region to a tourist mecca, upon which the state's economy has become increasingly dependent. Today, Waikiki's 450 acres generate $70 million in property taxes for the city annually, roughly one-third of the total property taxes received by the city. Property values in the region have skyrocketed, from an average of $840 an acre in 1917 to $22 million in 1990. Given the history of the reclamation project and resultant changes in the Waikiki district over the last 70 years, it is impossible not to conclude that the construction of the Ala Wai Canal has had a momentous impact on the development of the surrounding community and its economy, and on the economy of the entire state.

However, despite the significance of the structure, the building of the Ala Wai Canal and the reclamation project tells a sad story. The story is one in which many farmers lost their land and livelihood through a questionable practice of land condemnation and where a tranquil paradise, such as Waikiki was at the close of the 19th century, has been transformed into bustling, recreational playground with no sense of the history of the community from which it came. In fact the Ala Wai Canal is one of the only reminders of the spirit of Waikiki as it was in 1921.

The Ala Wai Canal
Honolulu County, HI

Bibliography

"Canal Course Highly Praised." *Honolulu Star-Bulletin & Advertiser*, March 31, 1951.

"City Workers To Strengthen Canal's Banks." *Honolulu Advertiser*, June 30, 1950.

Finstick, Sue Ann. "The Ala Wai Canal." Term paper, University of Hawaii, 1990.

Hawaii (Territory) Board of Health. *Reclamation of the Waikiki District of the City of Honolulu, Territory of Hawaii: Recommendations--Maps--Plans and Specifications, by L.E. Pinkham, President Board of Health.* Honolulu: Hawaiian Gazette, 1906.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1915.* Honolulu: Star-Bulletin, 1915.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1916.* Honolulu: Star-Bulletin, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1917.* Honolulu: Paradise of the Pacific, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1918.* Honolulu: New Freedom Press, 1918.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1919.* Honolulu: Paradise of the Pacific, 1919.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1920.* Honolulu, 1920.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1921.* Honolulu: Paradise of the Pacific, 1921.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1922.* Honolulu: Star-Bulletin, 1922.

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1923.* Honolulu: Star-Bulletin, 1923.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1924.* Honolulu: Star-Bulletin, 1924.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1925.* Honolulu: Star-Bulletin, 1925.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1926.* Honolulu: Star-Bulletin, 1926.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1927.* Honolulu: Star-Bulletin, 1927.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1928.* Honolulu: Star-Bulletin, 1928.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1929.* Honolulu: The Printshop Company, Ltd., 1929.

Hibbard, D. and D. Franzen. *The View From Diamond Head: Royal Residence to Urban Resort.* Honolulu: Editions Limited, 1987.

Honolulu, Hawaii. Bernice Pauahi Bishop Museum. Dillingham Archives, Files W-12, W-14, W-15, W-16.

Lum, Walter and Richard Cox. "The Ala Wai Canal: From Wetlands to World-famous Waikiki." *Irrigation and Drainage Proceedings 1991.* Honolulu: IR Div/ASCE, 1991.

Miller, Jacqueline. Ecological Studies of the Biota of the Ala Wai Canal. Honolulu: 1975.

Nakamura, Barry. "Waikiki and the Reclamation Project." Master's thesis, University of Hawaii, 1979.

"New Struggle Over Ala Wai Canal Use." *Honolulu Advertiser*, May 21, 1986.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Section number 9, 10 Page 10

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

"Opposition Swamps Canal Entrepreneur." *Honolulu Advertiser*, June 4, 1986.

"Realtor Sees Big Growth At Waikiki." *Honolulu Advertiser*, October 17, 1928.

"She's Lady of Many Moods." *Honolulu Advertiser*, November 27, 1969.

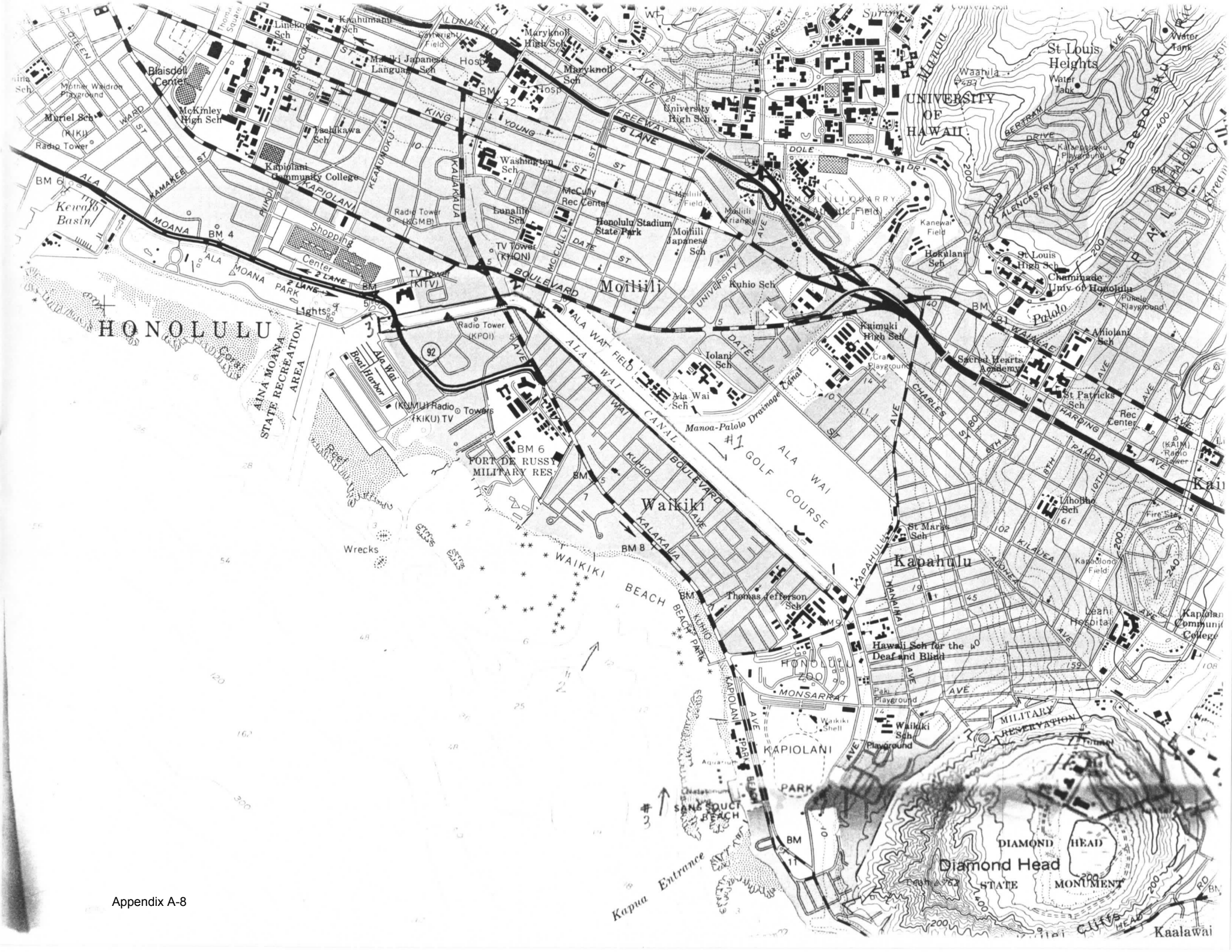
"Waikiki Magic Sends Lure World Over." *Honolulu Advertiser*, October 17, 1928.

Verbal Boundary Description

The boundary of the nominated property is delineated by the polygon whose vertices are marked by the following UTM reference points: 1) 03 623625/2353500, 2) 03 620500/2354875, 3) 03 620125/2354750.

Boundary Jusitification

The boundary of the nominated property includes the entire parcel of land historically associated with the canal ~~as well as the adjacent boulevards on the makai side of the canal~~. This area makes up the recreational "water park" that is the Ala Wai Canal today.


HONOLULU
Waikiki
Moiliili
Kapahulu
KAPIOLANI PARK
UNIVERSITY OF HAWAII
Diamond Head
DIAMOND HEAD STATE MONUMENT
Kaalawai
Kapua Entrance
Wrecks
Blaisdell Center
McKinley High Sch
Mother Waldron Playground
Muriel Sch (KIKI) Radio Tower
Kaahumanu Sch
Lincoln Sch
Makiki Japanese Language Sch
Maryknoll High Sch
Maryknoll Sch
University High Sch
Tachikawa Sch
Kapiolani Community College
Washington Sch
Lunalilo Sch
McCully Rec Center
Honolulu Stadium State Park
Moiliili Japanese Sch
Moiliili Triangle
Moiliili Field
Kanewai Field
Hokulani Sch
St Louis Heights
St Louis High Sch
Chaminade Univ of Honolulu
Pukele Playground
Kaimuki High Sch
Sacred Hearts Academy
Ahiolani Sch
St Patricks Sch
Rec Center
Iolani Sch
Ala Wai Sch
Kuhio Sch
Radio Tower (KGMB)
TV Tower (KHON)
TV Tower (KITV)
Radio Tower (KPOI)
(KIUM) Radio (KIKU) TV
Shopping Center
Lights
Aina Moana State Recreation Area
Ala Moana Park
Boat Harbor
Ala Wai Canal
Manoa-Palolo Drainage Canal
#1 Golf Course
Fort De Russy Military Res
St Marys Sch
Thomas Jefferson Sch
Hawaii Sch for the Deaf and Blind
Honolulu Zoo
Monsarrat
Paki Playground
Waikiki Shell
Waikiki Sch Playground
Kapiolani Community College
Leahi Hospital
Kapaolono Field
Lholiao Sch
Military Reservation
Sans Souci Beach
Waikiki Beach
Waikiki Beach Park
Kalakaua
Kuhio Boulevard
Ala Wai Boulevard
Ala Moana
Kapiolani
Kamakee St
Keeaumoku St
Pensacola St
King
Young
Wilder
Date St
McCully
University Ave
Dole St
Bertram Drive
Alencastre St
Waahila
Manoa
Palolo
Waialae
Kilauea
Harding
Charles
Pahoa
Aliikoa
Paty Drive
Water Tank
Fire Sta
Kaimuki
Kaiolani Community College
Kaalawai
Cliffs
Head
Rd
Trail
Reef
Coral
Shoal
Rocks
Tower
Ala Wai Field
Freeway
6 Lane
2 Lane
Lunalilo
Beretania
Judd St
Punahou St
Wilder Ave
Kaimuki
Kaiolani
Kaiolani Community College

APPENDIX B

ARCHAEOLOGICAL INVENTORY SURVEY

DAVID Y. IGE
GOVERNOR OF HAWAII

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

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

February 10, 2017

IN REPLY REFER TO:
Log No. 2016.01343
Doc. No. 1702KM06
Archaeology

Jayson Shibata, P.E.
Project Manager, Engineering Department
Hawaiian Electric Company
P.O. Box 2750
Honolulu, HI 96840

Dear Mr. Shibata:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Project
Waikīkī Ahupua'a, Honolulu (Kona) District, Island of O'ahu
TMK: (1) 2-6-017; 2-7-013, 014, and 036

Thank you for the opportunity to review the revised report/plan titled *Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua'a, Honolulu (Kona) District, Island of O'ahu, TMK: (1) 2-6-017; 2-7-013, 014, and 036* (Martel III and Hammatt, May 2016). The State Historic Preservation Division (SHPD) received this submittal on June 1, 2016. The SHPD requested revisions via email on January 14, 2017 (Susan Lebo [SHPD] to David Shideler [Cultural Surveys]) and received a revised draft on January 21, 2017 (David Shideler [Cultural Surveys] to Susan Lebo [SHPD]).

This archaeological inventory survey (AIS) was prepared at the request of the Hawaiian Electric Company (HECO). The landowner is the State of Hawaii. The project area includes 10 acres of roadway along University Avenue, Hīhīwai Street, Ala Wai Boulevard, Kālanimou Street, and Kai'olu Street, along with areas of Ala Wai Neighborhood Park and Ala Wai Elementary School. The project involves the relocation of underground transmission lines that connect to HECO's Waikīkī substation on Kai'olu Street. The proposed work will shift cables to the west of the existing route. A variety of methods will be utilized to complete the project: horizontal drilling will be done to cross under the Ala Wai Canal; open trenching will be used to install a ductbank/cable system from Kalaimoku Street along Ala Wai Boulevard to Kai'olu Street and connect to the Waikīkī substation; open trenching will be used to install a ductbank/cable system from the Ala Wai Neighborhood Park parking lot to a utility pole near the intersection with Kamoku Street; cables will be brought through an existing ductbank system from the park to a utility pole located on University Avenue; existing cables will be removed from Ala Wai Elementary School and Ala Wai Canal; pole replacement will occur near the intersections of University Avenue and Kapiolani Boulevard and Hīhīwai Street and Kamoku Street. Additionally, staging areas will be created on Kālaimoku Street, University Avenue, and in Ala Wai Neighborhood Park.

The AIS involved a 100% pedestrian inspection and subsurface testing involving excavation of five test trenches (T-1 through T-5) and five shovel test pits (STP-1 through STP-5). The AIS identified two previously identified historic properties: the Ala Wai Canal (Site 50-80-14-9757) and a culturally modified wetland (Site 50-80-14-5796). The general stratigraphy observed included modern layers (related to the existing road surface, or landscaping, or fill layers), overlying historic land reclamation fills, overlying a buried A horizon (Site 5796), overlying a natural marine sand. Martel III and Hammatt (2016) conducted pollen analysis and radiocarbon of select samples for Site 5796 and determined the layer likely represents the original wetland deposit utilized from pre-Contact through historic times.

Pursuant to Hawaii Administrative Rules (HAR) §13-284-6, Site 5796 is assessed significant under Criterion "d", and the Ala Wai Canal (Site 9757) is assessed significant under Criteria "a" and "d". Additionally, the Ala Wai Canal is listed on the Hawaii Register of Historic Places (HRHP) and is evaluated as eligible for listing on the Nation Register of Historic Places (NRHP) under Criterion A. Site 5796 was not evaluated for register eligibility. The AIS report project effect determination is "effect, with agreed upon mitigation commitments". No archaeological work is recommended within the Ala Wai Canal (Site 9757). Archaeological monitoring is recommended for the project area (excluding the canal) due to the potential for the project to impact Site 5796 (modified wetland) and the potential for the project to encounter yet unidentified buried historic properties elsewhere within the project area. SHPD concurs with the site significance assessments, eligibility recommendation for the Ala Wai Canal (Site 9757), project effect determination, and mitigation recommendation of archaeological monitoring.

The revisions adequately address the issues and concerns identified in our previous correspondence. The report meets the minimum requirements of HAR §13-284-5. **It is accepted**. Please send one hardcopy of the document, clearly marked FINAL, along with a text-searchable PDF version to the Kapolei SHPD office, attention SHPD Library.

As stipulated in HAR §13-284-7, when SHPD comments that a project will result in "effect, with agreed upon mitigation commitments," then detailed mitigation plans shall be developed for SHPD review and acceptance prior to project work commencing. The proposed mitigation for this project is data recovery in the form of archaeological monitoring.

SHPD looks forward to reviewing an archaeological monitoring plan (AMP) meeting the requirements of HAR §13-279-4 prior to project work commencing.

Please contact Kimi Matsushima at (808) 692-8027 or at Kimi.R.Matsushima@hawaii.gov for questions regarding archaeological resources or this letter.

Aloha,

Susan A. Lebo

Susan A. Lebo, PhD
Archaeology Branch Chief

cc: David Shideler, Cultural Surveys Hawai'i, Inc., dshideler@culturalsurveys.com

Final

Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu TMKs: [1] 2-6-017; 2-7-013, 014, and 036 (various parcels)

Prepared for
Hawaiian Electric Company

Prepared by
Thomas Martel III, B.A.
and
Hallett Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: WAIKIKI 179/183)

January 2017

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph.: (808) 242-9882
Fax: (808) 244-1994

Management Summary

ReferencPre	Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMKs: [1] 2-6-017; 2-7-013, 014, and 036 (Martel and Hammatt 2017)
Date	January 2017
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: WAIKIKI 183
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological fieldwork permit numbers 15-03 and 16-26, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-13-282.
Agencies	SHPD
Land Jurisdiction	State of Hawai‘i
Project Proponent	Hawaiian Electric Company (Hawaiian Electric)
Project Funding	Hawaiian Electric
Project Location	The project area is located on portions of Hīhīwai Street, Ala Wai Boulevard, Kālaimoku Street, Kai‘olu Street, University Avenue, Ala Wai Neighborhood Park, Ala Wai Canal, and Ala Wai Elementary School, in Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu. The project area is depicted on a 1998 Honolulu U.S. Geological Survey (USGS) quadrangle.
Project Description	The current project is of irregular shape and consists of relocation of underground sub-transmission line cables that connect to Hawaiian Electric’s Waikiki Substation located on Kai‘olu Street. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the cables to the west of the existing route, and utilize horizontal drilling to cross under the Ala Wai Canal. On the *makai* (seaward) side of the canal, open trenching will be used to install a ductbank/cable system which will be routed from Kalaimoku Street along Ala Wai Boulevard to Kai‘olu Street and will connect to the Waikiki substation. On the *mauka* (inland) side of the Ala Wai Canal, open trenching will be used to install a ductbank/cable system which will be routed from the Ala Wai Neighborhood Park parking lot along Hihiwai Street to a utility pole near the intersection with Kamoku Street. Cables will also be pulled through an existing ductbank system from the park to a utility pole located on University Avenue near Kapiolani Boulevard. There will be removal of existing cables from Ala Wai Elementary School and Ala Wai Canal, roughly in line with Kai‘olu Street. Pole replacement will occur near the intersections of University Avenue and Kapiolani Boulevard and Hīhīwai Street and Kamoku

	Street. There will also be staging areas on Kālaimoku Street, University Avenue and in Ala Wai Neighborhood Park parking lot.
Project Acreage	The current project area includes approximately 4.05 hectares (10.0 acres).
AIS Scope[i]	This AIS focused on archaeological historic properties and burial sites per the guidelines of HAR §13-276. The identification, documentation, and evaluation of in-use potential architectural historic properties such as historic buildings and structures was outside the scope of this AIS. Throughout this report the term "historic properties" is used and should be generally understood to refer to archaeological historic properties, unless otherwise stated.
Area of Potential Effect (APE)[ii]	The APE for the current project is defined as the entire approximately 4.05-hectare (10.0-acre) project area.
Historic Preservation Regulatory Context[iii]	This AIS investigation fulfills the requirements of HAR §13-276 and was conducted to identify, document, and assess significance of any historic properties. This document is intended to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) §6E-42 and HAR §13-284. This AIS was designed following consultation with the SHPD and interested lineal and cultural descendants of the area.
Fieldwork Effort	Fieldwork was accomplished between 21 December 2015 and 20 January 2016 by Trevor Yucha, B.S., Scott Belluomini, B.A., Nifae Hunkin, B.A., Megan Hawkins, M.A., Nigel Kingsbury, B.A., Jesse Davis, B.A., Alison Welser, M.A., and Thomas Martel III, B.A., under the general supervision of Hallett Hammatt, Ph.D. This work required approximately 23 person-days to complete.
Consultation	A cultural impact assessment (CIA) is currently being prepared for the proposed project.
Historic Properties Identified and Historic Property Significance[iv]	Two previously recorded historic properties were identified within the current project area. State Inventory of Historic Places (SIHP) # 50-80-14-5796, a wetland surface, was originally identified during a project located in the vicinity of the current project area (LeSuer et al. 2000). SIHP # -5796 is assessed as significant pursuant to HAR §13-284-6 under Criterion "d" (has yielded, or may be likely to yield, information important in prehistory or history). SIHP # -9757, Ala Wai Canal, was originally documented by Maly et al. (1994). SIHP # -9757 is assessed as significant under Criterion "a" pursuant to HAR §13-284-6. It has also been determined eligible for inclusion in the Hawaii Register of Historic Places (# 50-80-14-9757) and the National Register of Historic Places (see Appendix A) under Criterion A at the local level of significance.

Effect Recommendation[v]	The proposed project will potentially affect the two historic properties, SIHP #s -5796 and -9757, identified within the project area. CSH's project specific effect recommendation is "effect, with agreed upon mitigation commitments." The recommended mitigation measures will reduce the project's potential effect on significant historic properties.
Mitigation Recommendations	This AIS represents a good faith effort to identify and document the historic properties located within the project area. The results of this AIS indicate the culturally modified wetland (SIHP # -5796), is present at an average depth of approximately 0.89 m below the surface, beneath several strata of early twentieth century land reclamation and hydraulic fill. SIHP # -5796 was documented with a detailed written description, photographed in profile, radiocarbon dated, and analyzed for pollen. In order to mitigate adverse impacts to subsurface archaeological historic properties identified within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification of any additional historic properties that might be discovered during project construction and will provide additional information regarding SIHP # -5796 within the project area. The duration and extent of archaeological monitoring will be determined within an archaeological monitoring plan that will be submitted for the review and acceptance of the SHPD. No further archaeological work is recommended for SIHP # -9757, Ala Wai Canal.

[i] An "archaeological inventory survey" is defined as "the process of identifying and documenting the archaeological historic properties and burial sites in a delineated area, gathering sufficient information to evaluate significance of the historic properties and burials, and compiling the information into a written report for review and acceptance by the department [SHPD]" (HAR §13-276-2). An archaeological inventory survey report must contain documentation, arguments and reasoning, and mitigation commitments to support the completion of historic preservation review steps one through four for archaeological historic properties.

[ii] "Project Area" is defined (HAR §13-284-2) as "the area the proposed project may potentially affect, either directly or indirectly. It includes not only the area where the proposed project will take place, but also the proposed project's area of potential effect." "Effects include, but are not limited to, partial or total destruction or alteration of the historic property, detrimental alteration of the properties' surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with the chances of resulting damage, and neglect resulting in deterioration" (HAR §13-284-7[b]). Based on these definitions of "project area" and "effects" there is potential for project effects to historic properties to extend outside the footprint of project construction. Accordingly a definition and justification of the "project area" and "area of potential effect" employed in the AIS study is required.

[iii] The State of Hawai'i historic preservation review process is designed to identify and mitigate a project's impacts to significant historic properties. Historic properties are defined as "any building, structure, object, district, area, or site, including *heiau* [temple] and underwater site, which is over fifty years old" (HAR §13-284-2). The six potential historic preservation review steps include the following: 1) identification and inventory, to determine if historic properties are present in the project's area and, if so, to identify and document (inventory) them; 2) evaluation of historic property significance;

3) determination of project effect (impact) on significant historic properties; 4) mitigation commitments that commit to acceptable forms of mitigation in order to properly handle or minimize impacts to significant historic properties; 5) detailed mitigation plan, scope of work to properly carry out the general mitigation commitments; and 6) verification of completion of detailed mitigation plan (HAR §13-284-3). A project's effect and potential mitigation measures are evaluated based on the project's potential impact to "significant" historic properties (those historic properties determined significant following their evaluation of significance [HAR §13-284-6]).

[iv] Once a historic property is identified, then an assessment of significance shall occur pursuant to HAR § 13-284-6. To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following significance 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 significant 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; or "e" have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations being important to the group's history and cultural identity. By convention criterion "e" usually includes human skeletal remains and/or burials and religious sites.

[v] One of two effect determinations must be established: 1) "No historic properties affected," the project will have no effect on significant historic properties; or 2) "Effect, with agreed upon mitigation commitments," the project will affect one or more significant historic properties, and the effects will potentially be harmful. However, the agreed upon mitigation commitments involving one or more forms of mitigation will reasonably and acceptably mitigate the harmful effects (HAR § 13-284-7).

Table of Contents

Management Summary ..... **ii**

Section 1 Introduction **1**

1.1 Project Background 1
1.2 Historic Preservation Regulatory Context and Document Purpose 1
1.3 Environmental Setting 7
1.3.1 Natural Environment 7
1.3.2 Built Environment 7

Section 2 Methods **9**

2.1 Field Methods 9
2.1.1 Pedestrian Survey 9
2.1.2 Subsurface Testing 9
2.2 Laboratory Methods 9
2.2.1 Sediment Sample Analysis 9
2.2.2 Disposition of Materials 10
2.2.3 Research Methods 10
2.3 Consultation Methods 11

Section 3 Background Research **12**

3.1 Traditional and Historical Background 12
3.1.1 Waikīkī Waena and Waikīkī Kai 12
3.1.2 Pre-Contact to Early 1800s 14
3.1.3 Kālia 16
3.1.4 Mid- to Late 1800s and The Māhele 18
3.1.5 Rice Cultivation 26
3.1.6 Banana Cultivation 28
3.1.7 1900s 32
3.2 Previous Archaeological Research 45
3.2.1 McMahon 1994 50
3.2.2 Cleghorn 1996 50
3.2.3 LeSuer et al. 2000 50
3.2.4 Borthwick et al. 2002 50
3.2.5 Bush et al. 2002 51
3.2.6 Kailihiwa and Cleghorn 2003 51
3.2.7 Tulchin et al. 2004 51
3.2.8 McIntosh and Cleghorn 2004 51
3.2.9 Esh and Hammatt 2004 51
3.2.10 O'Leary et al. 2006 51
3.2.11 Esh and Hammatt 2006 52
3.2.12 Petrey et al. 2008 52
3.2.13 Yucha et al. 2009 52
3.2.14 Park and Collins 2010 52
3.2.15 Sroat et al. 2011 52
3.2.16 LaChance and Hammatt 2014 52
3.2.17 Gosser and Collins 2014 52
3.2.18 Pammer et al. 2014 53

3.2.19 Lima et al. 2014 53
3.2.20 Morriss and Hammatt 2015 53
3.3 Background Summary and Predictive Model 53

Section 4 Results of Fieldwork 55

4.1 Pedestrian Inspection Results 55
4.2 Subsurface Testing Results 55
4.2.1 Trench 1 (T-1) 57
4.2.1 Trench 2 (T-2) 57
4.2.2 Trench 3 (T-3) 57
4.2.3 Trench 4 (T-4) 64
4.2.1 Trench 5 (T-5) 64
4.2.2 Shovel Test Pit 1 (STP-1) 70
4.2.1 Shovel Test Pit 2 (STP-2) 70
4.2.1 Shovel Test Pit 3 (STP-3) 70
4.2.1 Shovel Test Pit 4 (STP-4) 70
4.2.2 Shovel Test Pit 5 (STP-5) 81

Section 5 Results of Laboratory Analysis 84

5.1 Historic Artifact Analysis 84
5.2 Sediment Sample Analysis 87
5.2.1 Pollen Analysis 87
5.2.2 Radiocarbon Analysis 89

Section 6 Historic Property Descriptions 103

6.1 SIHP # 50-80-14-5796 103
6.2 SIHP # 50-80-14-9757 118

Section 7 Summary and Interpretation 119

Section 8 Significance Assessments 121

Section 9 Project Effect and Mitigation Recommendations 123

9.1 Project Effect 123
9.2 Mitigation Recommendations 123

Section 10 References Cited 124

Appendix A National Register of Historic Places Inventory Nomination Form for the Ala Wai Canal 132

Appendix B Pollen Analysis (Phillips 2016) 147

List of Figures

Figure 1. Portion of the 1998 Honolulu USGS 7.5-minute topographic quadrangle showing the location of the project area 2
Figure 2. Tax Map Key (TMK) [1] 2-6-017 showing the project area (Hawai‘i TMK Service 2014) 3
Figure 3. TMK: [1] 2-7-013 showing the project area (Hawai‘i TMK Service 2014) 3
Figure 4. TMK: [1] 2-7-014 showing the project area (Hawai‘i TMK Service 2014) 4
Figure 5. TMK: [1] 2-7-036 showing the project area (Hawai‘i TMK Service 2014) 4
Figure 6. Aerial photograph of the project area (Google Earth 2013) 5
Figure 7. Aerial photograph depicting the proposed work plans and project area (Google Earth 2013) 6
Figure 8. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972) on a 2013 Google Earth aerial photograph, indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001) 8
Figure 9. Detail of an 1887 map of Honolulu by Wall, showing the current project location. The division between Waikīkī Kai and Waikīkī Waena is roughly through the bottom third of the project area 13
Figure 10. Nineteenth century photo of Waikīkī and fishponds, likely taken from Kālia (Hawai‘i State Archives) 17
Figure 11. 1853 sketch of Waikīkī with view to Diamond Head (University of Chicago) (note close proximity of houses to the shore) 17
Figure 12. Portion of an 1881 Hawaiian Government survey map by S.E. Bishop showing the location of land claims within the project area 20
Figure 13. Portion of a 1922 LCA 537, Map 1 showing the locations of LCAs in the Waikīkī Kai portion of the project area, with more detail than the 1881 S.E. Bishop map (Hawaii Land Survey Division) 21
Figure 14. Aerial photograph showing the locations of Kuleana LCAs (Google Earth 2013) within the project area 22
Figure 15. Photo of rice fields in Waikīkī in the 1890s; *mauka* is Mānoa Valley (Hawaiian Historical Society) 27
Figure 16. Portion of an 1893 Wall map of Honolulu, showing distribution of rice fields in and around the current project area 27
Figure 17. Portion of 1910 U.S. Engineers map of Waikīkī showing the project area; note the in-filling of the fishponds within the southern portion of Fort DeRussy 29
Figure 18. A 1910 photograph of the banana fields at Olohana Street, located approximately one block west of the current project area, showing the irrigation and drainage systems required for lowland banana cultivation (photo by Ray Jerome Baker; adapted from LeSuer et al. 2000) 30
Figure 19. A 1920 aerial photograph of Kālia to Ala Moana showing the project area located within the Waikīkī wetlands; note the banana crop fields in the foreground and the rice fields in the background (from Grant 1996) 31

Figure 20. Portion of an 1897 map by M.D. Monsarrat, showing the project area in relation to Pi‘inaio Stream, the fishponds of Kālia, and the growing road network including Waikīkī Road (Kalākaua Avenue), Beach Road (Ala Moana Boulevard), and Kālia Road....33
Figure 21. Portion of 1919 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area; note the remaining fishponds west of the project area....34
Figure 22. Portion of 1933 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area, the complete in-filling of the Kālia wetlands, and the development of the Ala Wai Canal. Three ponds are depicted to the north of the project area that have not been filled at this time....35
Figure 23. Portion of 1943 U.S. Army War Department topographic map, Honolulu and Diamond Head Quadrangles, showing the project area. Three ponds are depicted to the north of the project area that have not been filled at this time....36
Figure 24. Portion of 1953 Honolulu USGS topographic quadrangle showing the project area and the complete in-filling of Pi‘inaio Stream which was replaced by Ala Moana Boulevard. Note that the three ponds to the north of the project area have been filled by this time....37
Figure 25. 1978 USGS aerial orthophotograph, Honolulu Quadrangle, showing the project area....38
Figure 26. Creation of the Ala Wai Canal showing floating dredge line, ca. 1924 (Bishop Museum Archives)....39
Figure 27. 1927 aerial photo of the completed Ala Wai Canal showing the reclamation of the Kālia area within Waikīkī with coral fill (dredge and pipe in foreground) (Bishop Museum Archives)....39
Figure 28. 1927 Sanborn Fire Insurance map showing the newly created lots in the Waikīkī Kai portion of the project area....42
Figure 29. 1950a Sanborn Fire Insurance map showing the new apartments in the Waikīkī Kai portion of the project area....43
Figure 30. 1950b Sanborn Fire Insurance map showing the Waikīkī Waena portion of the project area....44
Figure 31. Previous archaeological studies in the vicinity of the current project area (Google Earth 2013)....48
Figure 32. Previously designated archaeological sites in the vicinity of the project area (Google Earth 2013)....49
Figure 33. A 2013 aerial photograph (Google Earth) showing the location of the test trenches within the project area....56
Figure 34. Photograph of T-1 southeast wall, view to east....58
Figure 35. Profile of T-1 southeast wall....59
Figure 36. Photograph of T-2 southwest wall, view to south....60
Figure 37. Profile of T-2 southwest wall....61
Figure 38. Photograph of T-3 southeast wall, view to southeast....62
Figure 39. Profile of T-3 southeast wall....62
Figure 40. Photograph of T-4 northeast wall, view to north....65

Figure 41. Photograph of T-4 northwest end of northeast wall, view to northeast....66
Figure 42. Profile of T-4 northeast wall....66
Figure 43. Photograph of T-5 southwest wall, view to south....68
Figure 44. Profile of T-5 southwest wall....68
Figure 45. Photograph of STP-1 and its contents, view to southeast....71
Figure 46. Profile of STP-1 northwest wall....72
Figure 47. Photograph of STP-2 southwest wall, view to southwest....73
Figure 48. Profile of STP-2 southwest wall....74
Figure 49. Photograph of STP-3 northeast wall, view to northeast....75
Figure 50. Profile of STP-3 northeast wall....76
Figure 51. Photograph of STP-4 northeast wall, view to northeast....78
Figure 52. Profile of STP-4 northeast wall....79
Figure 53. Photograph of STP-5 northwest wall, view to northwest....81
Figure 54. Profile of STP-5 northwest wall....82
Figure 55. Acc. # 1, stoneware base....85
Figure 56. Acc. # 2, flat stoneware fragment....85
Figure 57. Acc. # 3, record fragment....86
Figure 58. Radiocarbon dating results from T-1, Stratum V, the upper portion of SIHP # 50-80-11-5796, wetland sediments (S-1) (Beta Analytic, Inc.)....90
Figure 59. Calibrated radiocarbon dating results from T-1, Stratum V (upper portion), SIHP # 50-80-11-5796, wetland sediments (S-1) (OxCal 4.2)....91
Figure 60. Radiocarbon dating results from T-1, Stratum V, the middle portion of SIHP # 50-80-11-5796, wetland sediments (S-2) (Beta Analytic, Inc.)....92
Figure 61. Calibrated radiocarbon dating results from T-1, Stratum V (middle portion), SIHP # 50-80-11-5796, wetland sediments (S-2) (OxCal 4.2)....93
Figure 62. Radiocarbon dating results from T-1, Stratum V, the lower portion of SIHP # 50-80-11-5796, wetland sediments (S-3) (Beta Analytic, Inc.)....94
Figure 63. Calibrated radiocarbon dating results from T-1, Stratum V (lower portion), SIHP # 50-80-11-5796, wetland sediments (S-3) (OxCal 4.2)....95
Figure 64. Radiocarbon dating results from T-2, Stratum V, the upper portion of SIHP # 50-80-11-5796, wetland sediments (S-4) (Beta Analytic, Inc.)....97
Figure 65. Calibrated radiocarbon dating results from T-2, Stratum V (upper portion), SIHP # 50-80-11-5796, wetland sediments (S-4) (OxCal 4.2)....98
Figure 66. Radiocarbon dating results from T-2, Stratum V, the middle portion of SIHP # 50-80-11-5796, wetland sediments (S-5) (Beta Analytic, Inc.)....99
Figure 67. Calibrated radiocarbon dating results from T-2, Stratum V (middle portion), SIHP # 50-80-11-5796, wetland sediments (S-5) (OxCal 4.2)....100
Figure 68. Radiocarbon dating results from T-2, Stratum V, the lower portion of SIHP # 50-80-11-5796, wetland sediments (S-6) (Beta Analytic, Inc.)....101
Figure 69. Calibrated radiocarbon dating results from T-2, Stratum V (lower portion), SIHP # 50-80-11-5796, wetland sediments (S-6) (OxCal 4.2)....102
Figure 70. Sample profile of T-3 from LaSuer et al. (2000)....104
Figure 71. General stratigraphic description of T-3 from LaSuer et al. (2000)....104
Figure 72. Photograph of T-3 from Yucha et al. (2009)....107
Figure 73. Profile of T-3 from Yucha et al. (2009)....107

Figure 74. Photograph of Profile 3 from Sroat et al. (2011)....109
Figure 75. Profile 3 from Sroat et al. (2011)....109
Figure 76. Photograph of T-5 from Pammer et al. (2014)....111
Figure 77. Profile of T-5 from Pammer et al. (2014)....111
Figure 78. Photograph of TE-5 from Morriss and Hammatt (2015)....114
Figure 79. Profile of TE-5 from Morriss and Hammatt (2015)....115

List of Tables

Table 1. Land Claims Located within the Project Area....23
Table 2. Previous Archaeological Studies in the Vicinity of the Project Area....45
Table 3. Stratigraphic Description of T-1....59
Table 4. Stratigraphic Description of T-2....61
Table 5. Stratigraphic Description of T-3....63
Table 6. Stratigraphic Description of T-4....67
Table 7. Stratigraphic Description of T-5....69
Table 8. Stratigraphic Description of STP-1....72
Table 9. Stratigraphic Description of STP-2....74
Table 10. Stratigraphic Description of STP-3....77
Table 11. Stratigraphic Description of STP-4....80
Table 12. Stratigraphic Description of STP-5....83
Table 13. Summary of Historic Artifacts....86
Table 14. Historic Properties Identified within the Current Project Area....103
Table 15. Stratigraphic Description of T-3 from LaSuer et al. (2000)....106
Table 16. Stratigraphic Description of T-3 from Yucha et al. (2009)....108
Table 17. Stratigraphic Description of Profile 3 from Sroat et al. (2011)....110
Table 18. Stratigraphic Description of T-5 from Pammer et al. (2014)....112
Table 19. SIHP # -5796 Features....112
Table 20. Stratigraphic Description of TE-5 from Morriss and Hammatt (2015)....116
Table 21. Archaeological Historic Property Integrity, Significance, and Mitigation Recommendations....122

Section 1 Introduction

1.1 Project Background

At the request of Hawaiian Electric Company (Hawaiian Electric), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this archaeological inventory survey report (AISR) for the Ala Wai 46kV Underground Cables Relocation project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMKs: [1] 2-6-017; 2-7-013, 014, and 036. The approximately 4.05-hectare (10.0-acre) project area is of irregular shape and consists mostly of active roadways along portions of University Avenue, Hīhīwai Street, Ala Wai Boulevard, Kālaimoku Street and Kai‘olu Street, as well as Ala Wai Neighborhood Park, Ala Wai Canal, and Ala Wai Elementary School. The project area is depicted on a portion of the 1998 U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), tax map plats (Figure 2 through Figure 5), and a 2013 aerial photograph (Figure 6).

The current project is of irregular shape and consists of relocation of underground sub-transmission line cables that connect to Hawaiian Electric’s Waikiki Substation located on Kai‘olu Street. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the cables to the west of the existing route, and utilize horizontal drilling to cross under the Ala Wai Canal. On the *makai* (seaward) side of the canal, open trenching will be used to install a ductbank/cable system which will be routed from Kalaimoku Street along Ala Wai Boulevard to Kai‘olu Street and will connect to the Waikiki substation. On the *mauka* (inland) side of the Ala Wai Canal, open trenching will be used to install a ductbank/cable system which will be routed from the Ala Wai Neighborhood Park parking lot along Hihiwai Street to a utility pole near the intersection with Kamoku Street. Cables will also be pulled through an existing ductbank system from the park to a utility pole located on University Avenue near Kapiolani Boulevard. Existing cables will be removed from Ala Wai Elementary School and Ala Wai Canal, roughly in line with Kai‘olu Street. Pole replacement will occur near the intersections of University Avenue and Kapiolani Boulevard and Hīhīwai Street and Kamoku Street. There will also be staging areas on Kālaimoku Street, University Avenue, and in Ala Wai Neighborhood Park (Figure 7).

1.2 Historic Preservation Regulatory Context and Document Purpose

This AIS investigation fulfills the requirements of Hawai‘i Administrative Rules (HAR) §13-276 and was conducted to identify, document, and make significance assessments of any historic properties. This document is intended to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) §6E-42 and HAR §13-284. It is also intended to support any project-related historic preservation consultation with stakeholders such as state and county agencies, interested Native Hawaiian Organizations (NHOs), and community groups.

This AIS testing strategy was designed in consultation with the SHPD and interested lineal and cultural descendants of the area.

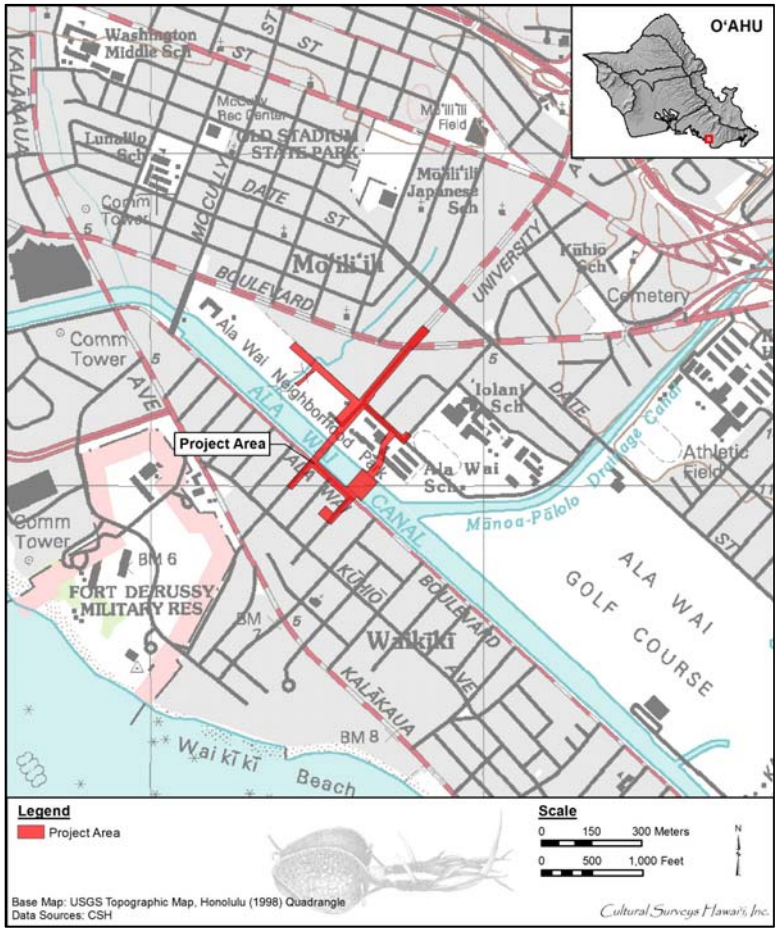


Figure 1. Portion of the 1998 Honolulu USGS 7.5-minute topographic quadrangle showing the location of the project area

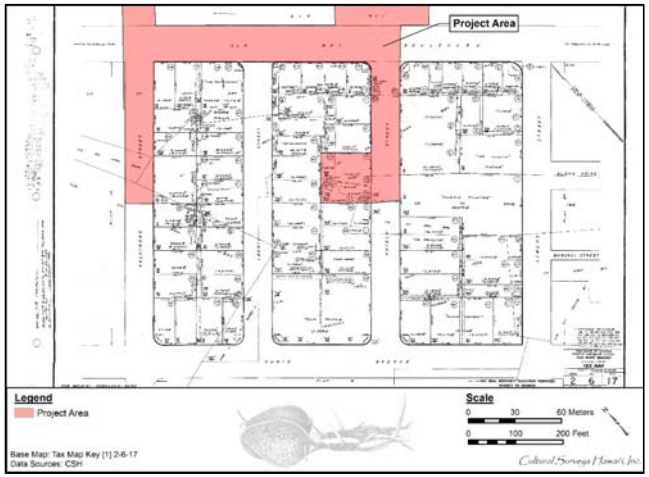


Figure 2. Tax Map Key (TMK) [1] 2-6-017 showing the project area (Hawai'i TMK Service 2014)

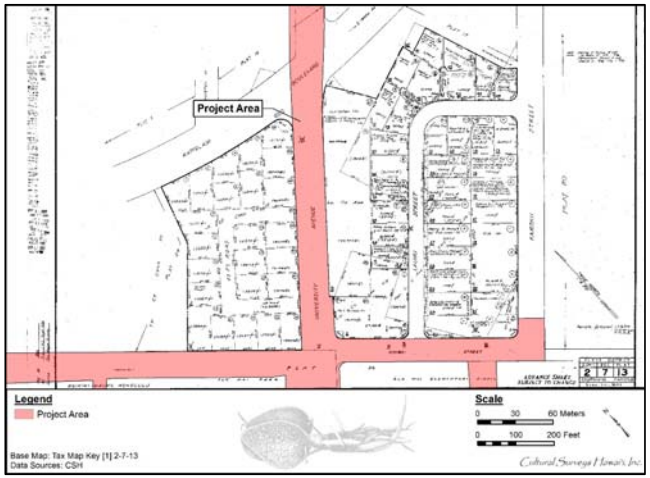


Figure 3. TMK: [1] 2-7-013 showing the project area (Hawai'i TMK Service 2014)

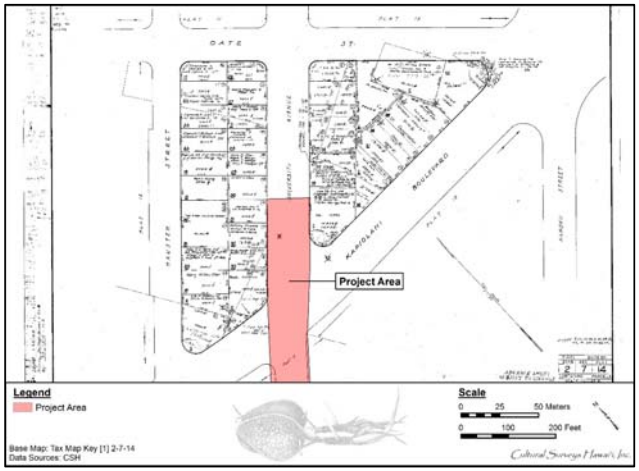


Figure 4. TMK: [1] 2-7-014 showing the project area (Hawai‘i TMK Service 2014)

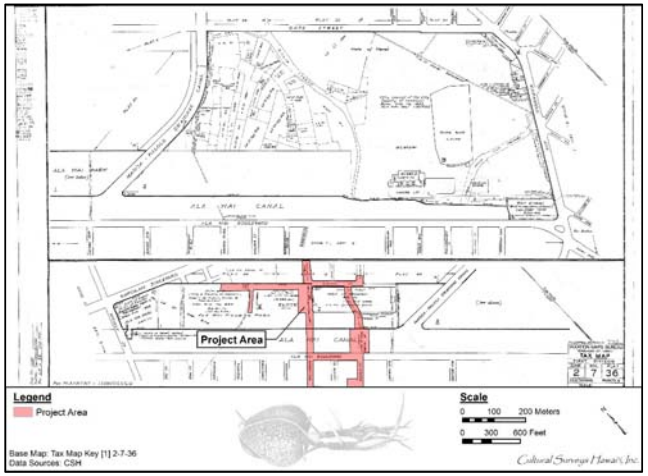


Figure 5. TMK: [1] 2-7-036 showing the project area (Hawai‘i TMK Service 2014)

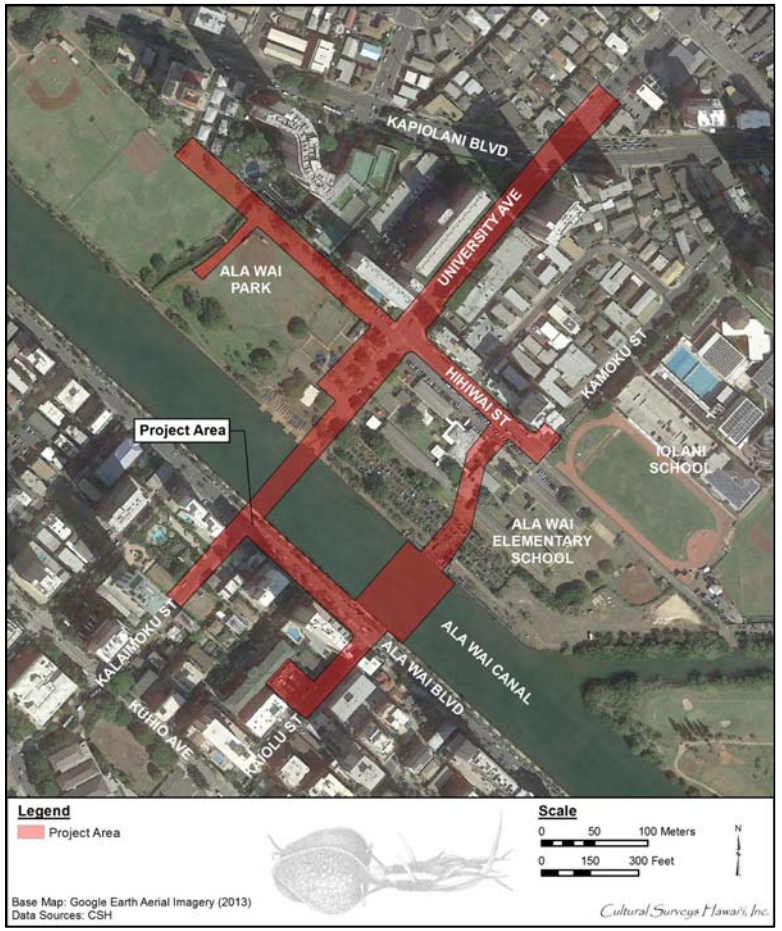


Figure 6. Aerial photograph of the project area (Google Earth 2013)

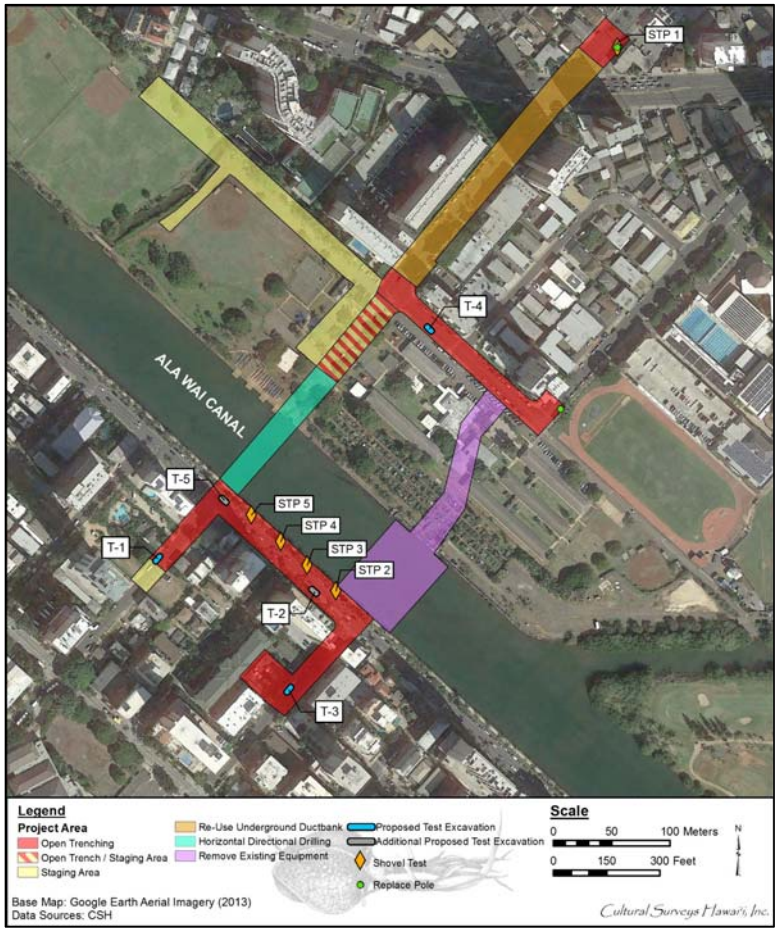


Figure 7. Aerial photograph depicting the proposed work plans and project area (Google Earth 2013).

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is located along the southeastern coast of O‘ahu. The Honolulu leeward coastal plain is stratified with Late Pleistocene coral reef substrate overlaid with calcareous marine beach sand, terrigenous sediments, and/or stream-fed alluvial deposits (Armstrong 1983:36). Terrigenous sediments are formed and deposited on land or are materials derived from land mixed with purely marine material. The modern Honolulu shoreline configuration is primarily the result of three factors: the rising sea level following the end of the Pleistocene (Stearns 1978); the 1.5-2.0 m highstand of the sea during the Middle to Late Holocene; and pre- and post-Contact human landscape modification. Lands within the project area are relatively level with an elevation of approximately 1 m (3 feet [ft]) above mean sea level (AMSL).

The project area receives between 23 and 31 inches (600-800 mm) of rainfall per year (Giambelluca et al. 2013). Despite the relatively low rainfall, during the pre-Contact and early post-Contact periods the natural landscape was rich in water resources in the form of Pi‘inaio Stream, which descended from the Ko‘olau mountains and formed a ribboned delta as it entered the sea in the *‘ili* (land district) of Kālia in the western portion of Waikīkī, and the surrounding marshy lands behind the dunes and swales of the coastline. Natural vegetation would have consisted of coastal marshland species.

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), sediments within the project area consist primarily of Fill land (FL) (Figure 8). The following is a description of Fill land (FL):

> Fill is described as a land type occurring mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. [Foote et al. 1972:31]

1.3.2 Built Environment

The first major modifications to the natural landscape of the project area within Kālia were undertaken following the translocation of the O‘ahu royal seat to Waikīkī in the 1400s. The natural wetlands of Waikīkī were transformed into a large network of fishponds, *‘auwai* (irrigation ditches), bunds, and agricultural fields, such as taro *lo‘i* (terraced ponds), banana and sugarcane plantings, and coconut groves.

Subsequent intensive historic development of the project area has resulted in an entirely modified landscape in which the original wetlands have been filled in and surfaced with paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks. The current project area is located in a completely urbanized setting, mostly along roadways. Portions of Ala Wai Canal, Ala Wai Park, and Ala Wai Elementary School are also located within the current project area.

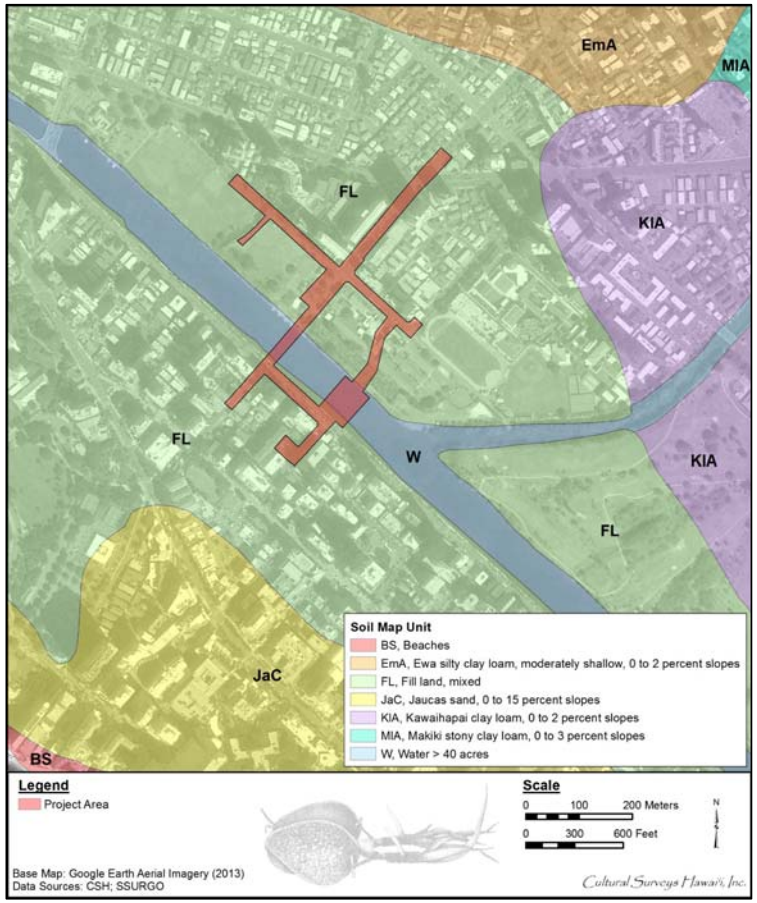


Figure 8. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972) on a 2013 Google Earth aerial photograph, indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001)

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this AIS under archaeological fieldwork permit numbers 15-03 and 16-26, issued by the SHPD pursuant to HAR §13-282. Fieldwork was conducted between 21 December 2015 and 20 January 2016 by CSH archaeologists Trevor Yucha, B.S., Scott Belluomini, B.A., Nifae Hunkin, B.A., Megan Hawkins, M.A., Nigel Kingsbury, B.A., Jesse Davis, B.A., Alison Welser, M.A., and Thomas Martel III, B.A., under the general supervision of Hallett Hammatt, Ph.D. This work required approximately 23 person-days to complete.

In general, fieldwork included 100% pedestrian inspection of the project area, GPS data collection, and subsurface testing.

2.1.1 Pedestrian Survey

A 100%-coverage pedestrian inspection of the project area was undertaken for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps.

2.1.2 Subsurface Testing

The subsurface testing program consisted of ten excavations including five shovel test pits (STP-1 through STP-55) and five backhoe-assisted test excavations (T-1 through T-5). In general, STPs measuring approximately 1 m long (3 ft) and 0.5 m (1.6 ft) wide and backhoe-assisted test excavations measuring approximately 6 m (20 ft) long and 0.6 m (2 ft) wide were excavated within the project area.

A stratigraphic profile of each test excavation was drawn and photographed. The observed sediments were described using standard USDA soil description observations/terminology. Sediment descriptions included Munsell color; texture; consistence; structure; plasticity; cementation; origin of sediments; descriptions of any inclusions, such as cultural material and/or roots; lower boundary distinctiveness and topography; and other general observations. Where stratigraphic anomalies or potential cultural deposits were exposed, these were carefully represented on test excavation profile maps.

Bulk and column samples were collected from several test excavations for further analysis.

2.2 Laboratory Methods

Materials collected during AIS fieldwork were identified and catalogued at CSH's laboratory facilities on O‘ahu. Analysis of collected materials was undertaken using standard archaeological laboratory techniques. Materials were washed, sorted, measured, weighed, described, and/or photographed.

2.2.1 Sediment Sample Analysis

Sediment samples collected from potential cultural strata and/or features were examined within the CSH laboratory to aid in characterizing the cultural content and chronology of these deposits. Samples were collected and screened in the field and/or collected as bulk samples. All samples

were labeled with provenience information, and the volume of each sample was recorded so that comparisons could be made between samples. Samples screened in the field utilized 1/8-inch wire mesh to remove the sedimentary matrix from the cultural content (faunal, floral, and artifactual remains). In the lab, bulk sediment samples were screened through 1/16-inch wire mesh. Wet screening of samples was performed as necessary. As applicable, the cultural material was washed, sorted, measured, weighed, described, photographed, identified, and catalogued. Results of analysis are described in Section 5.2 Sediment Sample Analysis.

2.2.1.1 Palynological Analysis

Palynology is the branch of science concerned with the study of pollen, spores, phytoliths, and other palynomorphs. Palynomorphs are often preserved in sediment samples and, following physical and chemical extraction, can be identified with a microscope. This information leads to the types of plants that made up the local environment, or the local watershed, at the time the sediment was deposited. A large amount of palynological research has been conducted on O‘ahu to examine human impacts on native vegetation.

Micro-charcoal particle quantification accompanied the palynological work. The size and amount of these charcoal particles within a sediment sample can indicate the level of human activity in the vicinity at the time the sediment was deposited.

2.2.1.2 Radiocarbon Analysis

Select charcoal samples were submitted to Beta Analytic, Inc. of Miami, Florida, for radiocarbon dating analysis. Charcoal samples from short-lived plant species were selected as they provide a tighter timeframe for possible radiocarbon dates. The samples were analyzed using the accelerator mass spectrometry (AMS) method. The conventional radiocarbon age determined by Beta Analytic, Inc. was then calibrated to calendar ages using the OxCal calibration program, version 4.2, developed by the University of Oxford Radiocarbon Accelerator Unit and available as shareware over the internet.

2.2.2 Disposition of Materials

Materials collected during the current AIS (excluding human remains and grave goods) will remain temporarily curated at the CSH office in Waimānalo, O‘ahu. CSH will make arrangements with the landowner regarding the disposition of this material. Should the landowner request different archiving of material, an archive location will be determined in consultation with the SHPD. All data generated during the course of the AIS are stored at the CSH offices.

2.2.3 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai‘i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ‘Aina database (Waihona ‘Aina 2000).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

2.3 Consultation Methods

This AIS was designed following consultation with the SHPD and lineal and cultural descendants. A cultural impact assessment (CIA) is currently being prepared for the current project.

Section 3 Background Research

3.1 Traditional and Historical Background

The current project area belongs to the *ahupua'a* (traditional land division) of Waikīkī. Waikīkī Ahupua'a at one time spanned the area from Kou (an older name for Honolulu) in the west to Maunalua in the east. Like other *ahupua'a* of southeastern O'ahu, Waikīkī Ahupua'a also traditionally extended from the Ko'olau mountain range on the *mauka* (inland) side all the way to the shoreline on the *makai* (seaward) side (Kanahele 1995:5).

During the growth of the Honolulu and Waikīkī settlements in the late pre-Contact (pre-1778) and early post-Contact periods, the seaward sections of southeastern O'ahu *ahupua'a*—Waikīkī Ahupua'a included—became effectively "cut off" from the sea along what would become the east-west King Street/Wai'alae Avenue alignment. The boundaries of Waikīkī *ahupua'a* shrank to Kalākaua Avenue in the west, Diamond Head in the east, and the sea coast to the south. Much of the available traditional and historical background literature from the late pre-Contact through early post-Contact era refers to this more limited *ahupua'a* of Waikīkī.

3.1.1 Waikīkī Waena and Waikīkī Kai

Historical and traditional sources sometimes make a distinction between Waikīkī Kai (coastal Waikīkī) and Waikīkī Waena (middle Waikīkī; "the middle land between the ocean and mountains") (Figure 9). The boundaries of Waikīkī Kai roughly coincide with the coastal area on the *makai* side of the Ala Wai Canal and the area within and *makai* of Kapi'olani Park. The boundaries of Waikīkī Waena roughly coincide with the area between King Street/Wai'alae Avenue and the Ala Wai Canal, encompassing the neighborhoods of Kamō'ili'ili, Kaimukī, and Kapahulu (Ruby 2005:iv) (see Figure 1). The current project area extends through the boundaries of both Waikīkī Kai and Waikīkī Waena, with the boundary separating the two areas being roughly correlated with the Ala Wai Canal, although an exact boundary has not been determined.

The distinction between Waikīkī Kai and Waikīkī Waena was more than geographical. Differences in land use and habitation patterns existed between the two areas during the pre- and early post-Contact era. In the fourteenth century, the Waikīkī Kai region had become the residential and power center of O'ahu's chiefly elite. Royal compounds, religious structures, villages (including the village of Waikīkī), fishponds, wetland taro patches, and coconut palms dotted the coastline and inner coastal areas of Waikīkī Kai. By contrast, Waikīkī Waena comprised the intensively cultivated "plains" of greater Waikīkī, a broad expanse of largely marshy land with habitation and cultivation areas clustered along the many streams and springs flowing through the region from the valleys to the sea.

Both Waikīkī Kai and Waikīkī Waena were highly watered lands. The name "Waikīkī" means "water spurting from many sources" (Pukui et al. 1974:223), appropriately reflecting the largely marshy character of greater Waikīkī until the completion of the Ala Wai Canal in 1928. Underground water periodically gushed upwards through the region's intermittently porous geological substructure of sediment, basaltic rock, and limestone (Kanahele 1995:8). At one point the Waikīkī marshland, fed by streams originating in Mākiki, Mānoa, and Pālolo valleys as well as from springs in Mānoa (Punahou and Kānewai), stretched 3 miles long by 1 mile wide, covering approximately 2,000 acres. The marshland's eastern boundary ran from Lē'ahi (Diamond Head)

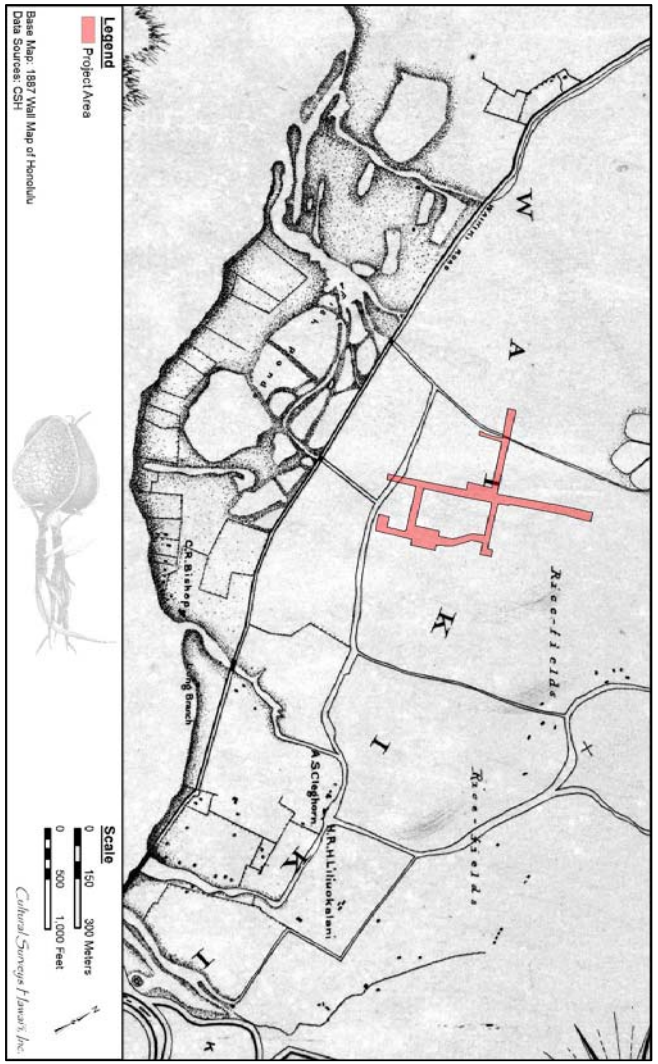


Figure 9. Detail of an 1887 map of Honolulu by Wall, showing the current project location. The division between Waikīkī Kai and Waikīkī Waena is roughly through the bottom third of the project area.

and Kaimukī craters to where Kapahulu Park (also known as Crane Community Park) is located today; its *mauka* boundary extended ‘Ewa along the mouth of Mānoa Valley into Kamō‘ili‘ili (Mō‘ili‘ili) and Mākiki districts, and its western boundary reached Wilder and Pi‘ikoi streets (Kanahele 1995:5–6).

3.1.2 Pre-Contact to Early 1800s

By the time of the arrival of westerners in the Hawaiian Islands during the late eighteenth century, Waikīkī had long been a center of population and political power on O‘ahu. According to Martha Beckwith (1940), by the end of the fourteenth century Waikīkī had become “the ruling seat of the chiefs of Oahu.” The preeminence of Waikīkī continued into the eighteenth century, evidenced by Kamehameha’s decision to reside there upon winning control of O‘ahu by defeating the island’s chief, Kalanikūpule. The nineteenth century Hawaiian historian John Papa ‘Ī‘ī (1959:17), himself a member of the *ali‘i* (chiefly class), described the king’s Waikīkī residence:

> Kamehameha’s houses were at Puaaliilii, *makai* (towards the ocean) of the old road, and extended as far as the west side of the sands of ‘Apuakehau. Within it was Helumoa where Ka‘ahumanu *mā* (and company) went to while away the time. The king built a stone house there, enclosed by a fence . . . [‘Ī‘ī 1959:17]

‘Ī‘ī further noted that the “place had long been a residence of chiefs. It is said that it had been Kekuapoi’s home, through her husband Kahahana, since the time of Kahekili” (‘Ī‘ī 1959:17).

Chiefly residences, however, were only one element of a complex of features that characterized Waikīkī during pre-Contact (before 1778). Beginning in the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. This field system—an impressive engineering design traditionally attributed to the chief Kalamakua—took advantage of streams descending from Makiki, Mānoa, and Pālolo valleys that also provided ample fresh water for the Hawaiians living in the *ahupua‘a*. Water was also available from springs in nearby Mō‘ili‘ili and Punahou. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. A sizeable population developed amidst this Hawaiian-engineered abundance. Captain George Vancouver (1798), arriving at “Whyteete” in 1792, captured something of this profusion in his journals:

> On shores, the villages appeared numerous, large, and in good repair; and the surrounding country pleasingly interspersed with deep, though not extensive valleys; which, with the plains near the sea-side, presented a high degree of cultivation and fertility.
>
> [Our] guides led us to the northward through the village, to an exceedingly well-made causeway, about twelve feet broad, with a ditch on each side.
>
> This opened our view to a spacious plain, which, in the immediate vicinity of the village, had the appearance of the open common fields in England; but, on advancing, the major part appeared to be divided into fields of irregular shape and figure, which were separated from each other by low stone walls, and were in a very high state of cultivation. These several portions of land were planted with the eddo or taro root, in different stages of inundation; none being perfectly dry, and some from three to six or seven inches under water. The causeway led us near a mile from the beach, at the end of which was the water we were in quest of. It was

> a rivulet five or six feet wide, and about two or three feet deep, well banked up, and nearly motionless; some small rills only, finding a passage through the dams that checked the sluggish stream, by which a constant supply was afforded to the taro plantations.
>
> [We] found the plain in a high state of cultivation, mostly under immediate crops of taro; and abounding with a variety of wild fowl, chiefly of the duck kind . . . The sides of the hills, which were at some distance, seemed rocky and barren; the intermediate vallies, which were all inhabited, produced some large trees, and made a pleasing appearance. The plain, however, if we may judge from the labour bestowed on their cultivation, seemed to afford the principal proportion of the different vegetable productions on which the inhabitants depend for their subsistence. [Vancouver 1798:161–164]

Further details of the exuberant life that must have characterized Hawaiian use of the lands including the *ahupua‘a* of Waikīkī are given by Archibald Menzies (1920), a naturalist accompanying Vancouver’s expedition:

> The verge of the shore was planted with a large grove of cocoanut palms, affording a delightful shade to the scattered habitations of the natives. Some of those near the beach were raised a few feet from the ground upon a kind of stage, so as to admit the surf to wash underneath them. We pursued a pleasing path back to the plantation, which was nearly level and very extensive, and laid out with great neatness into little fields planted with taro, yams, sweet potatoes and the cloth plant. These, in many cases, were divided by little banks on which grew the sugar cane and a species of Draecena [ti or *kī*] without the aid of much cultivation, and the whole was watered in a most ingenious manner by dividing the general stream into little aqueducts leading in various directions so as to be able to supply the most distant fields at pleasure, and the soil seemed to repay the labour and industry of these people by the luxuriancy of its productions. Here and there we met with ponds of considerable size, and besides being well stocked with fish, they swarmed with water fowl of various kinds such as ducks, coots, water hens, bitterns, plovers and curlews. [Menzies 1920:23–24]

However, the traditional Hawaiian focus on Waikīkī as a center of chiefly and agricultural activities on southeastern O‘ahu was soon to change—disrupted by the same Western Contact that produced the first documentation (including the records cited above) of that traditional life. The *ahupua‘a* of Honolulu—with the only sheltered harbor on O‘ahu—became the center for trade with visiting foreign vessels, drawing increasing numbers of Hawaiians away from their traditional environments. Kamehameha himself moved his residence from Waikīkī to the coast near Honolulu harbor, likely in order to maintain his control of the lucrative trade in sandalwood that had developed. By 1828, the missionary Levi Chamberlain (1957:26), describing a journey into Waikīkī, noted the following:

> Our path led us along the borders of extensive plats of marshy ground, having raised banks on one or more sides, and which were once filled with water, and replenished abundantly with esculent fish; but now overgrown with tall rushes waving in the wind. The land all around for several miles has the appearance of having once been

> under cultivation. I entered into conversation with the natives respecting this present neglected state. They ascribed it to the decrease of population. [Chamberlain 1957:26]

Tragically, the depopulation of Waikīkī was not simply a result of the attractions of Honolulu (where, by the 1820s, the population was estimated at 6,000 to 7,000) but also of the western diseases that had devastating effects upon the Hawaiian population.

3.1.3 Kālia

Most of the current project area is located in the *‘ili* of Kālia. A Hawaiian saying talks about the pleasant portion of the coast of Kālia in Waikīkī (Pukui 1983:186):

Ke kai wawalo leo le‘a o Kālia The pleasing, echoing sea of Kālia.

The ribboned delta of Pi‘inaio Stream entered the ocean here, bringing fresh waters from the mountain valleys and creating an area of abundance. The plentiful land and marine resources attracted utilization and settlement of the area (Figure 10 and Figure 11). In oral history interviews of residents who lived in Waikīkī before the construction of the Ala Wai Canal, the abundant resources of the area are described.

> We lived at Kalia, where my dad was a net fisherman. He caught kala, mullet, and weke. He also caught squid [octopus]. There was limu eleele where Pi‘inaio Stream entered the ocean. Towards Fort DeRussy there was limu manauea and limu huluhulu waena and a lot of wana. We caught lobsters using nets at night. We used to catch a lot of kala. Where the stream entered the ocean, there was a lot of mud, and there were clams in the mud. We caught opae and oopu in the stream. We fished for papio and white eels. We caught two types of crabs, aama and alamihi. On the reef my dad dived for uhu and kumu, and we did torch fishing at night for mullet, uhu, and kumu. [Fred Paoa in UHCOH, Vol. II:532–535]

> Limu manauea, limu lipoa, and limu wawaeiole, and big schools of manini were found at Kalia. [John Ernstberg in UHCOH Vol. I:125]

Kālia is also a place where *‘alamihi* crabs were once plentiful, leading to a play on the word *‘ala-mihi* (path of repentance), indicating someone who is in a repentant mood (Pukui 1983:110):

Ho‘i i Kālia ka ‘ai ‘alamihi. Gone to Kālia to eat ‘alamihi crabs.

Kālia was also known for a fishing technique used to catch schools of mullet. When a school of mullet appeared, a bag net was set and the men swam out in a row, surrounded the fish, and slapped the water together and kicked their feet, thus driving the frightened fish into the opening of their bag net. The fishermen of Kālia became known as human fishnets (Pukui 1983:150):

Ka i‘a pīkoi kānaka o Kālia; The fish caught by the men of Kālia;
he kānaka ka pīkoi, men are the floaters
he kānaka ka pōhaku. men are the sinkers

Kālia is also mentioned in a story about a woman who left her husband and children on Kīpahulu, Maui, to go away with a man of O‘ahu. Her husband missed her and went to see a *kahuna* (priest) who was skilled in *hana aloha* (prayer to evoke love) sorcery. The *kahuna* told the



Figure 10. Nineteenth century photo of Waikīkī and fishponds, likely taken from Kālia (Hawai‘i State Archives)

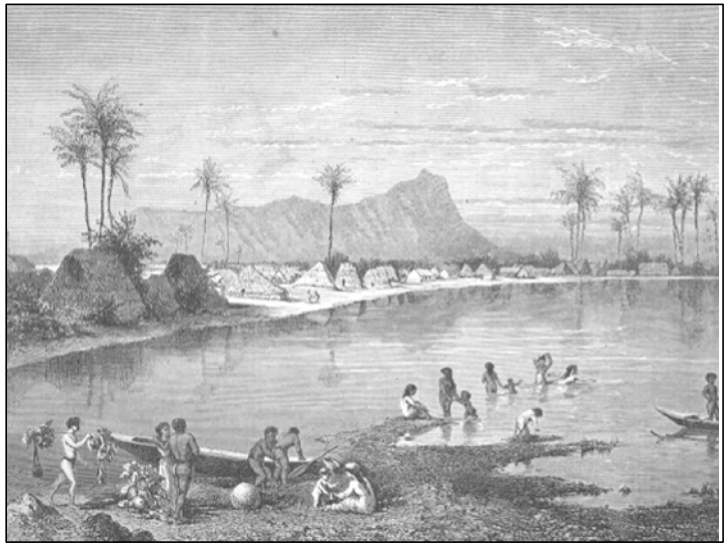


Figure 11. 1853 sketch of Waikīkī with view to Diamond Head (University of Chicago) (note close proximity of houses to the shore)

man to find a container with a lid and then speak into it of his love for his wife. The *kahuna* then uttered an incantation into the container, closed it, and threw it into the sea. The wife was fishing one morning at Kālia, O‘ahu, and saw the container. She opened the lid, and was possessed by a great longing to return to her husband. She walked until she found a canoe to take her home:

Ka makani kā‘ili aloha o	The love-snatching wind
o Kīpahulu.	of Kīpahulu

[Pukui 1983:158]

Pi‘inaio Stream played a vital role in the geography, and almost certainly the cultural usage, of the *‘ili* of Kālia. The meaning of Pi‘inaio is uncertain but it could be an allusion to going inland (*pi‘i*), to the location of a *naio* (bastard sandalwood; *Myoporum sandwicense*) tree, as may have commonly grown in the vicinity, to a stream crossing place. The name of the area “Kālia” translated as “waited for” has a sense of “waiting,” “loitering,” or “hesitating.” While the nuance is uncertain one could imagine the mouth of the Pi‘inaio Stream would be a logical place for travelers to pause. Pi‘inaio Stream extended through the northwestern portion of the project area.

The shallow relatively protected reefs of Waikīkī and the availability of the riparian resources of the Pi‘inaio estuary and the back dune ponds that were easily adaptable into fish ponds (the Loko Pāweo and Loko Kaipuni fishpond complexes) would have made the vicinity particularly desirable for Polynesian settlement.

Waikīkī was famous for its fishponds with one list citing 45 ponds—several of which were at Kālia (Bishop Museum 1989:8). John Papa ‘Ī‘ī (1959:49) relates an account from the early 1800s of a catch at a Kālia fishpond: “so large that a great heap of fish lay spoiling upon the bank of the pond.” The waste was disapproved of. This abundance of fishponds may have required significant maintenance and would have provided a potentially huge source of food for distribution at chiefly discretion.

3.1.4 Mid- to Late 1800s and The Māhele

The depopulation of Waikīkī, however, was not total and the *ahupua‘a* continued to sustain Hawaiians living traditionally into the mid-nineteenth century. Land Commission Award records associated with the mid-nineteenth century Māhele document awardees continuing to maintain fishponds and irrigated and dryland agricultural plots though on a greatly reduced scale than had been possible previously with adequate manpower.

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown, the government, and the *ali‘i* received their land titles. The *maka‘āinana (*common people) began to receive their *kuleana* awards (individual land parcels) in 1850. Although many Hawaiians did not submit or follow through or were not granted the claims for their lands, the distribution of LCAs can provide insight into patterns of residence and agriculture. Many of these patterns of residence and agriculture probably had existed for centuries past. By examining the patterns of *kuleana* (commoner) LCA parcels in the vicinity of the survey area, insight can be gained to the likely intensity and nature of Hawaiian activity in the area (Chinen 1958:8–12).

An 1881 Hawaiian Government survey map by S.E. Bishop—with locations of LCA parcels indicated—provides a detailed record of the physical landscape of Waikīkī before the transformations of the twentieth century (Figure 12). When the map was copied in 1922, additional material from subsequent government surveys was added, including locations of road corridors not present in 1881 (Figure 13). The maps reveal an extensive complex of irrigated fields, streams and irrigation water courses, and ponds stretching inland from the Waikīkī shoreline to the plains of Mō‘ili‘ili. Land Commission Award records for the awards shown on the map document house lots near the shore with associated taro *lo‘i* located inland and house lots adjacent to inland taro *lo‘i.* The records also indicate habitation and agricultural pursuits by the Native Hawaiian population continuing into the mid-nineteenth century.

A review of an 1881 Hawaiian Government survey map by S.E. Bishop indicates seven LCAs within the project area (see Figure 12, Figure 14, and Table 1). The majority of the parcels are located in the *‘ili* of Kālia, with one parcel located in Kuilei.

LCA documentation indicates LCA 154:4 was awarded to W. Sumner and includes what is labelled as Loko Kuilei on historic maps of the area, and describes a *kalo* patch *makai* in marsh. A description given by Lahilahi follows:

> Lahilahi, sworn, I know this land called Kuilei. It consists of kalo land principally, and some kula. I was born near it, and have lived there all my life. I cannot give the exact number of kalo patches. It consists of 4 distinct pieces, and one of sea, called Ele, beyond Diamond Hill. I went with Kalanikahua (surveyor) when he surveyed it, and the bounds given in these surveys are correct, which I can point out at any time. There are several tenants living on this land and having rights therein.
>
> Mr. Sumner got this land in time of Kamehameha 2 in 1822 or 1823, and he and his heirs have held them ever since in peace and quietness. I am headman of this land.
>
> Mr. Sumner on part of the heirs, said he did not wish to disturbe[sic] the right of the tenants there, he fully recognized their rights
>
> [Foreign Testimony 1846-1853:II:509–510]

LCA 154:4 is the only parcel in the project area that is not in the *‘ili* of Kalia. It is labelled as belonging to the *‘ili* of Kuilei, a *lele* (jump). A *lele* is described as a separate piece of an *‘ili*, a discontinuous portion (United States Congress 1894:1697). It is ambiguous in the above statement by Lahilahi, but it seems there were residents on this land.

LCA 867:2 was awarded to Nihopuu and includes an enclosure with a house lot, four *lo‘i* and a portion of *‘auwai*. Nihopuu indicates that he lives in a separate parcel by the ocean (outside project area). Kamainui describes the house lot and taro lands:

> “I have seen Nihopuu's house lot and taro land at Waikiki and here are the boundaries of the house lot:
>
> [Apana 1, outside of project area]:
>
> Toward the mountain and on the Honolulu side, Kaeina’s lots
>
> The sea is in the direction of the sea and

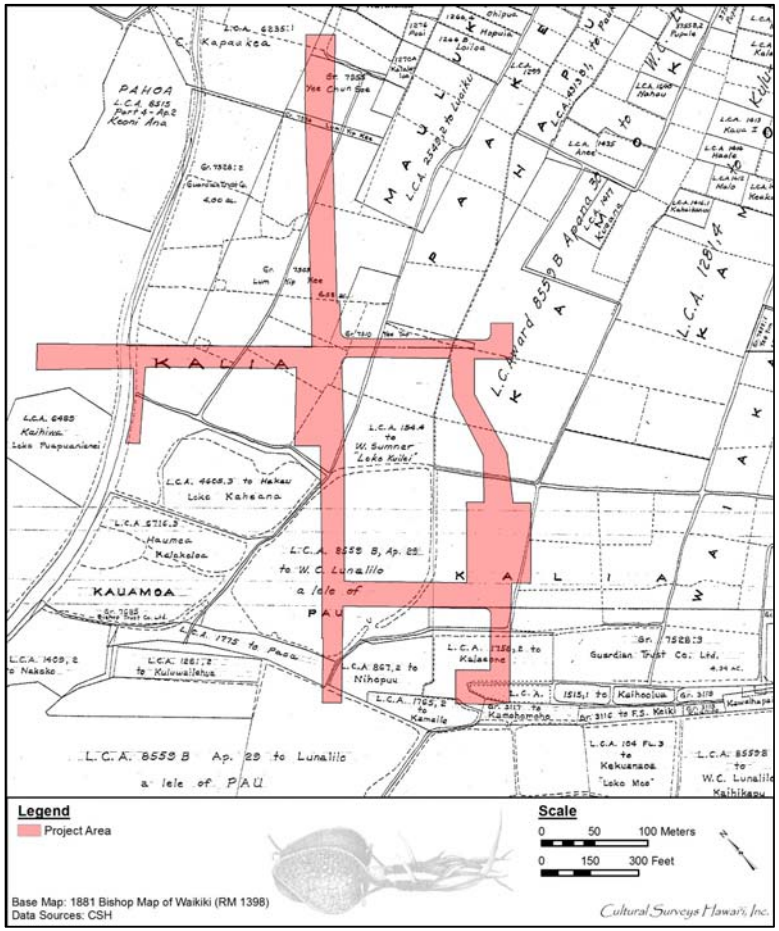


Figure 12. Portion of an 1881 Hawaiian Government survey Map of Waikiki by S.E. Bishop (RM 1398) showing the location of land claims within the project area

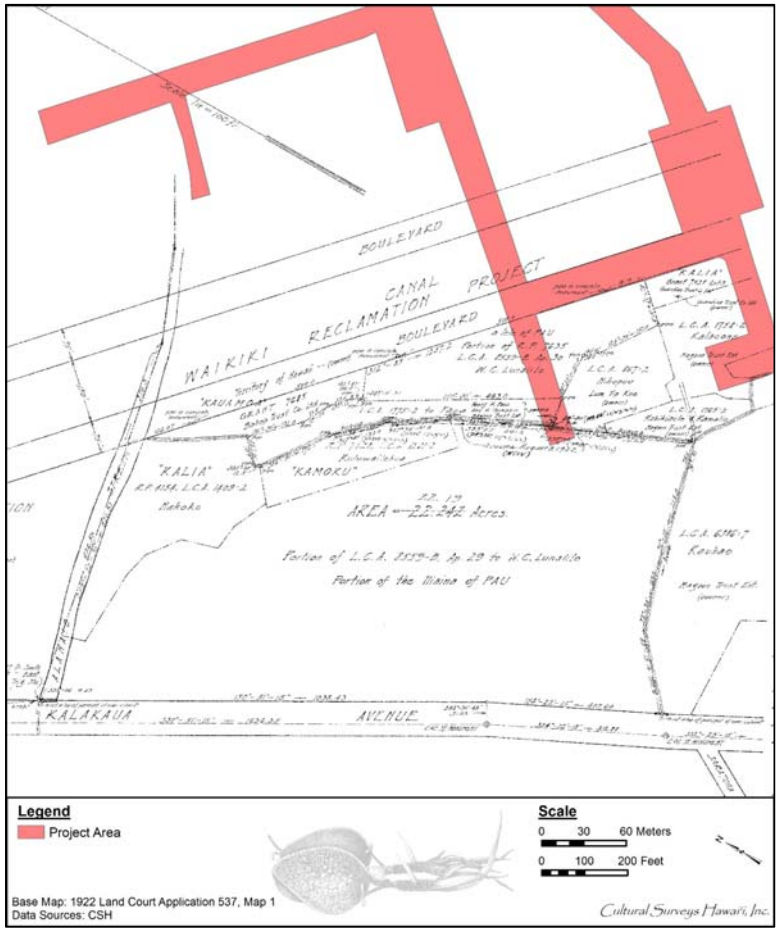


Figure 13. Portion of a 1922 LCA 537, Map 1 showing the locations of LCAs in the Waikīkī Kai portion of the project area, with more detail than the 1881 S.E. Bishop map (Hawaii Land Survey Division)

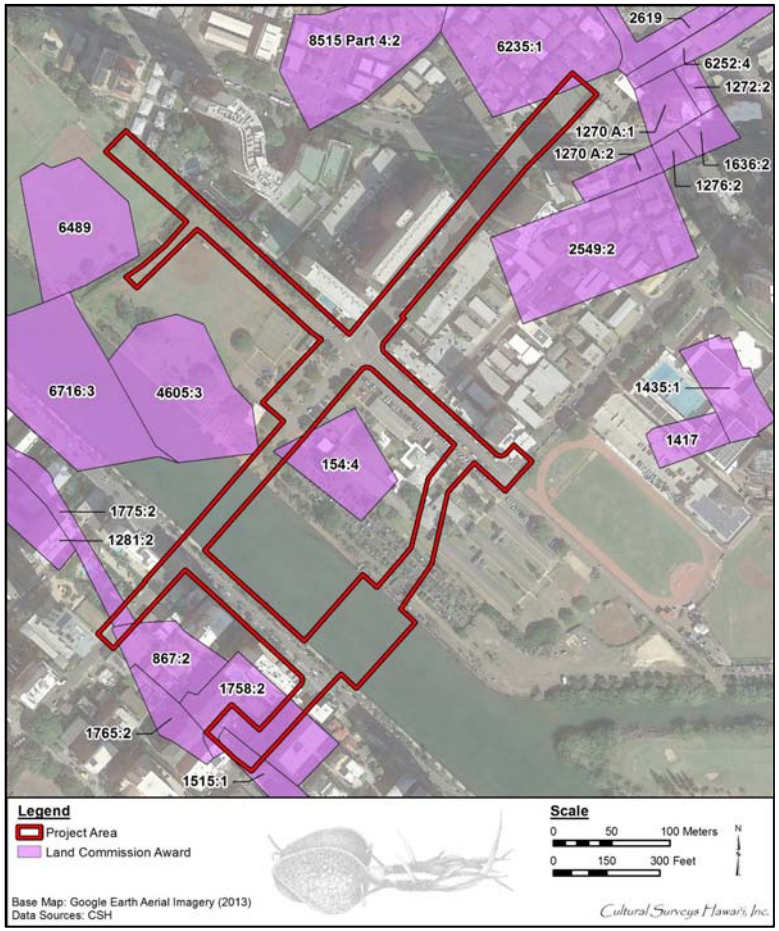


Figure 14. Aerial photograph showing the locations of Kuleana LCAs (Google Earth 2013) within the project area. (source of LCA data is an 1881 Bishop Map of Waikiki, RM 1398)

Table 1. Land Claims Located within the Project Area

Land Claim #	Claimant	*'Ili*	Land Use
154:4	W. Sumner	Kuilei	*Kalo* patch *makai* in marsh
867:2	Nihopuu	Kālia	Enclosure with house lot, four *lo'i* and *'auwai*
1515:1	Kaihuolua	Kālia	Three *lo'i*
1758:2	Kalaeone	Kālia	*Lo'i*, *paukū* (small land section) stream
1765:2	Kahikiaele and Kamalie	Kālia	*Lo'i*
1775:2	Paoa	Kālia	*Paukū* ditch of stream taro
6235:1	C. Kapaakea	Kālia	*Lo'i*

> Kahikaele's house lot, Waikiki.
>
> This place has a wooden fence with one house on it and he is living there. This had been an idle land during Kaahumanu's reign and since that time Nihopuu has lived there to the present in absolute peace.
>
> [*'Āpana* (parcel) 2, within project area]
>
> The boundaries of the taro land are:
>
> Kuluwailehua's land, toward the mountain
>
> My land, Waikiki
>
> Peleuli's land, toward the sea and
>
> Makuahine's land is on the Honolulu side.
>
> This place has an enclosure and the house within is for Nihopuu. These are four patches with a section of the creek. Nihopuu had received this from Peleuli and he occupied this for the same length of time as he had the house lot
>
> [Native Testimony 1846-1852:III:10]

The LCA documents indicate there was a house lot located within *'Āpana* 2. At the time of documentation, Nihopuu was residing in a house lot at *'Āpana* 1, at the ocean's edge. Although this would seem to indicate there was no one living at the house lot in *'Āpana* 2, it is likely that Nihopuu was staying there part-time, someone else was living there, or, at the very least, in years prior it served as a permanent habitation when the population of Waikīkī was much higher. Although this is the only documented habitation site within the project area, there are numerous sources for habitation sites around these inland agricultural plots.

LCA 1515:1 was awarded to Kaiholua and includes three *kalo* patches located in and around the project area. Kaiholua also has an enclosed house lot located by the beach. This parcel is described by Meanui:

> Meanui, sworn, says she knows the land of claimant at Kalia, Waikiki, Oahu. It consists of 3 kalo patches and a house lot.

> The kalo patches are bounded:
>
> On the Mauka side by Government land
>
> Waialae side by the stream
>
> Makai, the same
>
> Honolulu side by Kamalie’s land.
>
> Claimant has a house lot on the sea beach. It is enclosed.
>
> He has held the land and house lot in peace since the days of Kaahumanu.
>
> [Foreign Testimony1846-1853:III:470]

LCA 1758:2 was awarded to Kalaeone and includes a *lo‘i* and *paukū* stream that was being worked. The parcel is described by Kahonu as “1 taro patch and *paukū* stream” that is bounded, “Mauka and Waialae, konohiki’s land. Makai, Waalani’s land, Kamailie’s land. Honolulu, Nihopuu’s land” (Native Testimony 1846-1852:III:506). A *paukū* is a narrow strip of land smaller than a *mo‘o* (Pukui and Elbert 1986:320). The house site of Kalaeone is located on a separate parcel.

LCA 1765:2 was awarded to Kahikiaele and Kamalie and includes a *lo‘i*. The parcel is described by Kahonu:

> 1. House-lot with his personal house and 2 houses for others who live under him; this has not been completely enclosed.
>
> Mauka, M. Kekuanaoa’s fish pond
>
> Waialae, Kamalo
>
> Makai, the sea
>
> Honolulu, Nihopuu.
>
> 2. 1 taro patch:
>
> Mauka, Nihopuu
>
> Waialae, Kawahakai
>
> Makai, Kahaawepala
>
> Honolulu, Makuahine.
>
> Kekuanaoa had given them their land at the time of Kaahumanu I and they have continued living there without objections.
>
> [Native Testimony 1846-1852:III:505]

The *‘Āpana* 1 house lot of Kahikiaele is located next to the *‘Āpana* 1 house lots of Nihopuu and Kaiholua along the shore in present day Fort DeRussy. It is interesting to note that they all have neighboring house lots by the sea, and neighboring taro patches further inland.

LCA 1775:2 was awarded to Paoa (also called Pawa) and includes a *paukū* ditch and stream taro located in Kalia. Describing this parcel, on 16 December 1847 Paoa testified as follows:

> . . . I hereby state my claim for a section of irrigation ditch. I do not know its length— perhaps it is two fathoms more or less. The length of my interest at this place is from the time of Ka‘ahumanu I, which was when my people acquired this place . . . [Native Register 1846-1848:III:250]

Paoa also claimed—and was awarded—a separate house lot at the shore. The “irrigation ditch” parcel is further described by a witness, Kalaeone, testifying on Paoa’s behalf, as “a paukū ditch of stream taro” bounded “*Mauka* [by] Government land; *Waialae* [by] Nihopuu’s land; *Makai* [by] Kuluwailehua’s land, Keino’s land; *‘Ewa* [by] Nakoko’s land” (Native Testimony 1846-1852:III:509). The names of the adjacent awardees correspond to those shown on the 1881 map. Kalaeone also describes the history of Paoa’s tenure on his house lot and “*Paukū* ditch of stream taro”:

> Land to [Paoa] from his mother, Makuahine. Makuahine had received it from Naliikipi after the death of Kinau in 1839, because Makuahine is Naliikipi’s sister. Makuahine had bequested it permanently to [Paoa], their son. Makuahine, [Paoa’s] parent has died and [Paoa] has been living there to the present time peacefully [Native Testimony 1846-1852:III:509]

The LCA documents indicate Paoa’s parcel within the present project area comprised an actively worked taro cultivation feature that had been in his family for two generations. It is highly likely the *paukū* had been fully developed and operational at the time of the Paoa family’s acquisition earlier in the nineteenth century.

LCA 6235:1 was awarded to Kapaakea and includes only a general description of *lo‘i*. This parcel is located at the extreme northeast portion of the project area, in the vicinity of present day University Avenue and Kapiolani Boulevard. This parcel is the only one located in the project area that can definitively be ascribed to Waikīkī Waena. The rest of the LCA parcels are located in the vicinity of the Ala Wai Canal and so can be ascribed to Waikīkī Waena or, most likely, Waikīkī Kai, because the exact boundary has never been fully described.

LCA 8559B:29, located in Pau, and 8559B:30, located in Kamoku, were awarded to W.C. Lunalilo. These large tracts of land are located in the project area although Māhele award documents do not reveal specific activities or land usage for these particular properties during the mid-nineteenth century.

After reviewing the LCA information for the project area, the documentation suggests this entire Waikīkī Kai portion of the project area was interlaced with streams, *loko* and *‘auwai* and utilized for the purpose of watering individual taro patches. These practices are seen to be a continuance of traditional Hawaiian farming techniques known from ancient times. All of the *kuleana* claimants have residences in the vicinity. The single house lot documented in the project area belongs to Nihopuu, but he has been residing in a different house lot close to the ocean.

In contrast to this traditional Hawaiian lifestyle—still apparent from LCA documentation and the 1881 S.E. Bishop map (see Figure 12)—in the Waikīkī Kai portion of the project area, the Waikīkī Waena portion of the project area (in the vicinity of University Avenue and Hihiwai Street) hints at the changes starting to occur. These hints are manifest in Land Grants awarded to Chinese farmers, suggesting a shift in agriculture. This will be further elaborated below as a general discussion on the trend for converting former taro lands to rice lands.

As the nineteenth century progressed, Waikīkī Kai was becoming a popular site among foreigners, mostly American, who had settled on O‘ahu. An 1865 article in the *Pacific Commercial Advertiser* mentioned a small community that had developed along the beach. The area continued to be popular with the *ali‘i* and several notables had residences there. A visitor to O‘ahu in 1873 described Waikīkī as “a hamlet of plain cottages, whither the people of Honolulu go to revel in bathing clothes, mosquitoes, and solitude, at odd times of the year” (Bliss 1873:195–196).

Other developments during the second half of the nineteenth century, a prelude to the dramatically altered landscape of Waikīkī during the twentieth century, included the improvement of the road connecting Waikīkī to Honolulu (Waikīkī Road, the route of the present Kalākaua Avenue), the building of a tram line between the two areas, and the opening of Kapi‘olani Park on 11 June 1877. Traditional land uses in Waikīkī were abandoned or modified.

3.1.5 Rice Cultivation

By the end of the nineteenth century most of the fishponds that had previously proliferated had been neglected and allowed to deteriorate. The remaining taro fields were planted in rice to supply the growing numbers of immigrant laborers imported from China and Japan, and for shipment to the west coast of the United States (Coulter and Chun 1937).

As the sugar industry throughout the Hawaiian Kingdom expanded in the second half of the nineteenth century, the need for increased numbers of field laborers prompted passage of contract labor laws. In 1852, the first Chinese contract laborers arrived in the Islands. Contracts were for five years and pay was $3 a month plus room and board. Upon completion of their contracts, a number of the immigrants remained in the Islands, many becoming merchants or rice farmers. As was happening in other locales in the 1880s, groups of Chinese began leasing and buying (from the Hawaiians of Waikīkī) former taro lands for conversion to rice farming. The taro lands’ availability throughout the Islands in the late 1800s reflected the declining demand for taro as the Native Hawaiian population diminished (Coulter and Chun 1937).

The Hawaiian Islands were well positioned for rice cultivation. A market for rice in California had developed as increasing numbers of Chinese laborers immigrated there since the mid-nineteenth century. Similarly, as Chinese immigration to the Islands also accelerated, a domestic market opened.

> The primary market for both husked rice and paddy raised in all parts of the Hawaiian Islands was in Honolulu. The number of Chinese in the islands created a large home demand.
>
> In 1880 the home market was made more secure by an increase in the duty on rice imported into Hawai‘i to 1½ cents on paddy and 2½ cents on hulled rice. It resulted in further checking the importation of foreign rice and giving an immense impetus to the home product. [Coulter and Chun 1937:130]

By 1892, Waikīkī had 542 acres planted in rice, representing almost 12% of the total 4,659 acres planted in rice on O‘ahu (Figure 15 and Figure 16). Most of the former taro *lo‘i* converted to rice fields were *mauka* of the present Ala Wai Boulevard, understood to be Waikīkī Waena.

A review of an 1881 Hawaiian Government survey map by S.E. Bishop indicates land grants were awarded to people with Chinese names in the Waikīkī Waena portion of the project area,



Figure 15. Photo of rice fields in Waikīkī in the 1890s; *mauka* is Mānoa Valley (Hawaiian Historical Society)

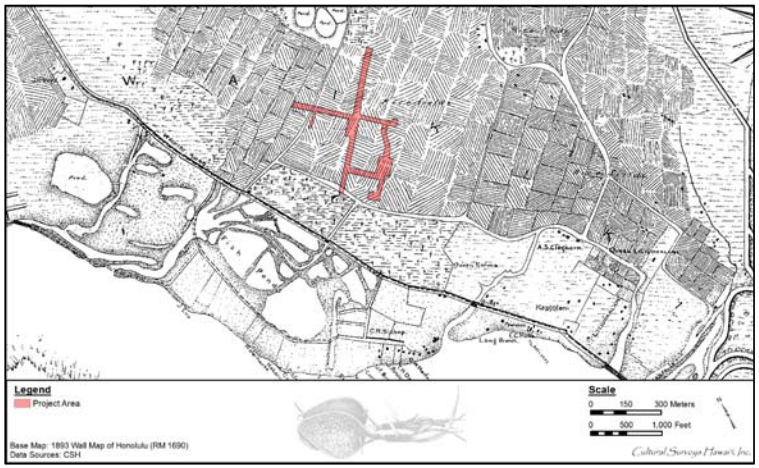


Figure 16. Portion of an 1893 Wall map of Honolulu, showing distribution of rice fields in and around the current project area

with a much more sparse dispersion of Hawaiian names as compared to the Waikīkī Kai portion (see Figure 12). There is no specific note in the land grant information as to how the land was utilized due to incomplete documentation. A review of an 1893 map of Honolulu by Wall shows that most of the project area is located within rice fields (see Figure 16). Within the 12 years that the maps were drawn (1881-1893) it is apparent there was a major shift away from traditional Hawaiian agriculture toward rice cultivation.

3.1.6 Banana Cultivation

According to historic maps and photographs, the Waikīkī Kai portion of the current project area appears to be located within former banana fields, cultivated post-Contact (after 1778) in the Waikīkī wetlands until the 1920s Waikīkī land reclamation (Figure 17, Figure 18, and Figure 19). Bananas were likely first brought to the Hawaiian Islands by the Polynesians. They fared well on long distance journeys, both in root form and ripened, likely due to their hardy corm-like bulb and its leathery peel (Pope 1926:8). By the time Captain Cook and his men made contact with Hawaiians in 1778, many different varieties of bananas were already being cultivated locally (Pope 1926:2). Multinational strains of bananas were introduced to Hawai‘i as early as the 1850s. Today, multinational strains of the fruit are so popularly grown in the Hawaiian Islands that only about 20 of the estimated 70 early Hawaiian varieties remain and these are often limited to remote valleys (Wagner et al. 1990:1465).

The Chinese banana, also known as the Dwarf or Cavendish banana, was introduced in 1855 and quickly became the most popular tropical fruit to be grown on a commercial scale because of its sweet taste, rapid growth, and resistance to insects like fruit flies (Higgins 1904:16). In addition to being the most widespread commercially grown banana in the Hawaiian Islands, the Chinese banana yields crops within one year of being planted at sea level, giving farmers the extra incentive to grow in lowlands. Banana farms flourished in areas like Waikīkī, which had been cultivated for centuries with taro *lo‘i,* and later on with rice. Von Tempski (1940) provides a first-hand observation of the marshy landscape and the banana fields of Waikīkī ca.1910:

> After driving through the business section of town we began passing lovely homes set back in gracious gardens. Gradually the houses became farther apart, and finally the road started across a marshy tract of ground paralleled by a solitary street-car track. On either side of the dike were vivid green rice paddies and taro patches. Thin-legged Chinamen in coolie hats were wading around, tending the crops. Each paddy was surrounded by raised ground planted with stocky banana trees bending under huge bunches of fruit. Shanties on high poles showed here and there and imposing fleets of ducks paddled through the reed ponds quacking, shaking their tails and up-ending to dive for minnows and frogs. [von Tempski 1940:8–586]

The banana plant is notoriously thirsty; it is estimated that for every one pound of fruit yielded from a banana plant, it takes over 600 pounds of water to grow (Pope 1926:14). Therefore, irrigation and drainage systems had to be implemented as rows “laid out in ditches 1½ to 2 feet deep with high ridges between . . . The ditches are made by running a plow several times through each row, after which the loosened soil is thrown to the sides” (Pope 1926:13). Banana fields required very “deep and thorough” plowing, and after between 4-8 years of cultivation it was required that the field be replowed to maintain its productivity (see Figure 18) (Pope 1926:13, 19).This process would obliterate the previous year’s rows, suggesting the natural land surface

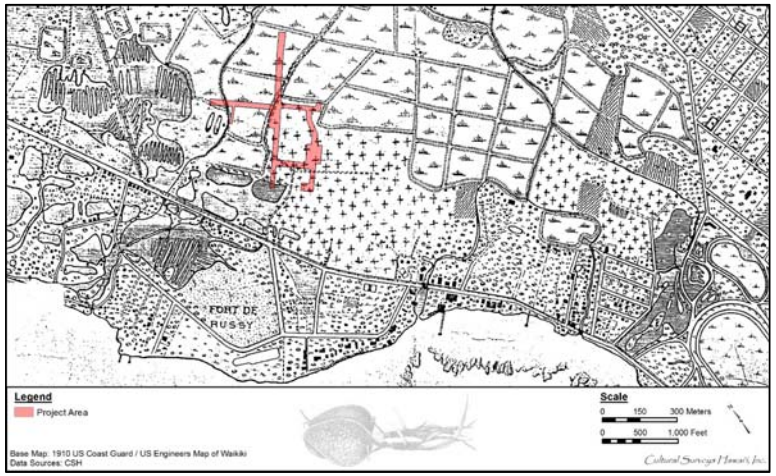


Figure 17. Portion of 1910 U.S. Engineers map of Waikīkī showing the project area; note the in-filling of the fishponds within the southern portion of Fort DeRussy



Figure 18. A 1910 photograph of the banana fields at Olohana Street, located approximately one block west of the current project area, showing the irrigation and drainage systems required for lowland banana cultivation (photo by Ray Jerome Baker; adapted from LeSuer et al. 2000)

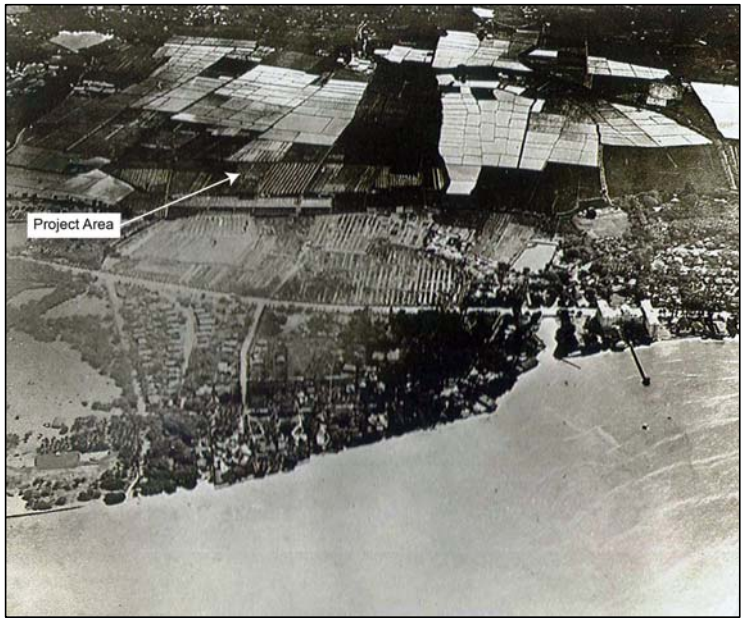


Figure 19. A 1920 aerial photograph of Kālia to Ala Moana showing the project area located within the Waikīkī wetlands; note the banana crop fields in the foreground and the rice fields in the background (from Grant 1996)

within the project area had undergone extensive and repeated restructuring. The aerial photograph depicted in Figure 19 shows the Waikīkī area in the 1920s prior to the land reclamation, with ditches associated with banana cultivation visible.

Due to its extensive irrigation, banana farming and duck ponds reportedly went hand in hand, one helping to sustain the other. A 1901 article titled “Chinese Duck Ranch” in *Paradise of the Pacific* (cited in Feeser 2006) describes the duck ponds:

> . . . it is typical of countless such enterprises across O‘ahu . . . the duck rancher carefully monitors every stage of his birds’ growth and guards his flock from predators such as mongoose. He also states that the rancher gets two uses from his irrigation ditches, which he freshens regularly: he employs them not only for ponds, but also for growing bananas. [Feeser 2006:30]

Chinese banana strains were considered the most commonly cultivated. It is likely that the bananas cultivated within the current project area were of a strain originating from China or other regions of Southeast Asia. The banana fields within the project area were eventually filled in during the Waikīkī land reclamation project, likely with material dredged from the nearby Ala Wai Canal.

3.1.7 1900s

Development of Waikīkī rapidly gained momentum in the twentieth century. In particular, the development of the Ala Wai Canal, Fort DeRussy military reservation, major vehicular thoroughfares (including Waikīkī Road, later renamed Kalākaua Avenue), and ultimately resort development, dramatically changed the landscape of the project area. As seen in Figure 9, Figure 16, Figure 17, Figure 20, and Figure 21, the fishponds of Kālia remained largely intact through the late 1800s and early 1900s. However, by 1928 the last of the Kālia fishponds had been filled in (Figure 22) and Pi‘inaio Stream had been filled in and replaced by Ala Moana Boulevard (see discussion below). In the 1940s and 1950s, prior to Statehood, the landscape remained much the same (Figure 23 and Figure 24). A 1978 aerial photograph of the project area shows the dramatic alteration of the landscape of Kālia over the course of less than a century (Figure 25).

3.1.7.1 Ala Wai Canal (SIHP #-9757)

It was during the 1920s that the lands, including the present project area, were transformed when construction of the Ala Wai Drainage Canal—begun in 1921 and completed eight years later—resulted in the draining and filling in of the remaining ponds and irrigated fields of Waikīkī, including those in Mō‘ili‘ili (see Figure 21, see Figure 22, Figure 26, and Figure 27). The canal was one element of a plan to urbanize Waikīkī and the surrounding districts, first conceived in 1906:

> The [Honolulu city] planning commission began by submitting street layout plans for a Waikīkī reclamation district. In January 1922 a Waikīkī improvement commission resubmitted these plans to the board of supervisors, which, in turn, approved them a year later. From this grew a wider plan that eventually reached the Kapahulu, Mō‘ili‘ili, and McCully districts, as well as lower Makiki and Mānoa . . . The standard plan for new neighborhoods, with allowances for local terrain, was to be that of a grid, with 80-foot-wide streets crossing 70-foot-wide avenues at right angles so as to leave blocks of house lots about 260 by 620 feet. Allowing for a 10-

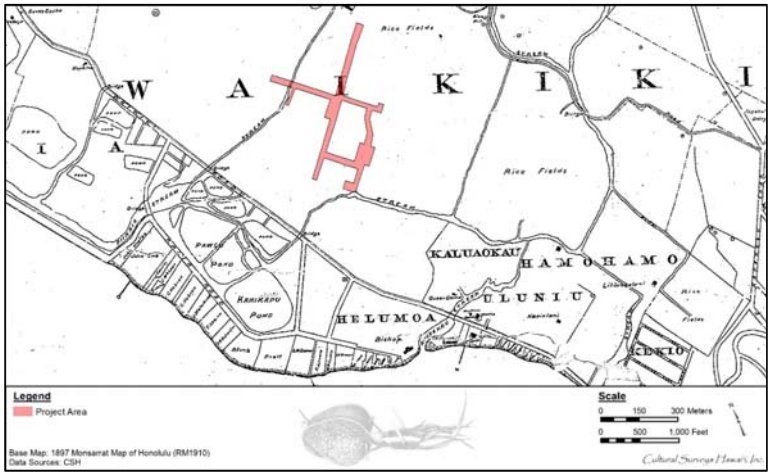


Figure 20. Portion of an 1897 map by M.D. Monsarrat, showing the project area in relation to Pi‘inaio Stream, the fishponds of Kālia, and the growing road network including Waikīkī Road (Kalākaua Avenue), Beach Road (Ala Moana Boulevard), and Kālia Road

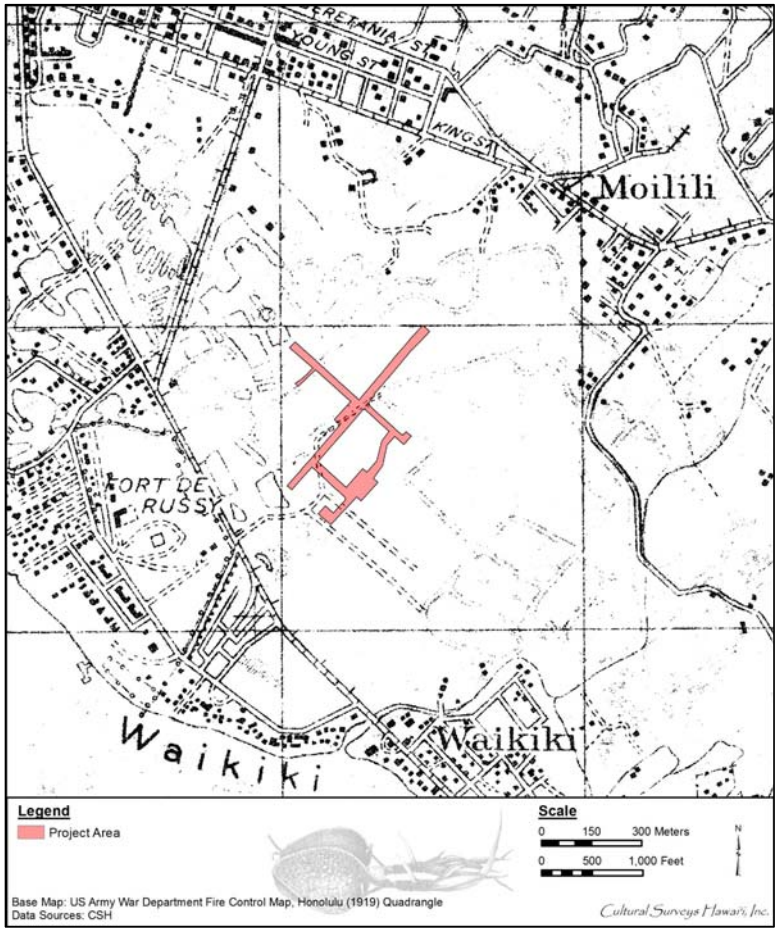


Figure 21. Portion of 1919 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area; note the remaining fishponds west of the project area

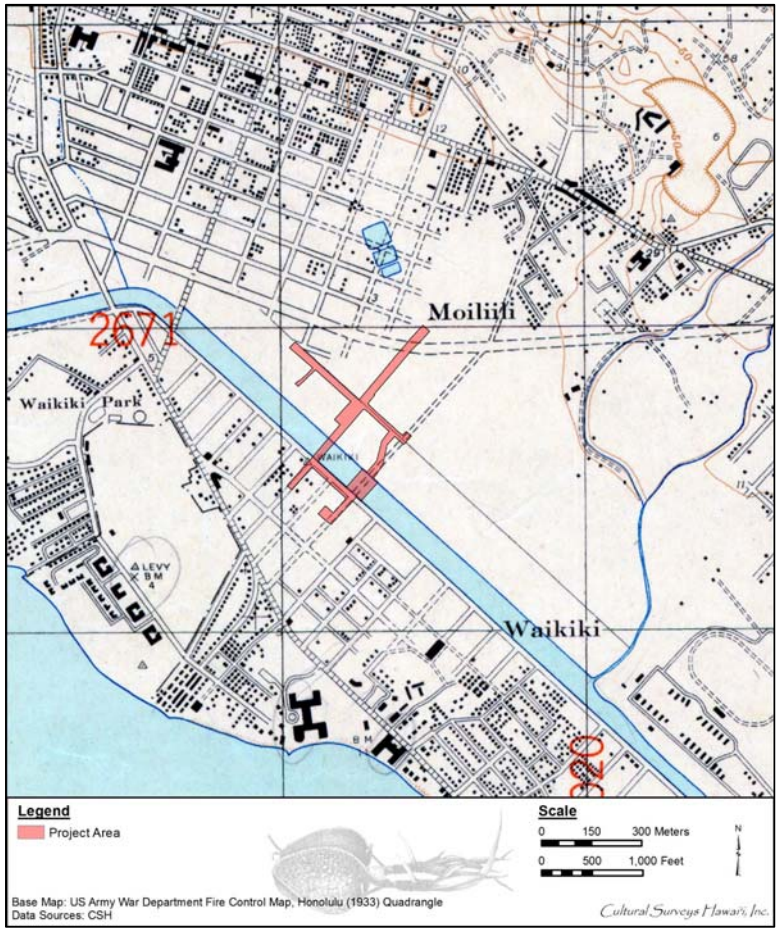


Figure 22. Portion of 1933 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area, the complete in-filling of the Kālia wetlands, and the development of the Ala Wai Canal. Three ponds are depicted to the north of the project area that have not been filled at this time

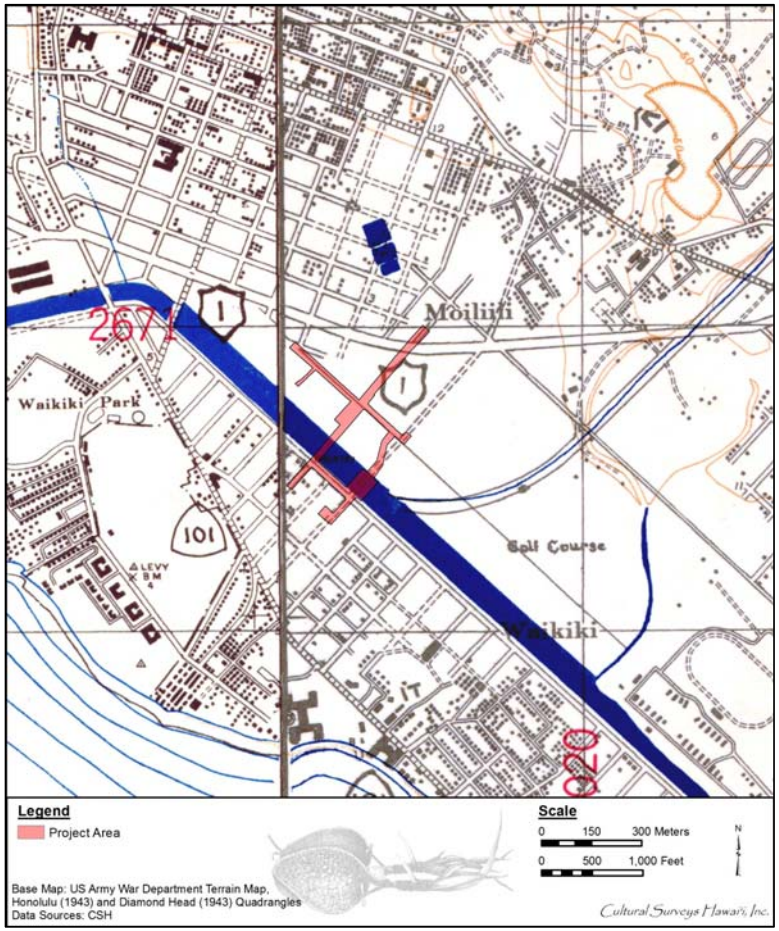


Figure 23. Portion of 1943 U.S. Army War Department topographic map, Honolulu and Diamond Head Quadrangles, showing the project area. Three ponds are depicted to the north of the project area that have not been filled at this time.

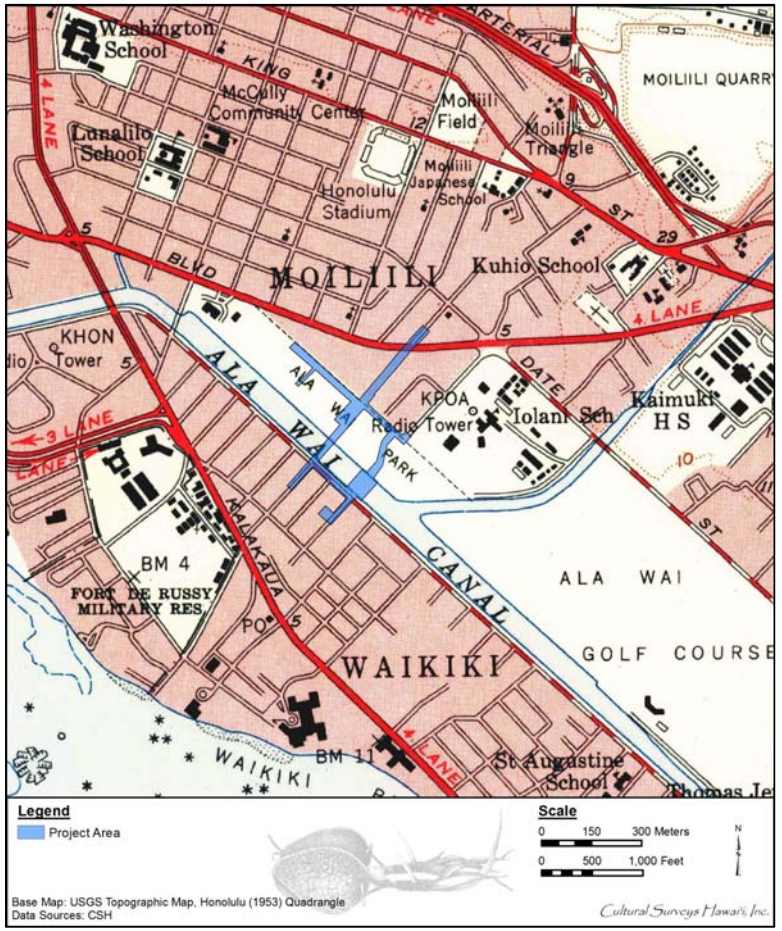


Figure 24. Portion of 1953 Honolulu USGS topographic quadrangle showing the project area and the complete in-filling of Pi'inaio Stream which was replaced by Ala Moana Boulevard. Note that the three ponds to the north of the project area have been filled by this time

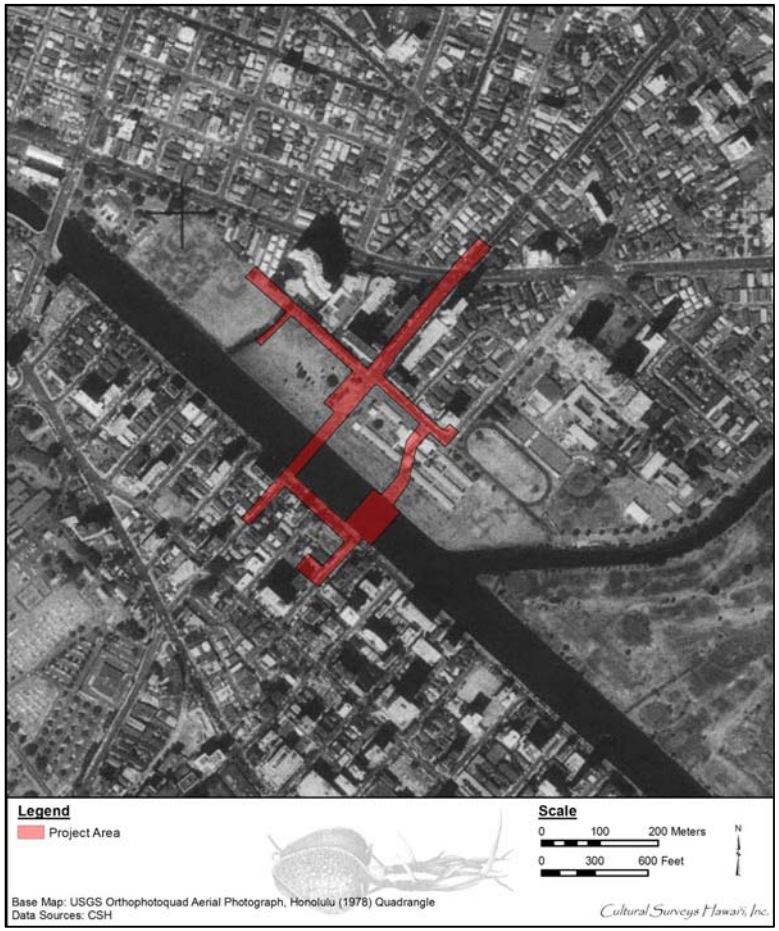


Figure 25. 1978 USGS aerial orthophotograph, Honolulu Quadrangle, showing the project area

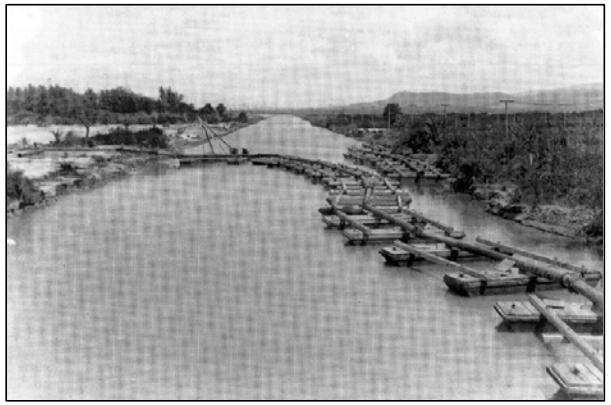


Figure 26. Creation of the Ala Wai Canal showing floating dredge line, ca. 1924 (Bishop Museum Archives)

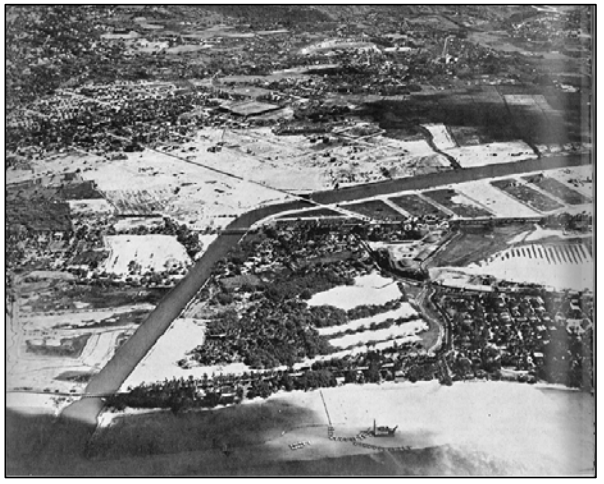


Figure 27. 1927 aerial photo of the completed Ala Wai Canal showing the reclamation of the Kālia area within Waikīkī with coral fill (dredge and pipe in foreground) (Bishop Museum Archives)

> foot-wide sidewalk and a 10-foot right-of-way [alley] down the center of each block, there would be twenty house lots, each about 60 by 120 feet, in each block. [Johnson 1991:311]

The final result was a “canal three miles long, with an average depth of twenty-five feet and a breadth of two hundred fifty feet” (*Honolulu Star-Bulletin*, 17 October 1928). Several claims were made against the dredging company, including compensation for destroyed crops and livestock, by farmers living in Waikīkī. For instance, a Chinese tenant farmer named Chang Fow, who was leasing lands in Waikīkī from the Bishop Trust Company, wrote a letter of complaint indicating the salt water that leached into his lands as a result of the dredging had devastated his fishponds and stocks of ducks and chickens (letter from Chang Fow to the Bishop Trust Company, 23 May 1922 in Nakamura 1979:100–101). His claims, along with those of other residents of the area, give an impression of the continuing agricultural subsistence base in Waikīkī that lasted into the 1920s, and rapidly became a thing of the past.

Information about the actual dredging and fill process and the materials dredged up and used for fill is minimal. Statements and pictures regarding the event suggest dredging was done both offshore on the ocean bed, and in the area slated for the canal. As yet, information regarding the filling process of personal properties—with the excess dredge that became the property of the Hawaiian Dredging Company—is unclear. Numerous phases seem to have taken place.

Nakamura (1979:85) writes that the government of the Territory of Hawaii solicited bids in 1920 for the dredge and fill project planned for the environs of Waikīkī. The plan was to create hundreds of acres of urban land at the expense of wetland agriculture and aquaculture in the area. The advertisement soliciting bids for the project put forward by Lyman H. Bigelow masked the significance of the undertaking by describing the project as “Dredging a Drainage Canal and Filling and Reclaiming Certain Unsanitary Lands at Waikiki” (Nakamura 1979:85). He further writes that State laws required property owners to pay for the filling in of their lands, which apparently was going to be done whether they wanted it or not. A lien would be fixed against their property and if payment was not made on time, the land would be foreclosed on. Nakamura points out that the cost was so high for some of the property owners that the bank lien could extend into a 15-year mortgage (Nakamura 1979:89).

Once filling of land that the Territorial government wanted (for state buildings) was complete, any further dredged materials became the property of the dredging company—Hawaiian Dredging Company—and they in turn could sell the materials to the property owners, who in turn were forced to buy the product. The involvement of Walter F. Dillingham of the Hawaiian Dredging Company was described in *Time* magazine, “Walter Dillingham used the muck dragged up from the sea to fill in low, marshy areas around Honolulu, over the years created 5,000 acres of solid ground that now holds a full third of the city’s population” (Nakamura 1979:112).

The land surface of modern Waikīkī is situated on the result of this decade-long dredging and fill project. In Nakamura’s (1979:113) *The Story of Waikīkī and the Reclamation Project,* he writes that this “land ‘reclamation’ program changed the ecology of Waikīkī from a once viable and important agriculture and aquaculture center . . . destroyed by profit-seeking capitalist entrepreneurs . . . under the subterfuge of ‘drainage’ and ‘sanitation.’” Many of the original property owners lost their land or sustained serious damage to their property as a result of the reclamation activities and/or the costly expense for the mandatory filling in of their properties.

Waikīkī was changed forever by the Ala Wai Canal. The ancient irrigation systems were gone, the farms were gone, the streams were gone, the mosquitoes were gone, and Waikīkī was separated from the rest of Honolulu by a broad canal. On the new high-and-dry lands behind the hotels, developers laid out tracts of inexpensive homes and garden apartments. Almost overnight Waikīkī became urban (Grant 1996:54).

3.1.7.2 Development of Waikīkī

Newly created land tracts following the Ala Wai Canal’s construction spurred a rush to development in the 1930s. An article in the *Honolulu Star-Bulletin* in 1938 extolled the area’s progress:

> The expansion of apartment and private residence construction is no secret. Examination of building permits will show that more projects have been completed during the past year, and more are now underway in this area, than in any other section of the territory. [Newton 1939:10]

The entrance of the United States into World War II following the Japanese bombing of Pearl Harbor on 7 December 1941 put on hold plans for the development of Waikīkī as a tourist destination. Until the war’s end in 1945, the tourist trade was non-existent “since the Navy controlled travel to and from Hawai‘i and did not allow pleasure trips” (Brown 1989:141). For the duration of the war, Waikīkī was transformed into a recreation area for military personnel.

> It was not the same Waikīkī as before the war, though; barbed wire barricades now lined its sands, and there were other changes too. Fort DeRussy became a huge recreation center, with a dance hall called Maluhia that attracted thousands of men at a time. The Moana Hotel continued to function, but many other establishments and private homes in the area were taken over by the military. [Brown 1989:141]

3.1.7.3 Post-1950 Modern Land Use

The 1950 Sanborn Fire Insurance maps identify the buildings and features present on the project area at mid-century compared to the empty lots visible on the 1927 Sanborn Fire Insurance map (Figure 28, Figure 29, and Figure 30). By the mid-1950s there were more than 50 hotels and apartment buildings from the Kālia area to the Diamond Head end of Kapi‘olani Park. By the mid-1950s, the Waikīkī population was not limited to transient tourists but included 11,000 permanent residents living in 4,000 single dwellings and apartments in stucco or frame buildings. The intensification of urban dwellings and tourist infrastructure has continued to the present day.

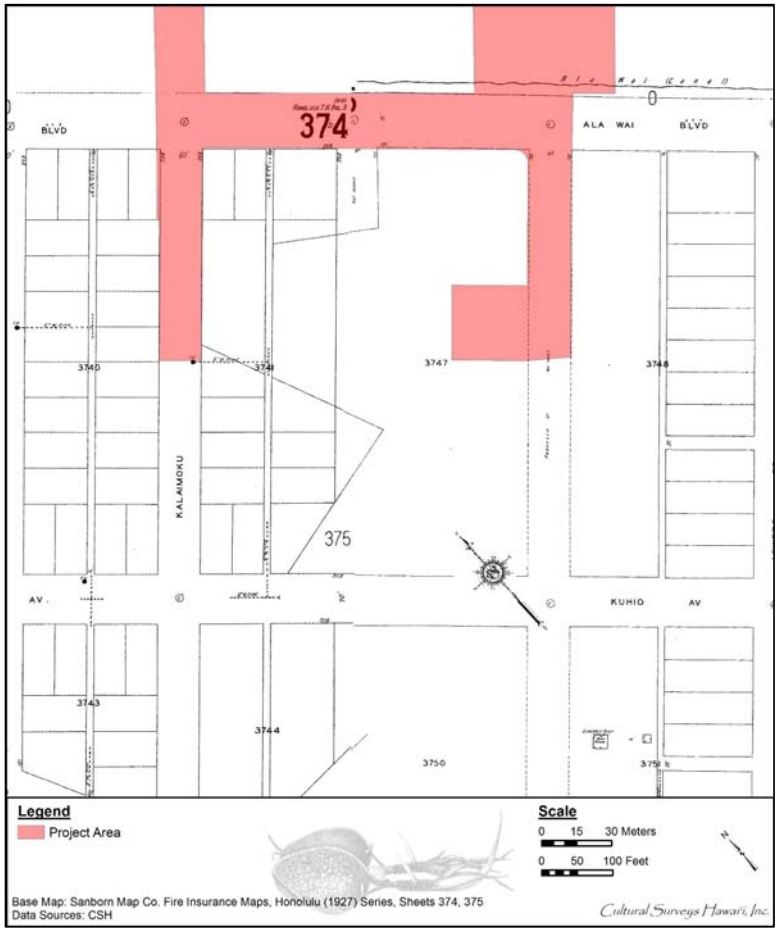


Figure 28. 1927 Sanborn Fire Insurance map showing the newly created lots in the Waikīkī Kai portion of the project area

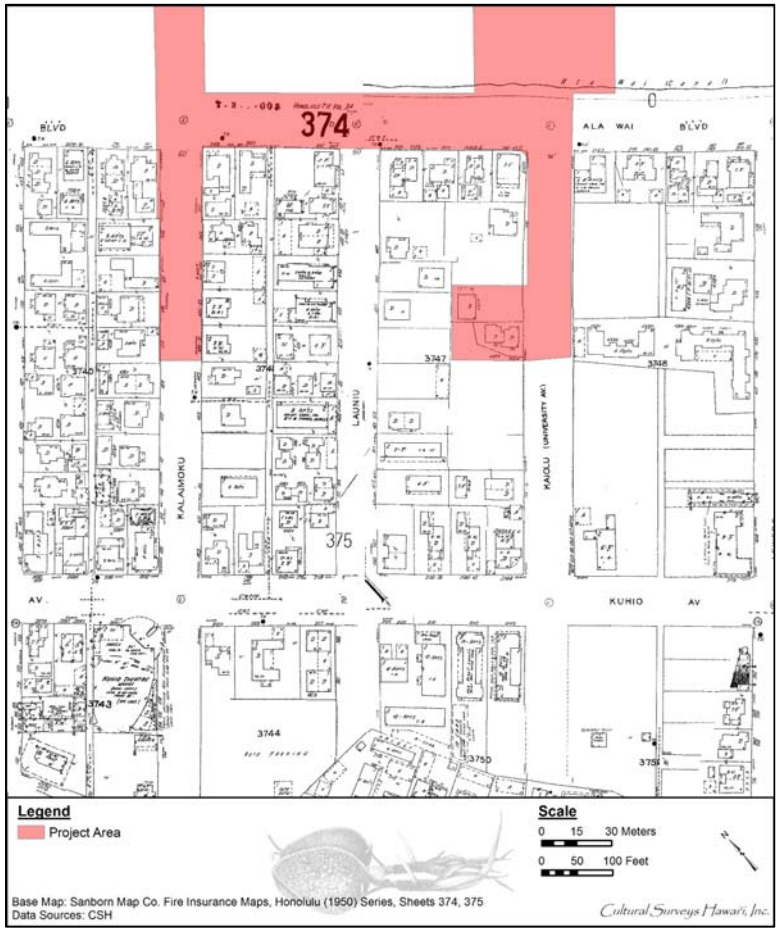


Figure 29. 1950a Sanborn Fire Insurance map showing the new apartments in the Waikīkī Kai portion of the project area

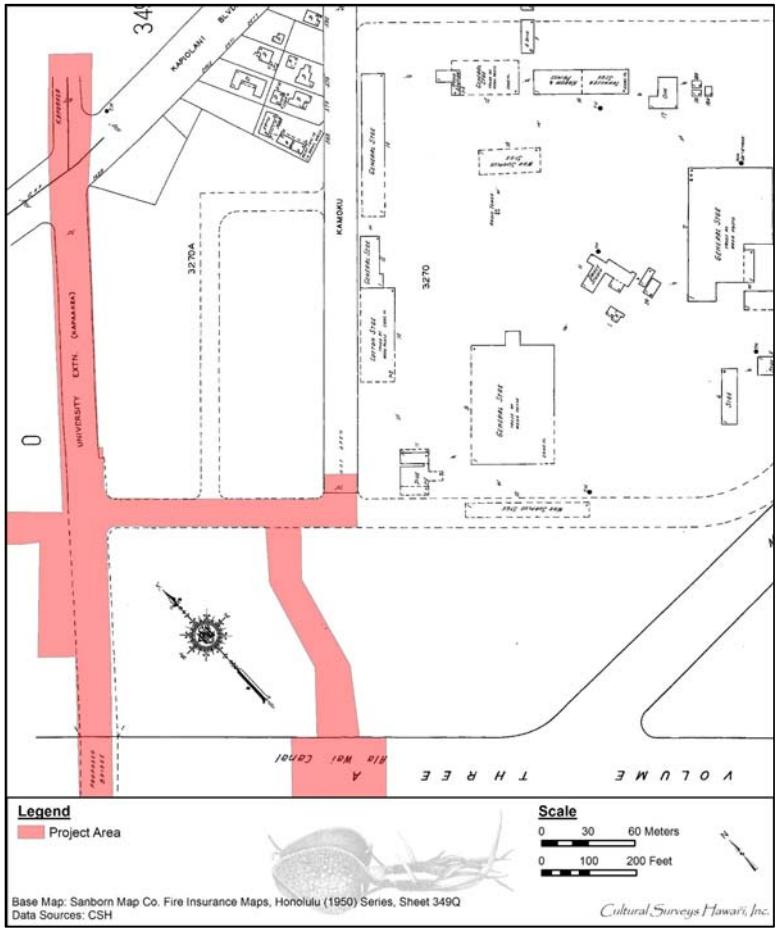


Figure 30. 1950b Sanborn Fire Insurance map showing the Waikīkī Waena portion of the project area

3.2 Previous Archaeological Research

Archaeological studies in the vicinity of the project area are listed on Table 2 and shown in Figure 31. Multiple archaeological monitoring programs, investigations, data recovery, or inventory surveys have previously been conducted within or near much of the project area. Archaeological finds documented during these studies include human burials, pre- and post-Contact cultural layers, buried fishponds, ditches, and other remains of extensive wetland agriculture, trash pits, and construction debris. These archaeological remains have been identified and documented beneath the extensive fill layers related to land reclamation activities associated with urban development. The historic properties identified in the vicinity of the project area are shown in Figure 32.

Table 2. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
McMahon 1994	Kalakaua near Kuhio	SHPD inadvertent discovery	Inadvertent burial discovery associated with SIHP # -4890
Cleghorn 1996	Proposed Kalākaua Plaza	Archaeological inventory survey	No significant findings
LeSuer et al. 2000	King Kalākaua Plaza Phase II	Archaeological inventory survey	SIHP # -5796, previous land surface (wetland sediments), adversely impacted by land alteration; SIHP # -4970, *'auwai*
Borthwick et al. 2002	71,000-sq-ft parcel (TMK: [1] 2-6-016:002)	Archaeological inventory survey	Absence of dry Jaucas sand deposits indicate burial finds unlikely in project area; identified SIHP # -6407, subsurface cultural layer
Bush et al. 2002	Kalākaua Ave (from Ala Moana Blvd to Kapahulu Ave)	Archaeological monitoring	Four human burials (SIHP # -5860 Features U and V, SIHP # -5864, and SIHP # -5856 Feature C) were documented in the southern portion of the project area; burial locations not shown in Figure 31. Three of the burials (SIHP # -5860 Features U and V and the SIHP # 5856 C) were disinterred and reburied at the Hali'a Aloha burial facility. One burial (SIHP # -5864) was left in place In addition, a historic to modern trash pit, an *imu*, an in situ pig skeleton, and wetland sediments possibly associated with the former Loko Kaipuni complex were identified in northern portion of project area; no SIHP #s assigned

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
Kailihiwa and Cleghorn 2003	Portions of Lau‘ula St, Waikolu Way and Royal Hawaiian Ave	Archaeological monitoring	No significant findings
Esh and Hammatt 2004	Ala Wai Blvd	Archaeological monitoring	No significant findings
McIntosh and Cleghorn 2004	Urban Loft Development at Launiu St (TMKs: [1] 2-6-017; 068, 070, 071, 072, 073)	Archaeological inventory survey	Documented SIHP # -6680, ponded field sediments which yielded anomalous date (calibrated 2-sigma date range of 1280 to 1010 BC)
Tulchin et al. 2004	Approximately 71,000-sq ft parcel (TMKs: [1] 2-6-016:002, 004, 006, 007, 008, 012-019, 062, 064, 070, 075, 076, and 077)	Archaeological data recovery	Samples from SIHP # -6407 Feature A (subsurface cultural layer) yielded pollen and radiocarbon dating results and Hawaiian use of *kuāuna* and *paukū* features
Esh and Hammatt 2006	Kūhiō Ave from Ka‘iulani Ave to Kapahulu Ave	Archaeological monitoring	No significant findings
O’Leary et al. 2006	0.5-acre Royal Kāhili Condo	Archaeological inventory survey	No significant findings
Petrey et al. 2008	1944 Kalākaua (TMKs: [1] 2-6-014:004, 006, 007, 008, 010, 019, and 058)	Archaeological inventory survey	No significant findings
Yucha et al. 2009	Waikiki Shopping Plaza (TMKs: [1] 2-6-019:056, 061)	Archaeological inventory survey	SIHP # -5796, a culturally modified wetland ground surface located beneath early twentieth century land reclamation fill deposits
Park and Collins 2010	Ala Wai Garden project	Archaeological monitoring	No significant findings

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
Sroat et al. 2011	Waikīkī Shopping Plaza (TMKs: [1] 2-6-019:056, 061)	Archaeological monitoring	SIHP # -5796, a culturally modified wetland ground surface located beneath early twentieth century land reclamation fill deposits
Gosser and Collins 2014	Intersection of Kuhio Ave and Namahana St	Archaeological monitoring	No significant findings
LaChance and Hammatt 2014	TMKs: [1] 2-3-034:033, 2-3-037:001 and 002, 2-6, and 2-7-036	Archaeological monitoring	No significant findings
Lima et al. 2014	TMKs: [1] 2-6-003, 005, 016, 024, and 027	Archaeological monitoring	No significant findings
Pammer et al. 2014	Bounded by Kūhiō Ave, Lau’ula St, and Lewers St (TMKs: [1] 2-6-018:043, 045–048)	Archaeological inventory survey	SIHP # -5796, a culturally modified wetland including a pond (Feature A) and a berm (Features B–E)
Morriss and Hammatt 2015	Beachwalk Wastewater Pumping Station (TMK: [1] 2-6-018:011)	Archaeological inventory survey	SIHP # -5796, a previously identified pre-Contact to early twentieth century natural wetland deposit

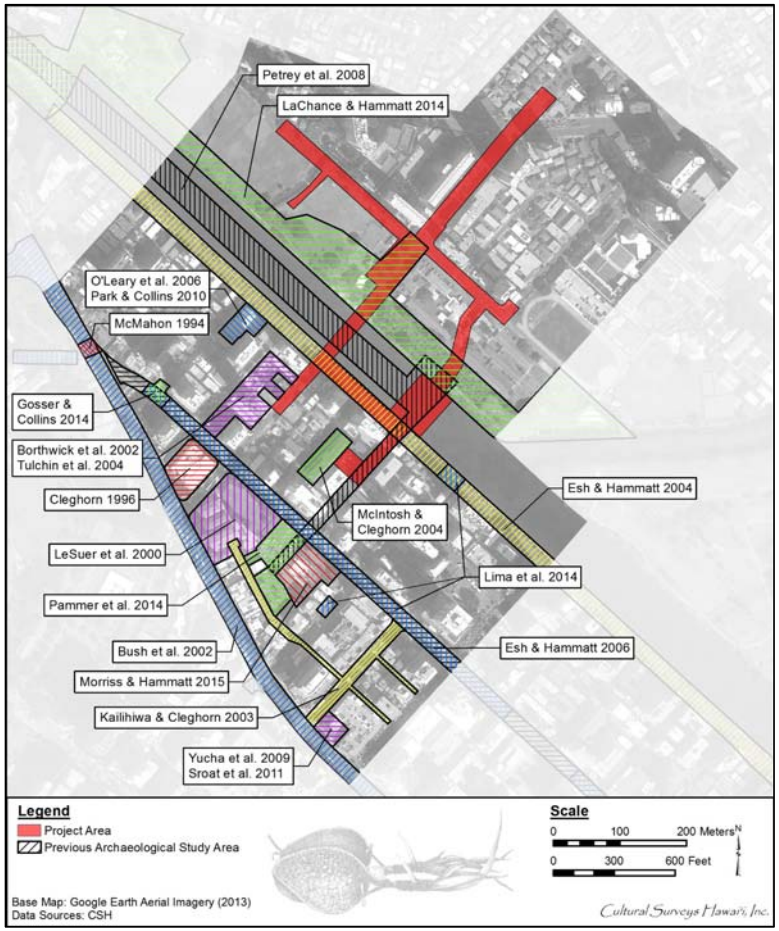


Figure 31. Previous archaeological studies in the vicinity of the current project area (Google Earth 2013)

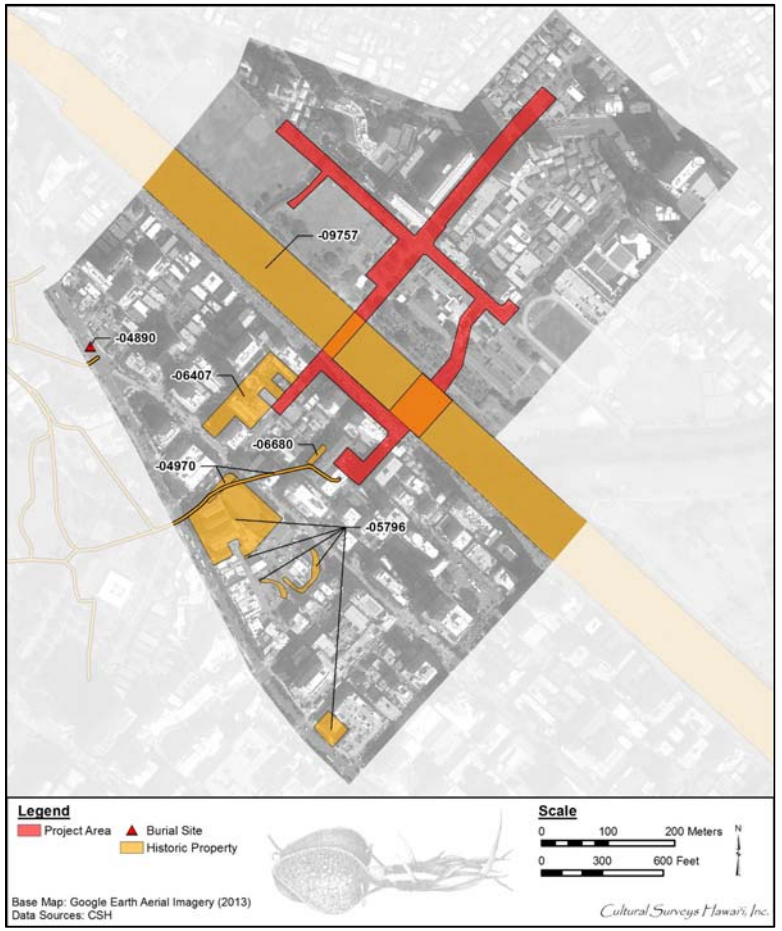


Figure 32. Previously designated archaeological sites in the vicinity of the project area (Google Earth 2013)

3.2.1 McMahon 1994

On 28 April 1994, an inadvertent burial discovery was made during excavation for a water line at the intersection of Kalākaua Avenue and Kuamo‘o Street (just *mauka* of Fort DeRussy). These remains represented a single individual (McMahon 1994).

3.2.2 Cleghorn 1996

In 1996, Pacific Legacy, Inc. conducted an AIS of the block bounded by Kalākaua Avenue, Kūhiō Avenue, ‘Olohana Street, and Kālaimoku Street (Cleghorn 1996). The survey included excavation of seven backhoe trenches. The subsurface testing indicated that

> [T]his area was extremely wet and probably marshy. This type of environment was not conducive for traditional economic practices. . . . The current project area appears to have been unused because it was too wet and marshy.
>
> Several peat deposits, containing the preserved remains of organic plant materials were discovered and sampled. These deposits have the potential to add to our knowledge of the paleoenvironment of the area. [Cleghorn 1996:15]

The report concluded that no further archaeological investigations of the parcel were warranted since “no potentially significant traditional sites or deposits were found,” but cautioned of the “possibility, however remote in this instance, that human burials may be encountered during large scale excavations” (Cleghorn 1996:15).

3.2.3 LeSuer et al. 2000

Between January and February 2000, CSH conducted an AIS consisting of archival research and subsurface investigations for a parcel (TMKs: [1] 2-6-018:010, 036, 042, 052, 055, 062, 064, 073, and 074) located in Waikīkī. The project parcel is located on the ‘Ewa (northwest) end of a block bounded by Kalaimoku Street, Kalākaua Avenue, Kūhiō Avenue, and Lewers Street.

Subsurface testing located the ‘Auwai O Pau and areas of possible fishpond and agricultural cultivation praxis. No habitation areas or human burials were identified during excavation. The prehistoric to early twentieth century wetland ground surface, which runs throughout the project parcel, was assigned as SIHP # -5796. Research documents the project area from ancient times to the present and reveals the historic significance of the parcel. Further details of LeSuer et al. (2000) are included in the Section 6.1.

3.2.4 Borthwick et al. 2002

In 2002, CSH conducted an AIS of a roughly 71,000-sq-ft project area in Waikīkī, O‘ahu (TMKs: [1] 2-6-016:002, 004, 006, 007, 008, 012–019, 062, 064, 070, 075, 076, and 077) (Borthwick et al. 2002). The project area is bounded by Olohana Street, Kūhiō Avenue, Kalaimoku Street, and Ala Wai Boulevard and is adjacent to the current project area. The inventory survey was primarily a subsurface survey as the project area had been cleared of buildings prior to survey commencement. Ten backhoe trenches were excavated and documented. The investigation identified SIHP # -6407, a subsurface cultural layer designated as strata III a-c. These were sandy clay loams and clay loams with organic materials and charcoal flecking understood as agricultural soils (Borthwick et al. 2002:32). Radiocarbon analysis of charcoal samples yielded a calibrated date range of ca. AD 1400–1660.

3.2.5 Bush et al. 2002

Between July 1999 and October 2000, CSH completed archaeological monitoring for Phase II of the Waikīkī Anti-Crime Street Lighting Improvement project along Kalākaua Avenue from Ala Moana Boulevard to Kapahulu Avenue (Bush et al. 2002). Wetland sediments believed to be associated with the Loko Kaipuni complex were documented between Ala Moana Boulevard and Kuamo‘o Street. In addition, a historic to modern trash pit was identified at the intersection of Ala Moana Boulevard and Kalākaua Avenue. In the central and southern portions of the project area, monitoring results documented intermittent wetland sediments associated with Waikīkī fishponds and *muliwai* (stream), several historic to modern era trash pits, one *imu* (fire pit) with an in situ pig skeleton, and four human burials (SIHP #s -5860 Features U and V, -5864, and -5856 Feature C; not shown on Figure 32).

3.2.6 Kailihiwa and Cleghorn 2003

In 2003, Pacific Legacy, Inc., under contract to the Honolulu Board of Water Supply, conducted archaeological monitoring services for the Waikīkī Water System Improvements project (Kailihiwa and Cleghorn 2003). No archaeological sites or features were recorded in the area and no human remains were encountered.

3.2.7 Tulchin et al. 2004

In August 2003, CSH performed data recovery in a project area that had formerly undergone subsurface testing as part of the inventory survey documented by Borthwick et al. (2002). Subsurface testing for the data recovery work was specifically focused on recovering stratigraphically informative samples from the previously identified *paukū/kuāuna* feature (SIHP # -6407 Feature A) in order to develop a better determination of the date and environment in which the *paukū/kuāuna* feature was constructed and maintained (Tulchin et al. 2004).

3.2.8 McIntosh and Cleghorn 2004

In 2004, Pacific Legacy, Inc. conducted an AIS for the proposed development on a 0.687-acre parcel (29,907 sq ft) at Launiu Street. Evidence of pond field agriculture in the form of gleyed silts and fine sands was found in the central western portion of the project area (McIntosh and Cleghorn 2004). Archaeological investigations resulted in identification of a single archaeological resource (SIHP # -6680), a buried *lo‘i* or pond field.

3.2.9 Esh and Hammatt 2004

In December 2004, CSH completed an archaeological monitoring report for Ala Wai Boulevard Improvements (Esh and Hammatt 2004). A single cow skeleton was encountered at the intersection of Ala Wai Boulevard and Seaside Avenue; the skeleton was reburied and no other archaeological remains were encountered.

3.2.10 O’Leary et al. 2006

In 2006, CSH conducted an archaeological inventory survey of 0.5 acres of the Royal Kāhili Condo property. No significant sites, human remains, or Hawaiian artifacts were discovered during the survey. The negative results were reported as an archaeological assessment (O’Leary et al. 2006).

3.2.11 Esh and Hammatt 2006

In 2006, CSH conducted archaeological monitoring on Kūhiō Avenue. No cultural material or human remains were encountered during monitoring, although an in situ dog burial was uncovered in the natural sand layer at the Kanekapolei Street and Kūhiō Avenue intersection. No cultural material was associated with the dog remains (Esh and Hammatt 2006).

3.2.12 Petrey et al. 2008

In 2008, CSH conducted an archaeological monitoring program for the City & County of Honolulu's Emergency Sewer Bypass project, Ala Wai Canal to Magic Island (Petrey et al. 2008). No cultural deposits were identified. The project area's subsurface deposits appeared to have been partially disturbed by importation of fill sediments into the project area, which were observed at Kai‘olu Street and at the Ala Wai Canal. Fill sediments were observed above the natural historic shoreline surface at Ala Moana Park Drive.

3.2.13 Yucha et al. 2009

In 2009, CSH conducted an AIS for the proposed Waikiki Shopping Plaza redevelopment project (Yucha et al. 2009). This investigation found that subsurface deposits consisted of several strata of early twentieth century land reclamation and hydraulic fill overlying a culturally modified wetland ground surface, SIHP # -5796, at a depth in excess of 1.5 m below surface. Jaucas sand deposits were absent within the project area. A monitoring program was recommended.

3.2.14 Park and Collins 2010

In 2010, Pacific Consulting Services, Inc. (PCSI) completed an archaeological monitoring report for ground-altering activities associated with the construction of the Ala Wai Garden Plaza. No archaeological cultural deposits or human remains were identified during monitoring (Park and Collins 2010).

3.2.15 Sroat et al. 2011

Between June 2009 and January 2010, CSH conducted archaeological monitoring for the Waikīkī Shopping Plaza Redevelopment project. This investigation identified portions of SIHP # -5796, a culturally modified wetland ground surface, in the side walls of several trenches within the project area, specifically in excavations reaching depths between 129-200 cm below surface.

3.2.16 LaChance and Hammatt 2014

Between January 2010 and May 2011, CSH conducted archaeological monitoring for the Beachwalk to Ala Moana Park Sewer project. No cultural deposits were identified. Subsurface deposits appear to have been disturbed by past land use, which likely included extensive earthmoving activity and importation of fill sediments into the project area.

3.2.17 Gosser and Collins 2014

In 2012, PCSI conducted archaeological monitoring in support of traffic control signal improvements at the intersection of Kuhio Avenue and Namahana Street (Gosser and Collins 2014). No historic properties or human skeletal remains were recorded during the project.

3.2.18 Pammer et al. 2014

In 2014, CSH conducted an AIS for the proposed 2139 Kūhiō Avenue project (Pammer et al. 2014). This investigation identified wetland sediments (SIHP # -5796) consistent with those identified by Yucha et al. (2009). The wetland sediments were encountered in 24 of the 26 trenches (excluding Trenches 16 and 17) and generally consisted of dark gray clay or sandy clay containing freshwater snail shells and, in some instances, a peat-rich layer. The investigation also identified a pond (Feature A) and a berm (Features B–E), which were considered components of the SIHP # -5796 wetland surface. Jaucas sand deposits were absent within the project area.

Several wetland sediment (SIHP # -5796) samples were taken from Trench 14 for radiocarbon, snail, and pollen analyses. The upper portion (Stratum IIa) of SIHP # -5796 in Trench 14 yielded a 2-sigma calibrated date range of AD 1790 to 1950 (52.5% probability), while the lower portion (Stratum IIb) yielded a 2-sigma calibrated date range of AD 1480 to 1650 (95.4% probability). A sample of the pond sediment (Stratum IId) in Trench 14 yielded a 2-sigma calibrated date range of AD 1800 to 1930 (70.2% probability). Snail analysis identified both native and introduced species of freshwater snails in the lower wetland sediments (Stratum IIb) from Trench 14. Meanwhile, the pollen analysis of the wetland sediments identified an abundance of sedges and grasses, typical of a marshland environment. Based on the results of the pollen and radiocarbon analyses, the study concluded the wetland surface may have been utilized for taro cultivation.

3.2.19 Lima et al. 2014

Between September 2012 and March 2013, CSH conducted archaeological monitoring for the Waikīkī Sewer Rehabilitation project (Lima et al. 2014). No cultural deposits were identified during monitoring. The project area's subsurface deposits appear to have been disturbed by past land use, which likely included extensive earth-moving activity and importation of fill sediments into the project area.

3.2.20 Morriss and Hammatt 2015

In 2014, CSH conducted an AIS for the proposed Beachwalk Wastewater Pumping Station project (Morriss and Hammatt 2015). This investigation identified wetland sediments (SIHP # -5796) consistent with those identified by previous studies, located beneath several layers of imported fill, including crushed coral and hydraulic-dredged marine sediments. The wetland sediments were encountered in all five test excavations (TE 1–5) and generally consisted of very dark grayish brown or dark gray silty clay and loamy clay. In general, the wetland sediments were either overlying a gravelly marine clay, or they were directly atop the coral shelf. They were encountered at an average depth of between 1.96 and 2.59 m below surface.

3.3 Background Summary and Predictive Model

During the pre-Contact period, Waikīkī was a center of population, chiefly residence, and political power on O‘ahu. Beginning in the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. Following Western Contact, Waikīkī went through a period of depopulation as a result of Honolulu's rise to preeminence and the devastating effects of western diseases. Traditional land uses in Waikīkī continued up until the end of the nineteenth century when the coastal fishponds were finally filled in and the remaining taro fields were planted with rice.

Development of the Kālia area of Waikīkī rapidly gained momentum in the twentieth century. In particular, the development of the Ala Wai Canal, Fort DeRussy military reservation, major vehicular thoroughfares (including Waikīkī Road, later renamed Kalākaua Avenue) dramatically changed the landscape of the project area.

Previous archaeology indicates much of the sediments in the area are fill deposits related to the construction of the Ala Wai Canal during the 1920s. Subsurface cultural deposits identified in the vicinity of the project area include human burials, pre- and post-Contact cultural layers, buried fishponds, ditches, and other remains of extensive wetland agriculture, trash pits, and construction debris. Natural wetland sediments (SIHP # -5796) dated to the pre- and post-Contact periods were identified below crushed coral and hydraulic fill deposits in areas adjacent to the current project area. These sediments are likely to be encountered throughout the present project area.

The LCA information for the project area suggests the entire Waikīkī Kai portion of the project area was interlaced with *loko* and *'auwai* and utilized for the purpose of watering individual taro patches. These practices are seen to be a continuance of traditional Hawaiian farming techniques known from ancient times. All of the claimants had residences elsewhere in the vicinity. The single house lot documented in the project area belonged to Nihopuu, but he had been residing in a different house lot close to the ocean. Land Grants were awarded to Chinese farmers in the Waikīkī Waena portion of the project area, suggesting the trend for converting former taro lands to rice lands was already occurring by the 1880s. Banana trees are a common component of these wetland environments, but there is no evidence to suggest there were large tracts of banana farms in the area prior to the late nineteenth century banana farms previously described. The banana farms are most likely associated with the trend of converting idle taro lands by Chinese farmers.

Historic accounts and background research indicate the project area was filled in with crushed coral and hydraulic fill in the 1920s during the construction of the Ala Wai Canal. Thus, background research suggests a high probability of encountering historic land reclamation deposits as well as wetland and/or agricultural sediments, or components of SIHP # -5796.

Section 4 Results of Fieldwork

4.1 Pedestrian Inspection Results

A 100%-coverage pedestrian inspection of the project area was undertaken for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps. The project area is located in an entirely modified landscape in which the original wetlands have been filled in and surfaced with paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks. The project area is located in a completely urbanized setting, mostly along road ways with portions of the Ala Wai Neighborhood Park and Ala Wai Elementary School also included. A portion of SIHP # -9757, Ala Wai Canal, was identified in the project area.

4.2 Subsurface Testing Results

The subsurface testing program consisted of ten excavations, including five shovel test pits (STP-1 through STP-5) and five backhoe-assisted test excavations (T-1 through T-5) that were completed and documented as part of the proposed project's compliance with HRS §6E-42 and HAR §13-284, and to fulfill requirements of HAR §13-276. Test excavations were undertaken in order to identify any subsurface historic properties and to document stratigraphy. Four of the five STPs were located in the manicured grassy areas along the Ala Wai Canal, with the remaining STP located at the extreme northwest portion of the project area at the intersection of University Avenue and Kapi'olani Boulevard. Four of the five backhoe-assisted test excavations were located within active roadways on the *makai* side of Ala Wai Canal, with the remaining backhoe-assisted test excavation located on the *mauka* side of the Ala Wai Canal along Hihiwai Street. The testing program examined historic and modern fill layers as well as underlying natural deposits. These test excavation locations are shown in Figure 33.

The stratigraphy in each test excavation was drawn and photographed. The sediments were described using standard USDA soil description observations and terminology. Sediment descriptions include Munsell color, texture, consistence, structure, plasticity, cementation, origin of sediments, descriptions of any inclusions such as cultural material and/or roots and rootlets, lower boundary distinctiveness and topography, and other general observations. Where historic cultural features were exposed (i.e., wetland features designated SIHP # -5796 documented in T-1 through T-3, T-5 and STP-3 through STP-5), the exposed extent of each feature was depicted on the test excavation profiles. The fieldwork results of this AIS subsurface testing program are presented below.

The general stratigraphy observed consists of a modern asphalt surface and associated base course or modern landscape A horizon, overlying generic fills, overlying early twentieth century land reclamation fills (crushed coral and hydraulic [dredged] fill), overlying a buried A horizon (SIHP # - 5796) , overlying a C horizon.

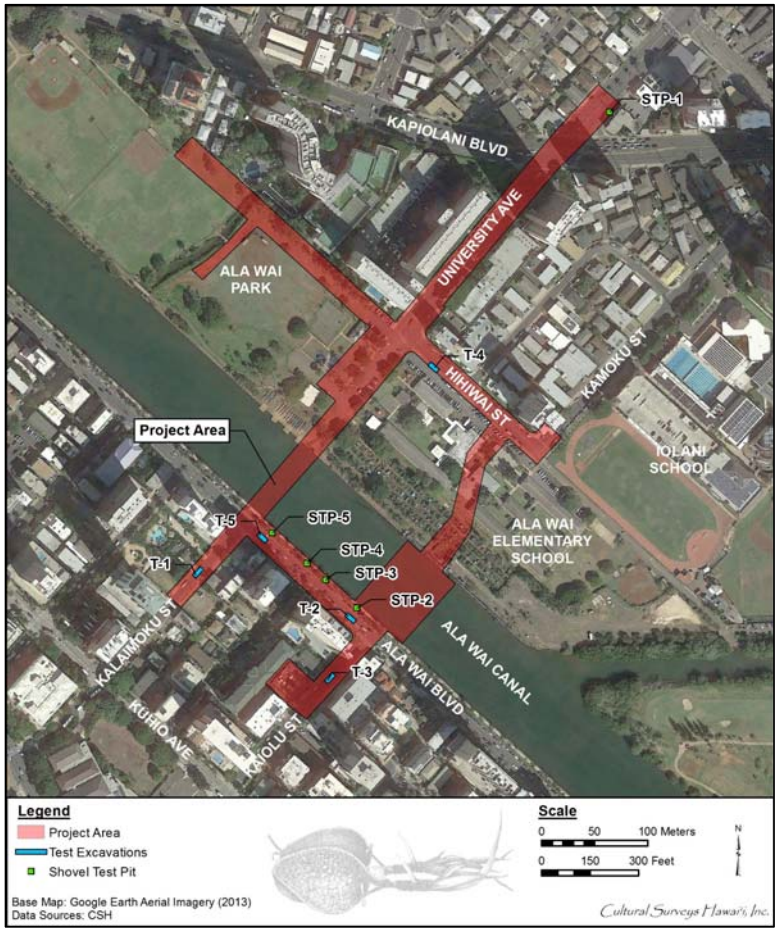


Figure 33. A 2013 aerial photograph (Google Earth) showing the location of the test trenches within the project area

4.2.1 Trench 1 (T-1)

T-1 is a linear trench located on the northwest side of Kalaimoku Street, southwest of the intersection with Ala Wai Boulevard. T-1 is oriented northeast-southwest and measures 6 m long by 0.65 m wide. The water table was encountered at 115 cmbs, the base of excavation was determined by the hard coral shelf found at 90 cmbs on the northeast end, and 145 cmbs on the southwest end.

The stratigraphy of T-1 consists of the asphalt surface (Stratum I), and associated very gravelly sand base course (Stratum II), over deposits of extremely cobbly sand crushed coral reclamation fill (Stratum III) and silty clay hydraulic (dredged) reclamation fill (Stratum IV), overlying a clay loam O horizon (Stratum V), and a sandy clay C horizon (Stratum VI) observed below water table in the southwest portion of the trench (Figure 34, Figure 35, and Table 3). The coral shelf is much higher in the northeast portion of T-1 (90 cmbs) than the southwest portion (145 cmbs).

The excavation of T-1 documented an O horizon (Stratum V) that included decomposed organic material, black humus, marine shell, and one *kukui* nut fragment. A C horizon composed of marine sand was observed in the southwest end of the trench, just above the coral shelf, before it was inundated by the water table. Three column samples (S-1 through S-3) and one bulk sample (BS-1) were collected from Stratum V. The three column samples collected from T-1 were submitted for pollen and radiocarbon analysis. The results can found in Section 5.2.

4.2.1 Trench 2 (T-2)

T-2 is a linear trench located in the middle lane of Ala Wai Boulevard, northwest of the intersection with Kaiolu Street. T-2 is oriented northwest-southeast and measures 6 m long by 0.8 m wide. The water table was encountered at 130 cmbs, and base of excavation for the southeast portion of the trench was excavated slightly lower than the northwest portion, at 140 cmbs and 125 cmbs, respectively.

The stratigraphy of T-2 consists of an asphalt surface (Stratum I) with an associated base course of extremely gravelly sand (Stratum II), over reclamation fill layers consisting of sandy loam with crushed coral (Stratum III) and silty clay loam hydraulic (dredged) fill (Stratum IV), overlying a clay loam O horizon (Stratum V) which extends into the water table (Figure 36, Figure 37, and Table 4).

The excavation of T-2 documented an O horizon of decomposing natural wetland material. Three column samples (S-3 through S-6) and one bulk sample (BS-2) were collected from Stratum V. The three column samples collected from T-2 were submitted for pollen and radiocarbon analysis. The results can found in Section 5.2.

4.2.2 Trench 3 (T-3)

T-3 is a linear trench located on the northwest side of Kaiolu Street, southwest of the intersection with Ala Wai Boulevard. T-3 is oriented northeast-southwest and measures 6.2 m long by 0.65 m wide. The water table was encountered at 125 cmbs and determined the base of excavation.

The stratigraphy of T-3 consists of an asphalt surface (Stratum I) and associated extremely gravelly sand base course (Stratum II), over reclamation fill deposits of extremely gravelly sandy loam crushed coral (Stratum III) and loamy sand hydraulic (dredged) fill (Stratum IV), overlying

a silty clay A horizon (Stratum V) that extends to the water table (Figure 38, Figure 39, and Table 5).



Figure 34. Photograph of T-1 southeast wall, view to east

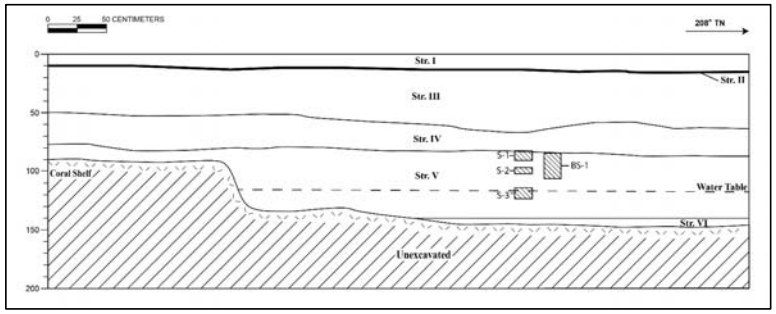


Figure 35. Profile of T-1 southeast wall.

Table 3. Stratigraphic Description of T-1

Stratum	Depth (cmbs)	Description
I	0–10	Asphalt
II	10–12	Base course; 2.5Y 2/1, black; very gravelly, sand; structureless (single-grain); moist, loose consistence; non-plastic; no cementation; terrigenous origin; clear, irregular lower boundary
III	10–64	Fill; 10YR 5/4, yellowish brown; extremely cobbly fine sand; structureless (single grain); dry, loose consistence; non-plastic; no cementation; marine origin; abrupt, wavy lower boundary; sand with crushed coral cobbles, consistent with crushed coral land reclamation fill
IV	50–82	Hydraulic fill; 10Y 3/1, very dark greenish gray; silty clay; structureless (massive); wet, slightly sticky consistence; very plastic; no cementation; mixed origin; very abrupt, smooth lower boundary; hydraulic (dredged) silty clay fill material consistent with land reclamation
V	78–140	O horizon; 10YR 2/1, black; clay loam; structureless (massive); wet, slightly sticky consistence; very plastic; no cementation; mixed origin; lower boundary not visible; common, fine roots; decomposed organic material, black humus; marine shell and inclusion (eolian), one *kukui* nut fragment (collected)
VI	140–145 (BOE)	C horizon; 2.5Y 3/1, very dark gray; sandy clay; weak, medium, blocky structure; wet, non-sticky consistence; no cementation; slightly plastic; marine origin; lower boundary not visible; few fine roots; marine sand underlying thick organic horizon



Figure 36. Photograph of T-2 southwest wall, view to south

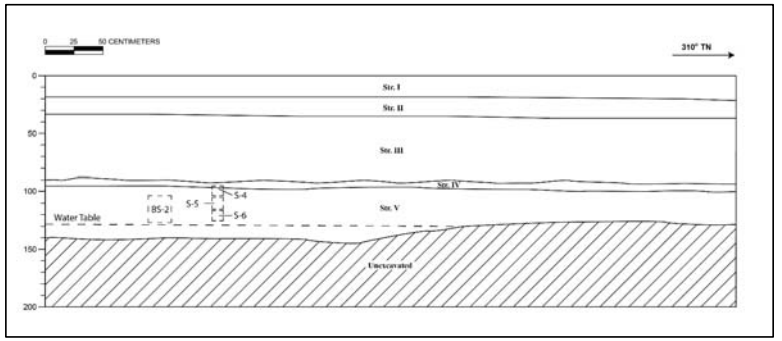


Figure 37. Profile of T-2 southwest wall

Table 4. Stratigraphic Description of T-2

Stratum	Depth (cmbs)	Description
I	0–20	Asphalt
II	20–35	Base course; 10YR 4/2, dark grayish brown; extremely gravelly, sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; terrigenous origin; abrupt, smooth lower boundary
III	35–90	Fill; 10YR 5/3, brown; sandy loam; structureless (single grain); moist, loose consistence; no cementation; non-plastic; marine origin; abrupt, smooth lower boundary; sand with crushed coral cobbles, consistent with crushed coral reclamation fill
IV	90–97	Hydraulic fill; 10Y 5/1, greenish gray; silty clay loam; structureless (massive); wet, slightly sticky consistence; non-plastic; no cementation; mixed origin; abrupt, smooth lower boundary; hydraulic (dredged) silty clay consistent with land reclamation fill
V	97–140 (BOE)	O horizon; 10YR 2/1, black; clay loam; structureless (massive); wet, sticky consistence; slightly plastic; no cementation; mixed origin; lower boundary not visible; few, fine rootlets; decomposed organic material, black humus; snail shells present



Figure 38. Photograph of T-3 southeast wall, view to southeast

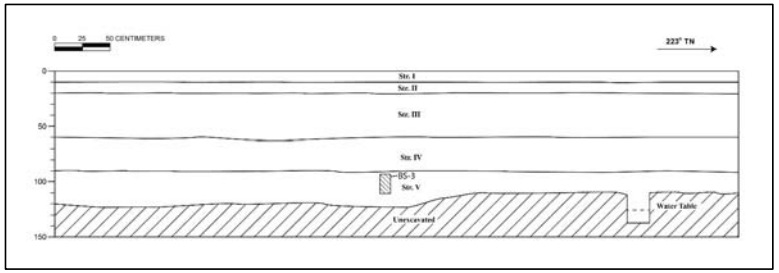


Figure 39. Profile of T-3 southeast wall

Table 5. Stratigraphic Description of T-3

Stratum	Depth (cmbs)	Description
I	0–10	Asphalt
II	10–20	Base course; 10YR 8/1, white; extremely gravelly sand; structureless (single grain); non-plastic; no cementation; terrigenous origin; very abrupt, smooth lower boundary; imported manufactured coral base course
III	20–60	Fill; 10YR 4/3, brown; extremely gravelly sandy loam; weak, very fine granular structurele; moist, loose consistence; non-plastic; no cementation; marine origin; very abrupt, smooth lower boundary; sand with crushed coral cobbles, consistent with crushed coral reclamation fill
IV	60–90	Hydraulic fill; 10 YR 4/3, brown; loamy sand; weak, very fine, platy structure; moist, loose consistence; non-plastic; no cementation; mixed origin; very abrupt, smooth lower boundary; hydraulic (dredged) loamy sand fill material consistent with land reclamation, lower portions have higher clay content
V	90–137 (BOE)	A horizon; 5GY 3/1, very dark greenish gray; silty clay; structureless (massive); moist, firm consistence; plastic; no cementation; mixed origin; lower boundary not visible; buried A horizon, natural wetland soils with high organic concentration

The excavation of T-3 documented a thick buried A horizon (Stratum V) consisting of natural wetland soils with a high organic concentration that extends to the water table. One bulk sample (BS-3) was collected from Stratum V.

4.2.3 Trench 4 (T-4)

T-4 is a linear trench located on the southwest side landscaped sidewalk area of Hihiwai Street, between the intersections with University Avenue and Lauiki Street. T-4 is oriented northwest-southeast and measures 6.2 m long by 0.65 m wide. The water table was encountered at 108 cmbs and determined the base of excavation.

The stratigraphy of T-4 consists of a silt loam modern A horizon (Stratum I) and associated extremely gravelly silt loam base course (Stratum II), over a very gravelly loamy sand fill lens (Stratum III) only observed on the ‘Ewa end of T-4, over a gravelly sandy clay loam fill of reworked alluvium (Stratum IV) also observed only on the ‘Ewa end of the trench, over discrete patches of a reworked sandy clay loam fill (Stratum VI), a natural sandy clay loam alluvium (Stratum V) on the Diamond Head side of T-4, over a sandy clay loam natural sediment (Stratum VII) (Table 6).

The excavation of T-4 documented a disturbance in the northwest portion of the trench. Modern/historic artifacts were identified in Stratum IV and Stratum VI including a U.S. nickel, tile fragments (collected), and glass fragments (not collected). The southeast end of the trench documented a natural alluvium (Stratum V), over a small protrusion of natural sediment (Stratum VII). There were no artifacts observed in the southeast end of T-4. No sediment samples were collected from T-4.

4.2.1 Trench 5 (T-5)

T-5 is a linear trench located in the middle lane of Ala Wai Boulevard, on the southeast side of the intersection with Kalaimoku Street. T-5 is oriented northwest-southeast and measures 6 m long by 0.8 m wide. The water table was encountered at 127 cmbs and determined the base of excavation.

The stratigraphy of T-5 consists of an asphalt surface (Stratum I) with an associated base course made up of extremely gravelly sand (Stratum II), over reclamation deposits of crushed coral sand fill (Stratum III) and sandy clay hydraulic (dredged) fill with crushed coral inclusions (Stratum IV), over top of a sandy clay loam O horizon of natural wetland sediment (Stratum V), overlying a natural deposit of lagoonal sand (Stratum VI) that extends into the water table (Figure 43, Figure 44, and Table 7).

The excavation of T-5 documented an O horizon (Stratum V) of decomposed organic wetland material, over a layer of lagoonal sand (Stratum VI) that extends to the water table. One bulk sample (BS-4) was collected from Stratum V.



Figure 40. Photograph of T-4 northeast wall, view to north



Figure 41. Photograph of T-4 northwest end of northeast wall, view to northeast

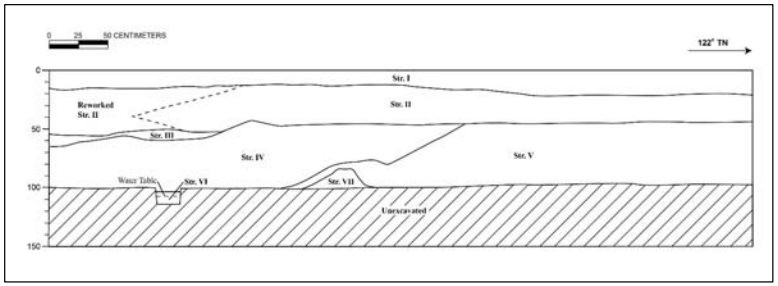


Figure 42. Profile of T-4 northeast wall

Table 6. Stratigraphic Description of T-4

Stratum	Depth (cmbs)	Description
I	0–25	A horizon; 7.5YR 3/3, dark brown; silt loam; weak, very fine, blocky structure; dry, weakly coherent consistence; slightly plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary; common, fine roots; modern landscaping sod
II	15–55	Base course; 10YR 3/3, dark brown; extremely gravelly silt loam; weak, very fine, blocky structure; dry, weakly coherent; slightly plastic; no cementation; mixed origin; wavy, irregular lower boundary; few, fine roots; base course associated with top soil, disturbed on the Ewa; gravels and cobbles
III	50–65	Fill; 10YR 5/4, yellowish brown; very gravelly loamy sand; weak, very fine, granular structure; moist, loose consistence; non-plastic; no cementation; mixed origin; abrupt, discointinuous lower boundary; fill lens in the ‘Ewa end of the trench, present on both sidewalls and the NW end wall; compact but not cemented; coral gravel inclusions
IV	45–104	Fill; 7.5YR 3/3, dark brown; gravelly sandy clay loam; moderate, fine, blocky structure; moist, friable consistence; slightly plastic; weak cementation; mixed origin; lower boundary not visible; reworked alluvium (Str. V) mixed with coral gravels and some basalt cobble and boulder inclusions, more sand content than Str. V. contains historic/ modern artifacts (stoneware fragments—collected, Acc. #s 01 and 02)
V	47–100	Natural; 10YR 3/4, dark yellowish brown; sandy clay loam; weak, very fine blocky structure; moist, friable consistence; slightly plastic; no cementation; terrigenous origin; lower boundary not visible; alluvium
VI	104–115 (BOE)	Fill; 7.5 YR 3/1, very dark gray; sandy clay loam; strong, meduim blocky structure; moist, firm consistence; plastic; no cementation; mixed origin; lower boundary not visisble; appears to be reworked natural material (Stratum VII), only occurs in broken patches; contains redoximorphic features, modern/historic artifacts (vinyl record fragment—collected, Acc. # 03), a small amount of marine shell fragments, and sand inclusions which appears to come from the above layer (Str.IV)
VII	86–100 (BOE)	Natural; 7.5 YR 3/1, very dark gray; sandy clay loam; strong, meduim blocky structure; moist, firm consistence; plastic; no cementation; mixed origin; lower boundary not visisble; natural sediment



Figure 43. Photograph of T-5 southwest wall, view to south

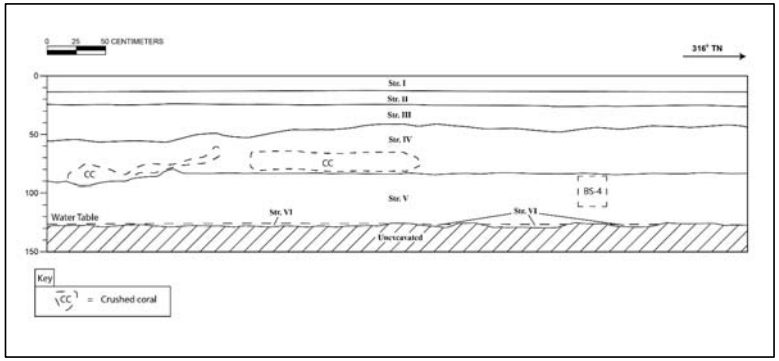


Figure 44. Profile of T-5 southwest wall

Table 7. Stratigraphic Description of T-5

Stratum	Depth (cmbs)	Description
I	0–14	Asphalt
II	14–25	Base course; 10YR 4/3, brown; extremely gravelly, sand; structureless (single-grain); moist, loose consistence; non-plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary
III	25–56	Fill; 10YR 6/3, pale brown; sand; structureless (single grain); moist, loose consistence; non-plastic; no cementation; marine origin; abrupt, wavy lower boundary; sand with crushed coral, consistent with crushed coral land reclamation fill
IV	40–90	Hydraulic fill; 10YR 6/4, light yellowish brown; sandy clay; structureless (massive); wet, slightly sticky consistence; non-plastic; no cementation; mixed origin; abrupt, irregular lower boundary; hydraulic (dredged) sandy clay fill material consistent with land reclamation with crushed coral inclusions; sand transitions to more sandy clay consistence at lower depths, 10YR 5/2, grayish brown
V	80–125	O horizon; 10YR 2/1, black; sandy clay loam; structureless (massive); wet, slightly sticky consistence; slightly plastic; no cementation; mixed origin; lower boundary not visible; few, fine roots; decomposed organic material, black humus; rocks and rootlets, one *kukui* nut fragment
VI	125–127 (BOE)	Natural sediment; 10YR 4/1, dark gray; sand; wet, non-sticky consistence; no cementation; non-plastic; marine origin; lower boundary not visible; lagoonal sand underlying thick organic horizon

4.2.2 Shovel Test Pit 1 (STP-1)

STP-1 is a 1 m by 0.5 m test pit located on the southeast side of University Avenue, northeast of the intersection with Kapiolani Boulevard. The water table was encountered at 96 cmbs and determined the base of excavation.

The stratigraphy of STP-1 consists of an asphalt surface (Stratum I), over a very cobbly sandy clay loam fill (Stratum II) that extends to the water table (Table 8). No sediment samples were collected from STP-1.

4.2.1 Shovel Test Pit 2 (STP-2)

STP-2 is a 0.5 m by 0.5 m test pit located in the grassy area on the northeast side of Ala Wai Boulevard, northwest of the intersection with Kaiolu Street. The water table was encountered at 104 cmbs and determined the base of excavation.

The stratigraphy of STP-2 consists of a sandy clay loam modern A horizon (Stratum I), over an extremely cobbly medium sand crushed coral reclamation fill (Stratum II), over a fine sand hydraulic (dredged) reclamation fill (Stratum III) that extends to the water table (Figure 47, Figure 48, and Table 9). No sediment samples were collected from STP-2.

4.2.1 Shovel Test Pit 3 (STP-3)

STP-3 is a 1 m by 0.5 m test pit located in the grassy area on the northeast side of Ala Wai Boulevard, southeast of the intersection with Launiu Street. The water table was encountered at 124 cmbs and determined the base of excavation.

The stratigraphy of STP-3 consists of a sandy clay loam modern A horizon (Stratum I), over a sandy loam fill (Stratum II), over a gravelly loamy sand fill (Stratum III), over a gravelly loamy sand fill (Stratum IV), over a sandy clay hydraulic (dredged) reclamation fill (Stratum V), over a sandy clay loam A horizon (Stratum VI), over a natural loamy sand (Stratum VII) that extends to the water table (Table 10).

The excavation of STP-3 documented a naturally deposited sediment (Stratum VII) that extends to the water table. One bulk sample (BS-5) was collected from the natural sediments (Strata VI–VII).

4.2.1 Shovel Test Pit 4 (STP-4)

STP-4 is a 1 m by 0.5 m test pit located in the grassy area on the northeast side of Ala Wai Boulevard, northwest of the intersection with Launiu Street. The water table was encountered at 150 cmbs and determined the base of excavation.

The stratigraphy of STP-4 consists of a gravelly loamy sand modern A horizon, over a gravelly sand land reclamation fill (Stratum II), over a silty clay hydraulic pump dredge fill (Stratum III), over a sandy loam A horizon (Stratum IV), over a natural sandy clay (Stratum V) that extends to the water table (Figure 51, Figure 52, and Table 11).



Figure 45. Photograph of STP-1 and its contents, view to southeast

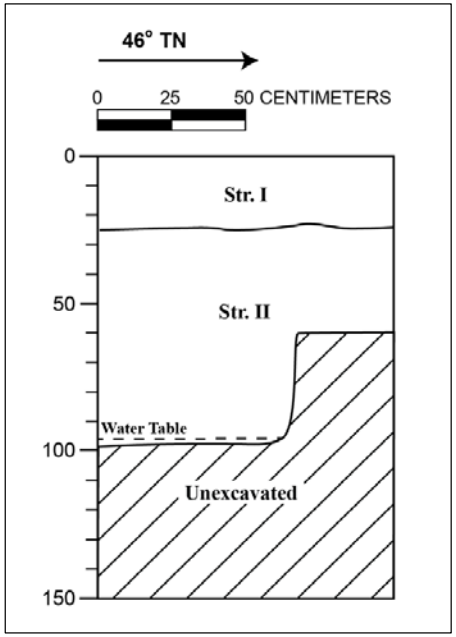


Figure 46. Profile of STP-1 northwest wall

Table 8. Stratigraphic Description of STP-1

Stratum	Depth (cmbs)	Description
I	0–25	Asphalt
II	25–97 (BOE)	Fill; 7.5YR 4/2, brown; very cobbly sandy clay loam; weak, very fine granular structure; wet, slightly sticky consistence; plastic; no cementation; mixed origin; lower boundary not visible; grading base course material



Figure 47. Photograph of STP-2 southwest wall, view to southwest

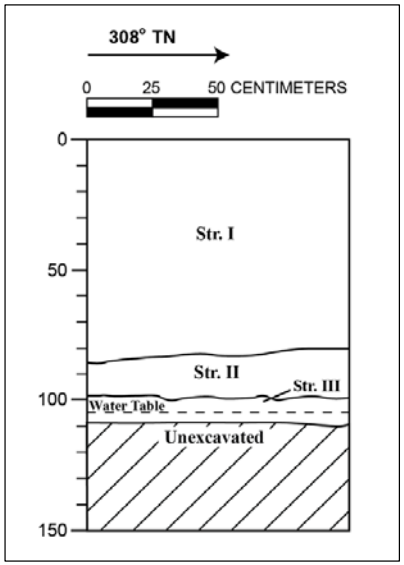


Figure 48. Profile of STP-2 southwest wall

Table 9. Stratigraphic Description of STP-2

Stratum	Depth (cmbs)	Description
I	0–85	A horizon; 5YR 3/3, dark reddish brown; sandy clay loam; moderate, medium, blocky structure; moist, firm consistence; plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary; many, medium roots; modern landscaping sod
II	80–99	Fill; 10YR 7/3, very pale brown; extremely cobbly medium sand; structureless (single grain); moist, loose consistence; non-plastic; no cementation; marine origin; diffuse, smooth lower boundary; common, fine roots; crushed coral fill consistent with land reclamation
III	99–104 (BOE)	Hydraulic fill; 10YR 6/3, pale brown;fine sand; structureless (single grain); moist, loose consistence; non-plastic; no cementation; marine origin; lower boundary not visible; hydraulic (dredged) sand fill material consistent with land reclamation



Figure 49. Photograph of STP-3 northeast wall, view to northeast

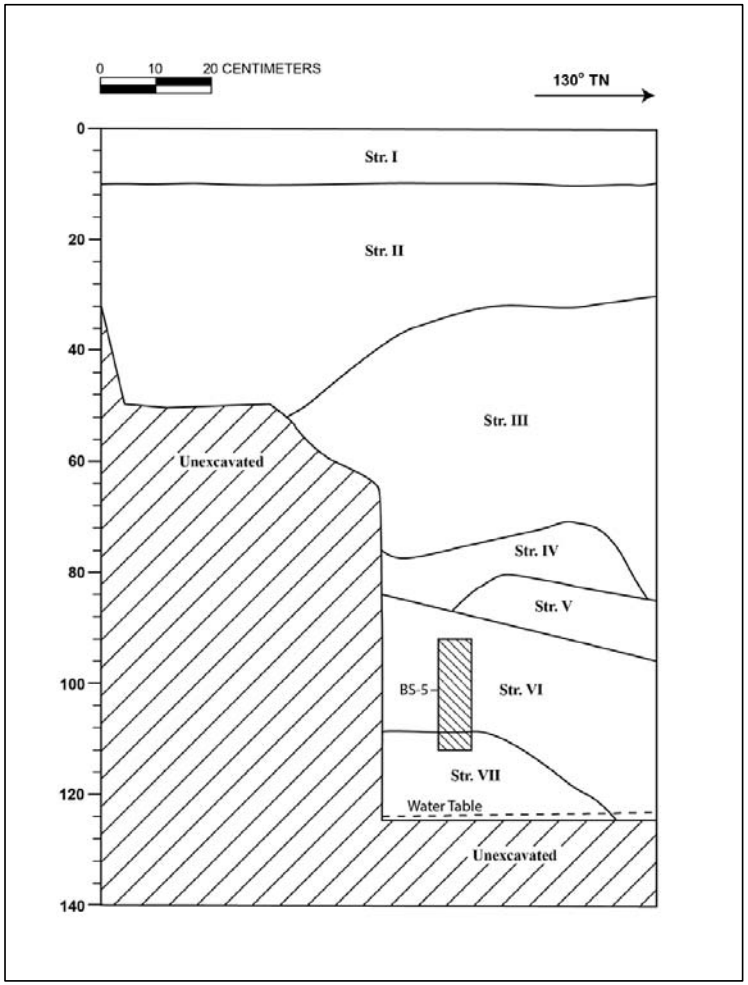


Figure 50. Profile of STP-3 northeast wall

Table 10. Stratigraphic Description of STP-3

Stratum	Depth (cmbs)	Description
I	0–10	A horizon; 7.5YR 3/4, dark brown; sandy clay loam; moderate, medium, blocky structure; moist, firm consistence; plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary; common, fine roots; modern landscaping sod
II	10–52	Fill; 7.5YR 4/4, brown; sandy loam; weak, fine, blocky structure; moist, friable consistence; slightly plastic; no cementation; terrigenous origin; clear, irregular lower boundary; common, fine roots; general fill, appears to be related to the installation of an irrigation pipe encountered in stratum
III	30–85	Fill; 10YR 5/4, yellowish brown; gravelly loamy sand; weak, fine, blocky structure; moist, friable consistence; slightly plastic; no cementation; mixed origin; clear, irregular lower boundary; common, coarse roots; appears to be mixed fill post-depositionally disturbed with loam mixed in, most likely redeposited natural material mixed with sand and crushed coral cobbles
IV	71–87	Fill; 10YR 7/3, very pale brown; gravelly loamy sand; weak, fine, granular structure; moist, loose consistence; non-plastic; weak cementation; mixed origin; abrupt, irregular lower boundary; few, fine roots; truncated fill, possibly related to land reclamation based on sediment content and hydraulic dredge fill below
V	80–96	Hydraulic fill; 10 YR 6/3, pale brown; sandy clay; structureless (massive); wet, non-sticky consistence; slightly plastic; no cementation; marine origin; very abrupt, irregular lower boundary; few, medium roots; truncated hydraulic (dredged) fill, associated with land reclamation; sediment is a brown color as opposed to typical beige or blue-gleyed color
VI	84–125	A horizon; 10YR 3/2, very dark grayish brown; sandy clay loam; structureless (massive); wet, sticky consistence; plastic; no cementation; terrigenous origin; abrupt, irregular lower boundary; appears to be disturbed natural, organically rich A horizon; no humus observed so not designated as an O horizon; no decomposing organic odor detected; for such a high loam content the stratum was massive, thick, and sticky as opposed to firm and blocky. This stratum was truncated on all side walls except for the NE wall. A fence picket extended out from the north corner at 115 cmbs near one of the disturbed lateral boundaries.
VII	109–125 (BOE)	Natural; 10YR 5/6, yellowish brown; loamy sand; structureless (massive); wet, slightly sticky consistence; slightly plastic; no cementation; mixed origin; most likely a C horizon; slightly sticky but also massive; perhaps if it were moist or dry it would retain more structure



Figure 51. Photograph of STP-4 northeast wall, view to northeast

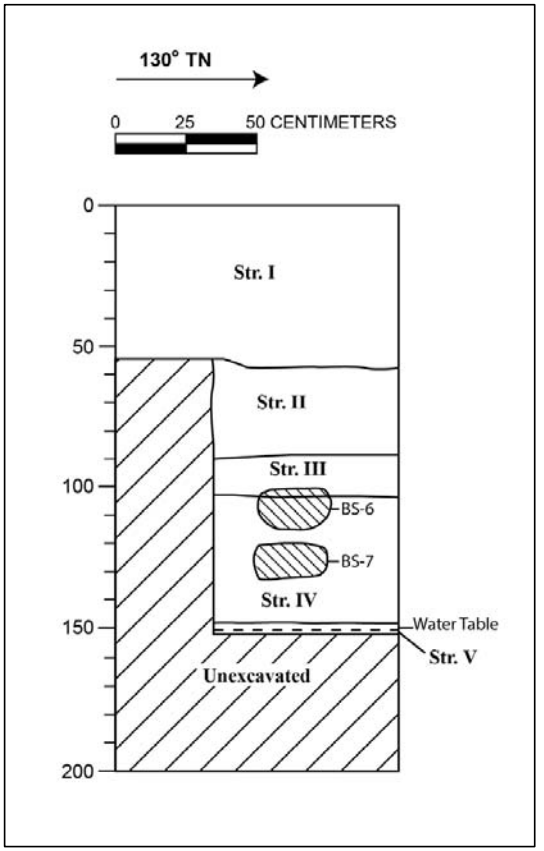


Figure 52. Profile of STP-4 northeast wall

Table 11. Stratigraphic Description of STP-4

Stratum	Depth (cmbs)	Description
I	0–57	A horizon, 10YR 3/3, dark brown; gravelly loamy sand; weak, fine, granular structure; moist, loose consistence; slightly plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary; common, fine roots; modern landscaping sod
II	57–90	Fill; 10YR 5/4, yellowish brown; gravelly sand; weak, very fine granular structure; moist, loose consistence; non-plastic; no cementation; mixed origin; abrupt, smooth lower boundary; common, fine roots; generic fill associated with land reclamation
III	89–103	Hydraulic fill; 10YR 6/3, pale brown; silty clay; structureless (massive); wet, slightly sticky consistence; slightly plastic; no cementation; marine origin; very abrupt, smooth lower boundary; hydraulic (dredged) reclamation fill, possibly collected closer to land, much more brown than the typical pump dredge; oxidation staining; sandy clay that transitions to silty clay
IV	102–148	A horizon; 10YR 3/1, very dark gray; sandy loam; strong, medium, blocky structure; moist, friable consistence; plastic; no cementation; terrigenous origin; clear, smooth lower boundary; common, fine roots; A/O horizon; same natural organic deposit as STP 3; *kukui* nut collected; appreciable amount of brackish water snails; more sand content than STP-3; very tiny roots observed; decomposing organic odor detected
V	148–153 (BOE)	Natural; 2.5Y 3/1, very dark gray; sandy clay; weak, medium blocky structure; wet, non-sticky consistence; slightly plastic; no cementation; mixed origin; lower boundary not visible; few, fine roots; most likely C horizon; similar to lowest deposit in T-1; differs from lowest deposit in STP-3; more sand content and more of a bluish gray brown

The excavation of STP-4 documented an organic rich A horizon (Stratum IV) that contained a *kukui* nut (collected), brackish water snails, and had a higher sand content than the A horizon sediment from STP-3, over a natural sediment (Stratum V) that also contained a higher sand content than the analogous natural sediment from STP-3, and extends to the water table. Two bulk samples (BS-6 and BS-7) were collected from Stratum IV.

4.2.2 Shovel Test Pit 5 (STP-5)

STP-5 is a 1 m by 0.5 m test pit located in the grassy area on the northeast side of Ala Wai Boulevard, southeast of the intersection with Kalaimoku Street. The water table was encountered at 130 cmbs and determined the base of excavation.

The stratigraphy of STP-5 consists of a silty clay loam modern A horizon (Stratum I), over a gravelly sandy clay loam fill (Stratum II), over a very gravelly sandy loam fill (Stratum III), over a very gravelly sandy clay construction fill (Stratum IV), over a sandy clay locally procured fill (Stratum V), over a medium sand fill lens (Stratum VI), over a sandy clay A horizon (Stratum VII), over a loamy sand C horizon (Stratum VIII) that extends to the water table (Table 12).

The excavation of STP-5 documented a naturally deposited wetland A horizon (Stratum VII), over a natural wetland marine sand C horizon (Stratum VIII) that extends to the water table. Two bulk samples were collected (BS-8 and BS-9), one from each of the natural sediment layers (Strata VII–VIII).



Figure 53. Photograph of STP-5 northwest wall, view to northwest

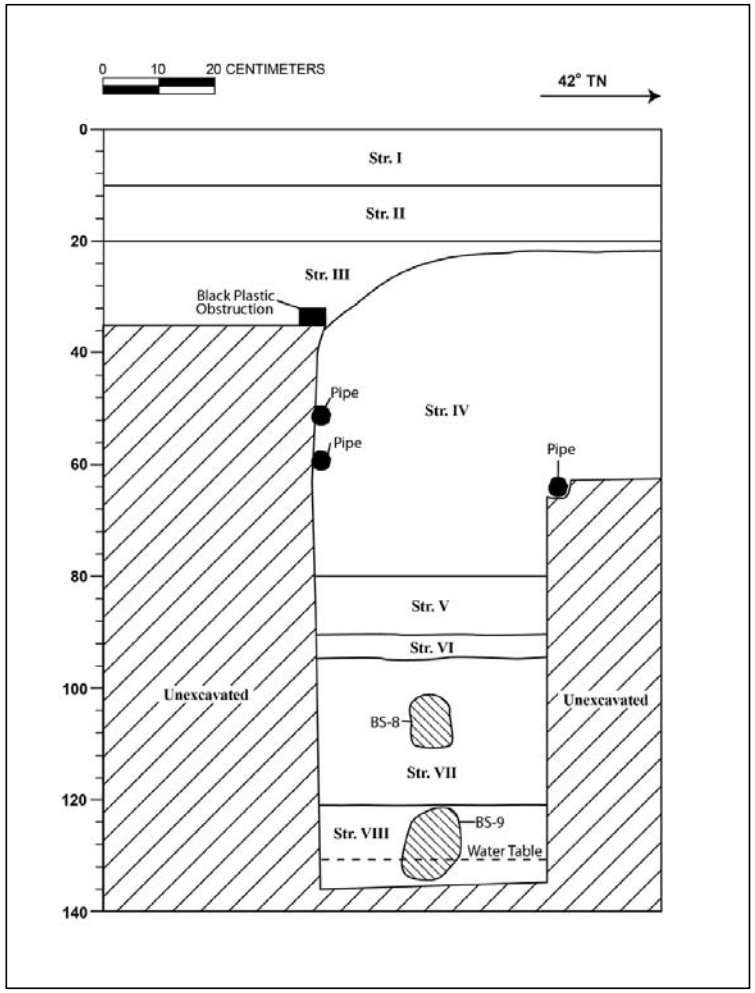


Figure 54. Profile of STP-5 northwest wall

Table 12. Stratigraphic Description of STP-5

Stratum	Depth (cmbs)	Description of Sediment
I	0–10	A horizon; 2.5YR 3/3, dark reddish brown; silty clay loam; weak, fine, blocky structure; moist, firm consistence; plastic; no cementation; terrigenous origin; abrupt, smooth lower boundary; many, fine roots; modern landscaping sod
II	10–20	Fill; 10YR 3/3, dark brown; gravelly sandy clay loam; weak, very fine, granular structure; moist, friable consistence; slightly plastic; weak cementation; mixed origin; clear, smooth lower boundary; many, medium roots; graded fill material deposited for planter construction
III	20–35	Fill; 7.5YR 4/4, brown; very gravelly sandy loam; weak, very fine granular structure; moist, loose consistence; slightly plastic; no cementation; mixed origin; clear, smooth lower boundary; common, medium roots; sub-grade material to raise the surface elevation
IV	22–80	Construction fill; 10YR 4/2, dark grayish brown; very gravelly sandy clay; weak, fine granular structure; moist, firm consistence; slightly plastic; no cementation; mixed origin; clear, smooth lower boundary; few, fine roots; backfill for utility
V	80–90	Fill; 10YR 3/1, very dark gray; sandy clay; weak, fine, granular structure; moist, firm consistence; plastic; no cementation; clear, smooth lower boundary; few, fine roots; locally procured and deposited to raise elevation
VI	90–94	Fill; 10YR 6/6, brownish yellow; medium sand; structureless (single grain); moist, loose consistence; non-plastic; no cementation; marine origin; abrupt, smooth lower boundary; few fine roots; thin sand lens deposited to level surface
VII	94–120	A horizon; 10YR 3/1, very dark gray; sandy clay; structureless (massive); moist, firm consistence; plastic; no cementation; mixed origin; abrupt, smooth lower boundary; many, fine roots; naturally deposited wetland soil
VIII	120–134 (BOE)	C horizon; 5BG 6/1, greenish gray; loamy sand; weak, very fine, granular structure; wet, slightly sticky consistence; no cementation; non-plastic; marine origin; lower boundary not visible; wetland marine sand

Section 5 Results of Laboratory Analysis

5.1 Historic Artifact Analysis

No traditional Hawaiian artifacts were encountered during AIS excavations. Representative historic artifacts were collected for further laboratory analysis, focusing primarily on attributes to provide a general time frame for the associated stratigraphy. Three artifacts were recovered during the course of fieldwork including two ceramic fragments and one record fragment. They are depicted in Figure 55 through Figure 57 and are listed in Table 13.

Ceramic vessels were analyzed for basic descriptions such as shape, paste, color, and designs. Shapes were designated as “flatware” (e.g., plates, shallow saucers) or “hollowware” (e.g., bowls, cups) when the exact type was unknown. When the fragment was too small to determine the general shape, the item is listed as “tableware” or “unknown.” The Florida Museum of Natural History (2014) maintains an internet site with a visual guide to historic ceramics. This website was used as the basis for attribute descriptions for paste, ware, background color, glaze, decoration, design motif, and rim motif. Their ceramic identification site divides paste type into “earthenwares,” “stonewares,” and “porcelains.” The terminology and dates for manufacturing or decoration techniques used in this section are from the Maryland Archaeological Conservation Lab (2012) internet site “Diagnostic Artifacts of Maryland,” or from Lebo (1997: Appendix G), unless otherwise noted. Acc. #s 1 and 2 are both stoneware fragments, with Acc. # 1 being a base fragment from an unknown vessel and Acc. # 2 being a body fragment from a large flat unknown vessel. Because of the lack of diagnostic features of the fragments, little else can be said about them.

Acc. # 3 is a record fragment. The ability to play back music was first introduced with the advent of the phonograph, invented by Thomas Edison in 1877. The first types of records Edison utilized were made of waxed paper, tinfoil, and later hollow wax cylinders. The first flat disc records were invented by Emile Berliner in 1889; he distinguished himself from Edison’s cylinders by calling his invention the gramophone (Welch and Burt 1997). By the turn of the century 10- and 12-inch records were invented, which could play for a longer time (3-4 minutes) than the older wax cylinders (1-2 minutes). The earliest records were made of hard rubber, with shellac records being introduced around 1895 (Welch and Burt 1997). The first vinyl records were invented in 1931 by RCA. The vinyl record became popular after World War II when the materials became more abundant (Welch and Burt 1997).

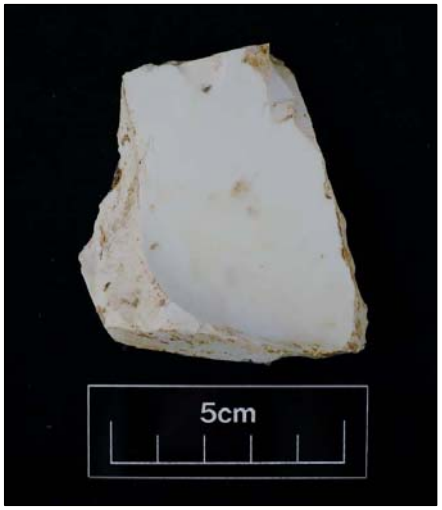


Figure 55. Acc. # 1, stoneware base



Figure 56. Acc. # 2, flat stoneware fragment

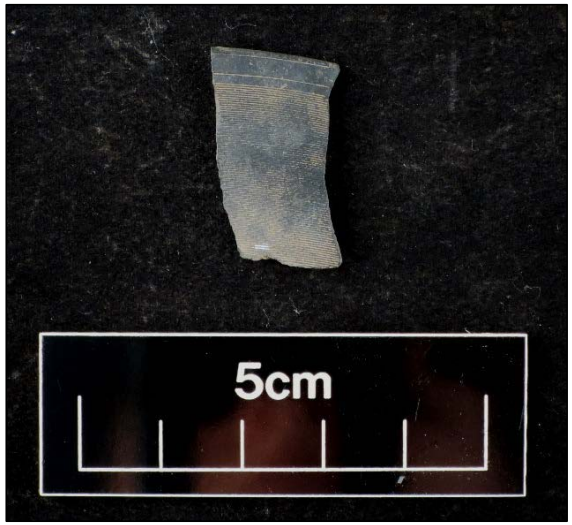


Figure 57. Acc. # 3, record fragment

Table 13. Summary of Historic Artifacts

Acc. #	Trench	Str.	Depth	Material	Type	Description	Weight (g)	Age
0001	4	IV	58-85	Ceramic	Household	Stoneware household vessel, base, transparent glaze	84.2	
0002	4	IV	58-85	Ceramic	Household	Stoneware flat fragment, transparent glaze on both sides	729.8	
0003	4	VI	104-115	Other	Record	Fragment of a pressed vinyl record	1.3	Post-1931

5.2 Sediment Sample Analysis

Sediment sample analysis included pollen analysis and radiocarbon analysis of samples collected from portions of SIHP # -5796 (buried former wetland) within T-1 (S-1 through S-3) and T-2 (S-4 through S-6).

5.2.1 Pollen Analysis

Six samples were submitted to EcoPlan Associates, Inc. of Flagstaff, AZ for pollen analysis. Three samples each were collected from T-1 and T-2 as column samples from Stratum V. The column samples were cut from the sidewall using a trowel and then cleanly separated in the CSH lab to properly prepare them for analysis.

The column samples collected from Stratum V represent the portions of the SIHP # -5796 wetland sediments observed throughout the Waikīkī Kai portion of the project area in varying thicknesses and textures. The six samples from Stratum V were examined to provide a depositional record of vegetation from the wetland sediments. A report was prepared by EcoPlan Associates (Phillips 2016). Below is the results and discussion section of the report. The full report can be found in Appendix B.

> All samples had enough identifiable pollen grains for 200-grain counts. Overall, 13 types of pollen and spores were identified. Sedge was dominant, comprising 50 percent or more of the assemblage in all samples. Grasses (both regular- and large-sized grains) and monolete fern spores were subdominants. In general, the composition of the assemblage reflected wetlands dominated by sedge. An abundance of regular-sized grass pollen grains potentially represented plant succession on landscapes cleared for agriculture or habitation and then abandoned (Gagne and Cuddihy 1990). *Niu* (coconut) was the only Polynesian introduction. No unequivocal historical introductions were identified. It is possible that common large grass pollen grains represented *laiki* (rice) and/or *ko* (sugarcane) farming in the area, or the collection of *pili* grass (*Heteropogon contortus*). In practice, *laiki*, *ko*, and *pili* grass have common traits under light microscopy and cannot be distinguished (Moore et al. 1990); SEM is required. Considering the traditional and historical land use of the area large grass pollen grains are considered either *laiki* or *ko*, although *pili* is also a possibility.
>
> Charcoal concentrations in Trench 1 were sporadic. At the base of the column (S-3), charcoal concentration was comparable to those of Trench 2. Then, a spike in charcoal (S-2) content suggested increase burning in the sample area. Afterward, a sharp decline in charcoal (S-1) indicated much reduced activity in the area. In contrast, charcoal concentrations within the Trench 2 sample column were consistent, suggesting regular land use in the area represented.
>
> In pre-contact early contact times, the wetlands along the O‘ahu coastline were ideal for traditional Hawaiian *kalo* (taro; *Colocasia*) farming in *lo‘i* pondfields. With the arrival of Europeans, sandalwood forests were harvested, grazing animals were introduced, and grasslands encroached on upland areas surrounding the project area. In the latter half of the 19th Century, Chinese and other foreign laborers were brought to the islands to support the growing sugar industry. To suite their tastes, many pond

fields were leased and turned to *laiki* cultivation in the 1880s. By the early decades of the 20th Century, *laiki* farming was on the decline. During this time, sugarcane became a major crop on suitable terrain beyond the wetlands. Around the 1920s, the area was filled with crushed coral and reclaimed dredge fill. Urbanization followed.

Historical documents indicate that the project was used at various times for growing *ko*, *laiki*, *kalo*, and *mai'a* (bananas; *Musa*). Although *kalo* and *mai'a* pollen grains were not found in the current analysis, this does not necessarily mean they were not grown in the area. This is due primarily to the ecology of both plants, but also the nature of farming (Onwueme 1999). First, *kalo* rarely blooms and sets seed naturally. Some varieties have never been known to flower. Furthermore, like other members of the Araceae (arum family), *kalo* produces relatively small quantities of pollen when in bloom. Second, *kalo* is harvested at a time when the edible corm has its highest nutritional content and is most viable for propagation. This occurs before flowering. *Mai'a* have sterile male flowers and produce no pollen (Kepler and Rust 2011). Rather, the plants propagate asexually by means of corms or "shoots". In contrast, grasses produce pollen in abundance. *Laiki* grains (rice) are the goal of cultivation and the plants gothrough an entire life cycle before harvest, potentially depositing large amounts of pollen in the surrounding sediments. Given the history of the location and suitability of the environment, it is possible that the large grass pollen grains in Stratum V represent *laiki* farming in the project area It is possible, however, that some of the large grass pollen grains blew in from *ko* fields surrounding the site.

Previously, Scott Cummings (2013) conducted pollen analysis on three samples from a trench along Kuhio Avenue, less than 200 m *makai* of Trenches 1 and 2 of the current project. Historic maps indicate bananas were farmed in the area. All samples were dominated by sedge pollen; grass pollen was subdominant. The data indicated that a sedge/grassland marsh was present during the interval represented by the samples. A single *kalo* pollen grain showed that taro was farmed at some point. Large grass grains were interpreted as *Saccharum*-type, suggesting *ko* fields either in the project area or nearby. These data are comparable to the current project pollen assemblage, particularly the dominance of sedge and grass pollen. Although no *kalo* pollen was found in the current analysis, the strong presence of large grass pollen grains indicates *ko* and/or *lakai* farming in the area, as was suggested by Scott-Cummings (2013).

Summary and Conclusions

Six samples from two trenches were analyzed. All samples contained sufficient amounts of pollen for 200-grain counts. The percentages of degraded grains were relatively low in all samples, suggesting that the data are a reasonably accurate representation of the original pollen assemblage.

Sedge pollen dominated all samples, reflecting the marshlands and fields described in historic accounts of the area. Subdominant were grass pollen of both regular- and large-sized grains. In both locations, sedge pollen percentages were consistent within the sampled columns, suggesting marsh environments persisted throughout

the time span represented by the samples. Varying grass pollen frequencies could reflect changing farming strategies and/or land use inand around the project area. The large grass pollen grains likely come from *ko* or *laiki*. A spike and then decline in charcoal concentration in the middle and upper portion of the sample column of Trench 1 reflects an increase in land clearance, possibly followed by a fallow period [Phillips 2016:2-4].

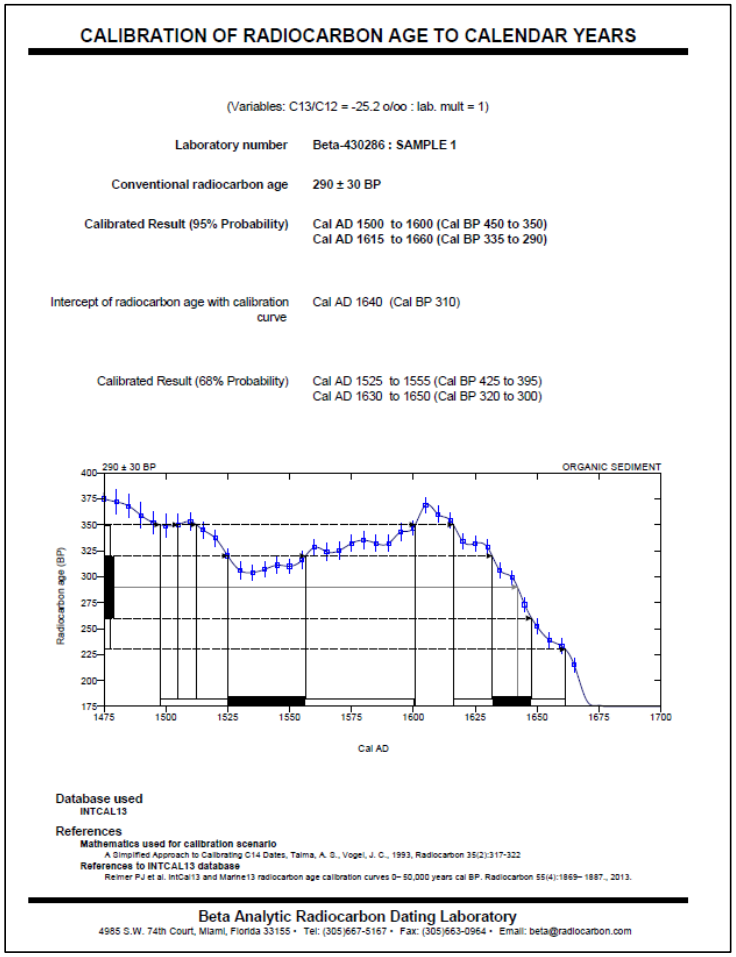
5.2.2 Radiocarbon Analysis

Six samples of organically enriched sediment collected from T-1 and T-2 (three samples from each) were sent to Beta Analytic, Inc. for radiocarbon dating using the accelerator mass spectrometry (AMS) method, in order to better establish the age range of occupation at the subsurface cultural layer. The samples were collected from SIHP # -5796, wetland sediments (Stratum V). Discrete column samples of Stratum V were collected from the trench sidewalls for submittal for both pollen and radiocarbon analysis.

Beta Analytic Sample 1 (S-1) collected from T-1 Stratum V consisted of organically rich material from the upper portion of the SIHP # -5796 wetland sediments, which was separated in the lab by Beta Analytic to isolate the organic materials. S-1 (Beta-430286) yielded three possible date ranges, with calibrated 2-sigma date ranges of AD 1490–1670 (95.4%) and 1520–1580 (45.7%) being the most probable (Figure 58 and Figure 59). These date ranges are well within the pre-Contact period, indicating pre-Contact activity associated with the upper boundaries of the SIHP # -5796, wetland sediments

Beta Analytic Sample 2 (S-2) collected from T-1 Stratum V consisted of organically rich material from the middle portion of the SIHP # -5796 wetland sediments, which was separated in the lab by Beta Analytic to isolate the organic materials. S-2 (Beta-430287) yielded seven possible date ranges, with a calibrated 2-sigma date range of AD 1720–1820 (50.7%) and AD 1730–1810 (41.9%) being the most probable (Figure 60 and Figure 61). These date ranges indicate post-Contact activity in the middle areas of the SIHP # 50-80-11-5796, wetland sediments. S-2 was taken from directly below S-1, which suggests post-Contact activities within this portion of the project area extended below the upper portion of wetland sediment (Stratum V) in the area. However, S-1, with an older date range, is overlying the post-Contact sediment (S-2) indicating evidence of post-Contact disturbance or continued use of Stratum V.

Beta Analytic Sample 3 (S-3) collected from T-1 Stratum V consisted of organically rich material from the lower portion of SIHP # -5796, and was separated in the lab by Beta Analytic to isolate the organic materials. S-3 (Beta-430288) yielded three possible date ranges, with calibrated 2-sigma date ranges of AD 1460–1640 (95.4%) and AD 1550–1640 (45.2%) being the most probable (Figure 62 and Figure 63). These date ranges are well within the pre-Contact period, indicating pre-Contact activity associated with the lower portion of the SIHP # -5796, wetland sediments. S-3 was taken from directly below S-2. The date ranges for the lower portion of SIHP # -5796 are slightly older than the pre-Contact date ranges of S-1, although the post-Contact date ranges for the middle portion (S-2) indicate some disturbance and continued use in the post-Contact era.



CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -25.2 o/oo : lab. mult = 1)

Laboratory number	Beta-430286 : SAMPLE 1
Conventional radiocarbon age	290 ± 30 BP
Calibrated Result (95% Probability)	Cal AD 1500 to 1600 (Cal BP 450 to 350) Cal AD 1615 to 1660 (Cal BP 335 to 290)
Intercept of radiocarbon age with calibration curve	Cal AD 1640 (Cal BP 310)
Calibrated Result (68% Probability)	Cal AD 1525 to 1555 (Cal BP 425 to 395) Cal AD 1630 to 1650 (Cal BP 320 to 300)

Database used
INTCAL13

References
Mathematics used for calibration scenario
A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322
References to INTCAL13 database
Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0– 50,000 years cal BP. Radiocarbon 55(4):1869– 1887., 2013.

Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

Figure 58. Radiocarbon dating results from T-1, Stratum V, the upper portion of SIHP # 50-80-11-5796, wetland sediments (S-1) (Beta Analytic, Inc.)

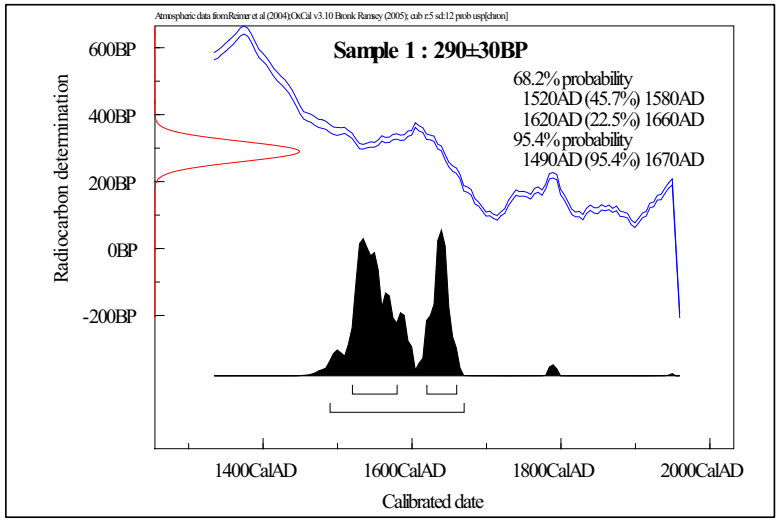
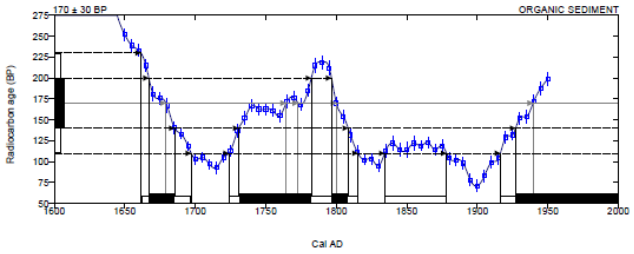


Figure 59. Calibrated radiocarbon dating results from T-1, Stratum V (upper portion), SIHP # 50-80-11-5796, wetland sediments (S-1) (OxCal 4.2)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -24.8 o/oo : lab. mult = 1)

Laboratory number	**Beta-430287 : SAMPLE 2**
Conventional radiocarbon age	**170 ± 30 BP**
Calibrated Result (95% Probability)	Cal AD 1660 to 1695 (Cal BP 290 to 255) Cal AD 1725 to 1815 (Cal BP 225 to 135) Cal AD 1835 to 1880 (Cal BP 115 to 70) Cal AD 1915 to Post 1950 (Cal BP 35 to Post 0)
Intercept of radiocarbon age with calibration curve	Cal AD 1680 (Cal BP 270) Cal AD 1765 (Cal BP 185) Cal AD 1775 (Cal BP 175) Cal AD 1800 (Cal BP 150) Cal AD 1940 (Cal BP 10) Post AD 1950 (Post BP 0)
Calibrated Result (68% Probability)	Cal AD 1665 to 1685 (Cal BP 285 to 265) Cal AD 1730 to 1780 (Cal BP 220 to 170) Cal AD 1795 to 1810 (Cal BP 155 to 140) Cal AD 1925 to Post 1950 (Cal BP 25 to Post 0)



Database used
INTCAL13

References
Mathematics used for calibration scenario
A Simplified Approach to Calibrating C14 Dates, Talma, A. G., Vogel, J. C., 1993, Radiocarbon 35(2):317-322
References to INTCAL13 database
Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0– 50,000 years cal BP. Radiocarbon 55(4):1869– 1887., 2013.

Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

Figure 60. Radiocarbon dating results from T-1, Stratum V, the middle portion of SIHP # 50-80-11-5796, wetland sediments (S-2) (Beta Analytic, Inc.)

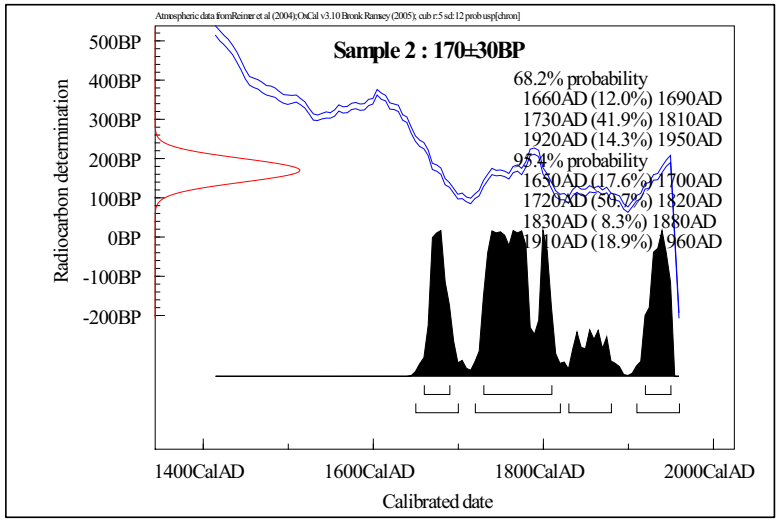


Figure 61. Calibrated radiocarbon dating results from T-1, Stratum V (middle portion), SIHP # 50-80-11-5796, wetland sediments (S-2) (OxCal 4.2)

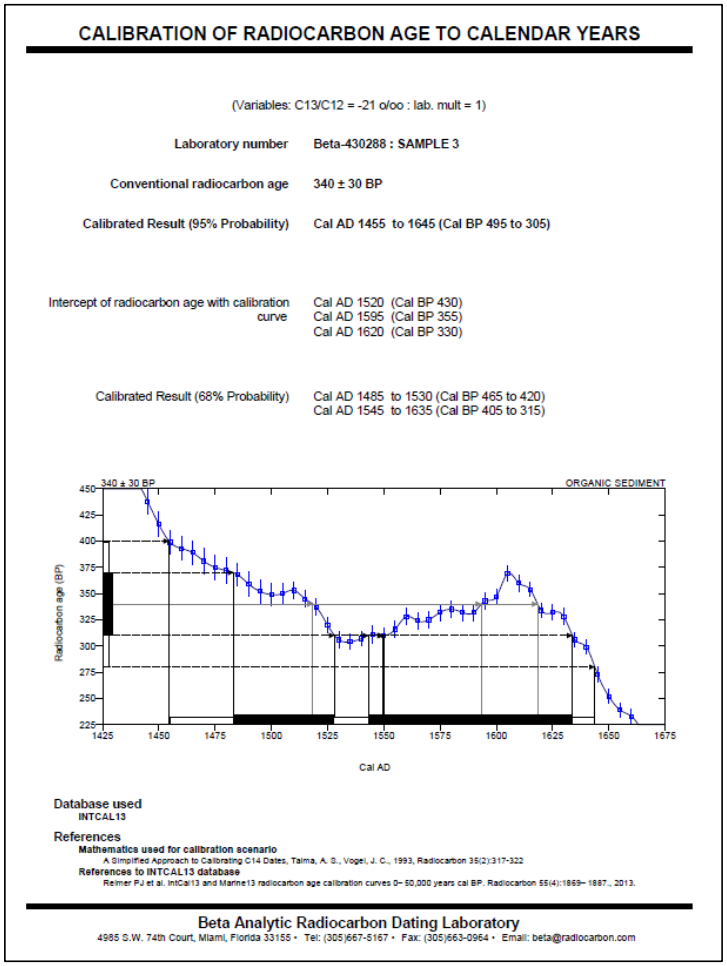


Figure 62. Radiocarbon dating results from T-1, Stratum V, the lower portion of SIHP # 50-80-11-5796, wetland sediments (S-3) (Beta Analytic, Inc.)

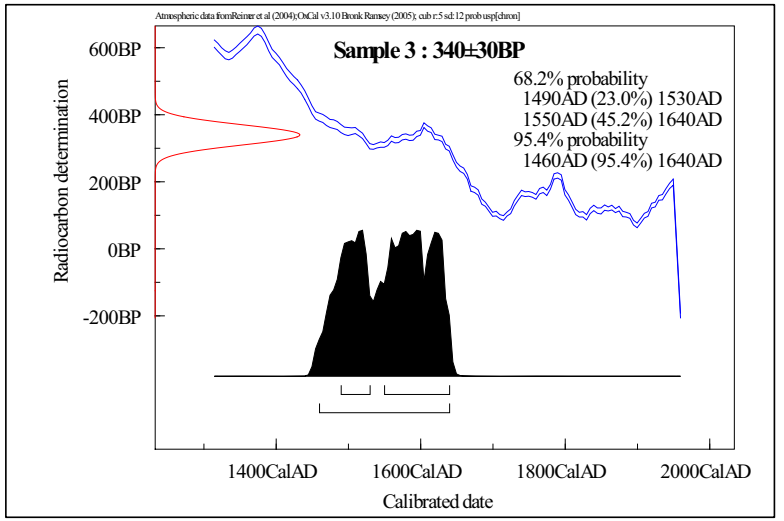


Figure 63. Calibrated radiocarbon dating results from T-1, Stratum V (lower portion), SIHP # 50-80-11-5796, wetland sediments (S-3) (OxCal 4.2)

Beta Analytic Sample 4 (S-4) collected from T-2 Stratum V consisted of organically rich material from the upper portion of the SIHP # -5796 wetland sediments, which was separated in the lab by Beta Analytic to isolate the organic materials. S-4 (Beta-430289) yielded three possible date ranges, with calibrated 2-sigma date ranges of AD 1390–1450 (85.1%) and AD 1400–1435 (68.2%) being the most probable (Figure 64 and Figure 65). These date ranges are well within the pre-Contact period, indicating pre-Contact activity associated with the upper boundaries of the SIHP # -5796, wetland sediments

Beta Analytic Sample 5 (S-5) collected from T-2 Stratum V consisted of organically rich material from the middle portion of the SIHP # -5896 wetland sediments, which was separated in the lab by Beta Analytic to isolate the organic materials. S-5 (Beta-430290) yielded three possible date ranges, with a calibrated 2-sigma date range of AD 1420–1520 (91.4%) and AD 1430–1470 (68.2%) being the most probable (Figure 66 and Figure 67). These date ranges are well within the pre-Contact period, indicating pre-Contact activity associated with the middle portion of the SIHP # -5796, wetland sediments. S-5 was taken from directly below S-4.

Beta Analytic Sample 6 (S-6) collected from T-2 Stratum V consisted of organically rich material from the lower portion of SIHP # -5796, and was separated in the lab by Beta Analytic to isolate the organic materials. S-6 (Beta-430291) yielded four possible date ranges, with calibrated 2-sigma date ranges of AD 1380–1440 (66.0%) and AD 1395–1430 (54.5%) being the most probable (Figure 68 and Figure 69). These date ranges are well within the pre-Contact period, indicating pre-Contact activity associated with the lower portion of the SIHP # -5796, wetland sediments. S-6 was taken from directly below S-5. The date ranges for the lower portion of SIHP # -5796 are slightly older than the pre-Contact date ranges of S-4 and S-5, indicating the material was not heavily disturbed and was utilized completely within the pre-Contact era, with no evidence for continued use or modification in the post-Contact era.

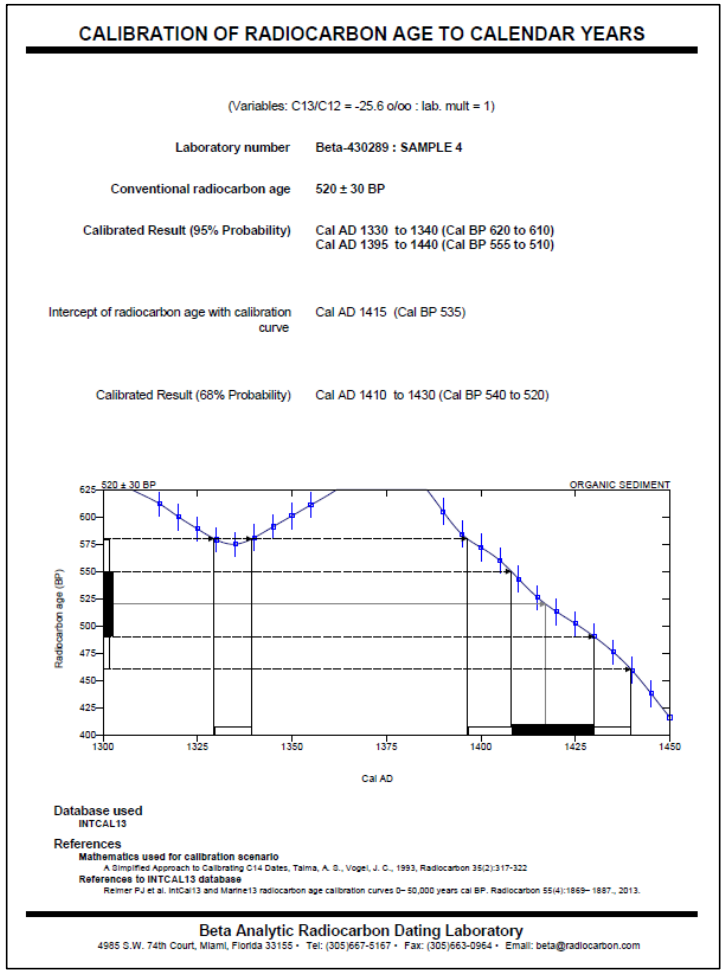


Figure 64. Radiocarbon dating results from T-2, Stratum V, the upper portion of SIHP # 50-80-11-5796, wetland sediments (S-4) (Beta Analytic, Inc.)

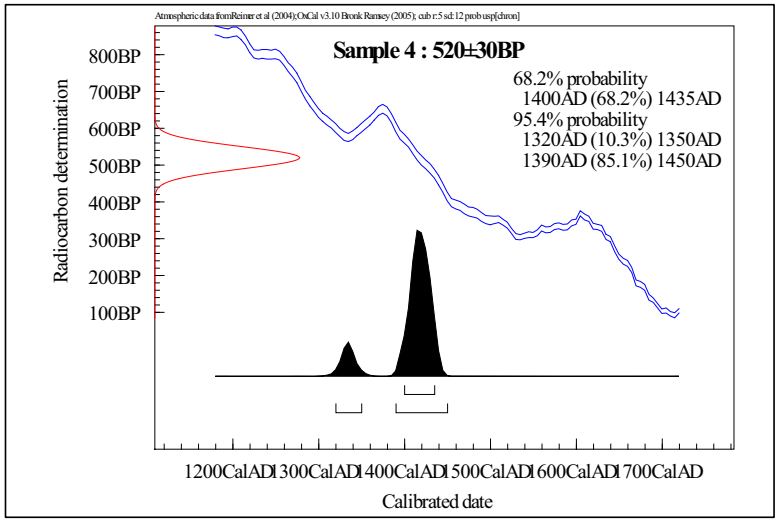


Figure 65. Calibrated radiocarbon dating results from T-2, Stratum V (upper portion), SIHP # 50-80-11-5796, wetland sediments (S-4) (OxCal 4.2)

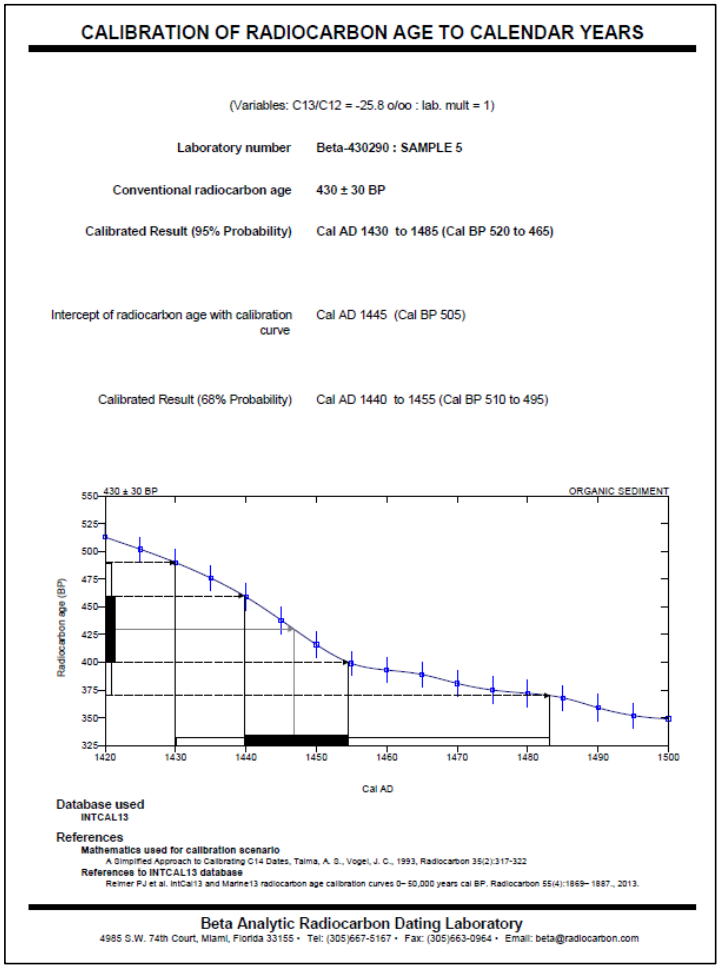


Figure 66. Radiocarbon dating results from T-2, Stratum V, the middle portion of SIHP # 50-80-11-5796, wetland sediments (S-5) (Beta Analytic, Inc.)

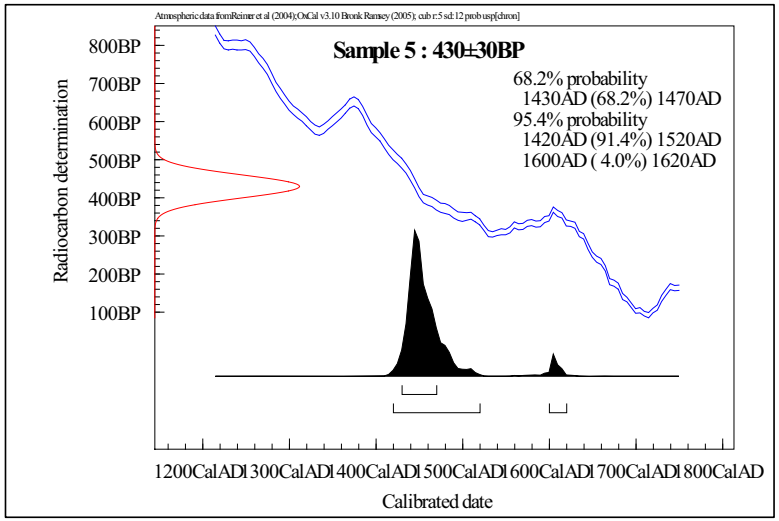


Figure 67. Calibrated radiocarbon dating results from T-2, Stratum V (middle portion), SIHP # 50-80-11-5796, wetland sediments (S-5) (OxCal 4.2)

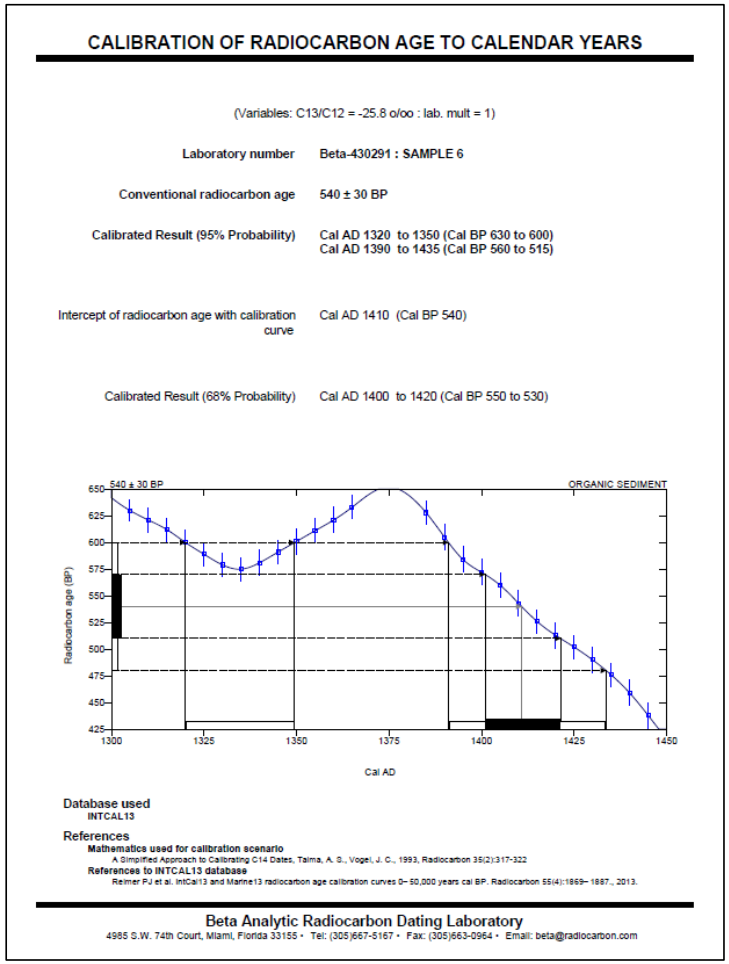


Figure 68. Radiocarbon dating results from T-2, Stratum V, the lower portion of SIHP # 50-80-11-5796, wetland sediments (S-6) (Beta Analytic, Inc.)

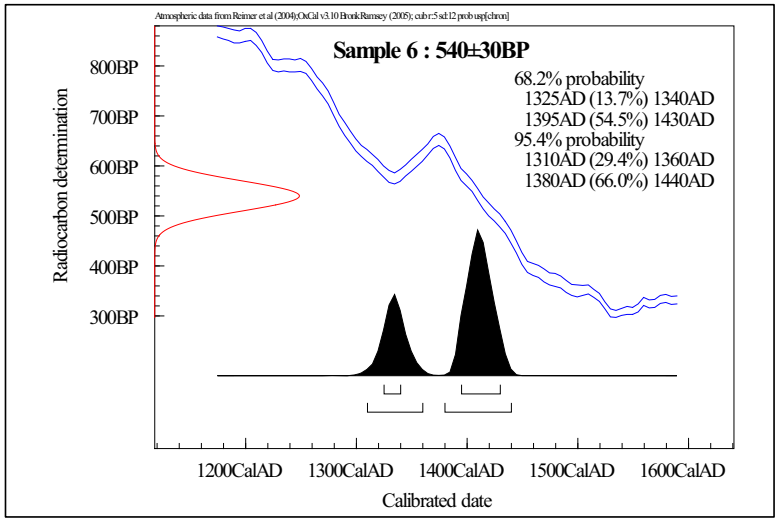


Figure 69. Calibrated radiocarbon dating results from T-2, Stratum V (lower portion), SIHP # 50-80-11-5796, wetland sediments (S-6) (OxCal 4.2)

Section 6 Historic Property Descriptions

Two archaeological historic properties were identified within the current project area during this AIS. They are summarized in Table 14 and their distributions are depicted on Figure 32.

Table 14. Historic Properties Identified within the Current Project Area

SIHP #	Formal Type	Function
50-80-14-5796	Original wetland surface	Culturally modified wetland
50-80-14-9757	Ala Wai Canal	Water control/ recreation

6.1 SIHP # 50-80-14-5796

FORMAL TYPE:	Original wetland surface
FUNCTION:	Culturally modified wetland
NUMBER OF FEATURES:	5
AGE:	Pre-Contact to historic (1920s)
TEST EXCAVATIONS:	T-1 through T-3, T-5, and STP-3 through STP-5
TAX MAP KEY:	[1] 2-6-016 and 017 (Right-of-Ways [ROW], current project); 2-6-018:010 and 087 (LaSuer et al. 2000); 2-6-019:056 and 016 (Yucha et al. 2009); 2-6-018:043, 045, 046, and 054 (Pammer et al. 2014); 2-6-018:011 (Morriss and Hammatt 2015)
LAND JURISDICTION:	State of Hawai‘i (current project)
PREVIOUS DOCUMENTATION:	LeSuer et al. (2000), Yucha et al. (2009), Sroat et al. (2011), Pammer et al. (2014), Morriss and Hammatt (2015)

SIHP # -5796 consists of a sequence of layers or deposits of agricultural wetland sediments, non-agricultural wetland sediments, peat sediments, pond sediments, and pond berms dating from the pre-Contact period to the early 1900s. The wetland sediments represent an extension of the previously identified historic property first documented by LeSuer et al. (2000) during subsurface testing for King Kalākaua Plaza, located approximately 120 m to the southwest of the current project area. Additional portions of this site were identified by Yucha et al. (2009) during an AIS for the Waikīkī Shopping Plaza redevelopment project located approximately 350 m south of the current project area; Pammer et al. (2014) during an AIS for the 2139 Kūhiō Avenue project, located approximately 120 m southwest of the current project area; and Morriss and Hammatt (2015) during an AIS for the Beachwalk Wastewater Pumping Station project, located approximately 120 m south of the current project area.

The stratigraphy observed during this study is consistent with the LeSeur et al. (2000), Yucha et al. (2009), Sroat et al. (2011), Pammer et al. (2014), and Morriss and Hammatt (2015) studies. LeSeur et al. (2000) found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796) (Figure 70, Figure 71

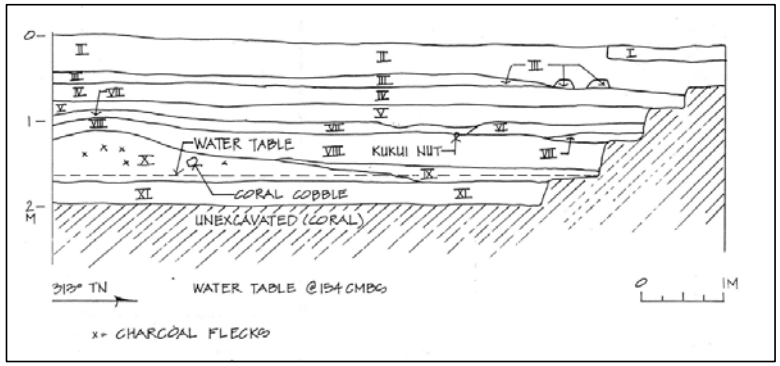


Figure 70. Sample profile of T-3 from LaSuer et al. (2000)

Stratigraphy:

Stratum I	Recent construction or demolition refill.
Stratum II	1920-1930 Ala Wai land-reclamation fill event
Stratum III	1920-1930 Ala Wai land-reclamation fill event
Stratum IV	1920-1930 Ala Wai land-reclamation fill event
Stratum V	1920-1930 Ala Wai land-reclamation fill event
Stratum VI	1920-1930 Ala Wai land-reclamation fill event
Stratum VII	1920-1930 Ala Wai land-reclamation fill event
Stratum VIII	1920-1930 Ala Wai land-reclamation fill event
Stratum IX	Prehistoric-historic agricultural wetlands (pre land-reclamation)
Stratum X	Prehistoric-historic agricultural wetlands (pre land-reclamation)
Stratum XI	Natural sand deposits, during the formation of Waikīkī.

Figure 71. General stratigraphic description of T-3 from LaSuer et al. (2000)

and Table 15). The study described SIHP # -5796 as varying between a dark gray sandy loamy clay, sandy clay loam, and one trench that contained clay loam with an underlying layer of peat. The site was found to contain organic materials, roots and rootlets, and charcoal flecking, as well as historic artifacts (ceramic fragment, a shoe, and milled wood) and midden (LeSeur et al. 2000).

Yucha et al. (2009) also found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796) (Figure 72, Figure 73 and Table 16). The study encountered the site in eight of the nine test trenches, and found it to consist of two highly organic soils, composed of a dark gray to dark brown clay loam and containing freshwater snail shells, rootlets, decomposing organic material, and charcoal flecking. Radiocarbon analysis was performed on two bulk samples collected from SIHP # -5796, Strata IIIa (Trench 6) and IIIb (Trench 9). Stratum IIIa produced a calibrated 2-sigma date range of AD 1440 to 1640 at a 95.4% probability, while the sample collected from Stratum IIIb produced a calibrated 2-sigma date range of AD 1390 to 1490 at a 94.4% probability. Though the dates indicate a pre-Contact period, the project area continued to be utilized for banana cultivation through the early twentieth century, suggesting the area was likely continually utilized from the fourteenth century until land reclamation activities in the 1920s.

Sroat et al. (2011) also identified natural wetland sediments (SIHP # -5796) located beneath thick layers of varying fill materials, including hydraulic fill and crushed coral fill imported during early twentieth century land reclamation activities (Figure 74, Figure 75 and Table 17). The study encountered the site in eight of a total of nine test trenches between depths of 1.5 to 2.05 m below surface. The wetland sediment was typically presented as very dark gray to very dark grayish brown clay loam. This sediment was identified as culturally modified due to the soil matrix and content (suggestive of a wetland agricultural environment) and the wavy topography of *mauka-makai* soil ridges separated by shallow parallel *'auwai* within three of the test trenches. These modifications were determined to be suggestive of possible banana cultivation during the historic era, preceded by probable pre-Contact to early post-Contact taro farming.

Pammer et al. (2014) also identified natural wetland sediments (SIHP # -5796) located beneath thick layers of varying fill materials, including hydraulic fill and crushed coral fill imported during early twentieth century land reclamation activities. The study encountered the site in 24 of the 26 trenches, typically presented as a dark gray clay or sandy clay containing freshwater snail shells and, in some instances, a peat-rich layer. The study also identified five features associated with SIHP # -5796 (Figure 76, Figure 77, Table 18, Table 19).

Feature A is a pond (Trench 14) observed on early twentieth century historic maps. The natural wetland sediments appear to extend over the pond material, suggesting this represents a berm feature located on the edge of the pond, constructed of the surrounding natural wetland materials. This pond feature may represent a natural environmental feature of the SIHP # -5796 wetlands or may be a duck pond related to twentieth century banana cultivation based on historical research. Features B–E are portions of a large berm (Trenches 18, 19, 21, and 24). Based on its configuration, the berm likely marks the edge of a *lo'i*, possibly associated with the berm separating LCA 6367 and Grant 2785, shown on the 1881 Bishop map (see Figure 12). A 1920 aerial photo of Waikīkī also depicts what appears to be a berm separating the various banana crops, suggesting the continued construction and/or use of berms in twentieth century agricultural fields.

Table 15. Stratigraphic Description of T-3 from LaSuer et al. (2000)

Strata	CMBS	Description
I	0-15 @ 1m	2.5 YR 3/4 dark reddish brown, Sandy Clay Loam, gravelly, compact, structureless, inclusions: few roots & rootlets, coral pebbles & cobbles, and some asphalt and bottle glass fragments; abrupt-wavy lower boundary
II	4-33	10 YR 5/4, 5/2 light yellowish brown mottled with gray brown, Loamy Sand, gravelly (mostly medium size), slightly compact, structureless, inclusions: few roots & rootlets, and abundant coral pebbles & cobbles; abrupt-wavy lower boundary
III	33-48	10 YR 5/2, 6/4, 4/4 gray brown, light yellowish brown, dark yellowish brown, Very Fine Sand Microstratigraphy, loose, structureless, inclusions: few roots & rootlets; very abrupt-smooth discontinuous lower boundary
IV	48-69	10 YR 6/4 light yellowish brown, Fine Sand Microstratigraphy with Very Fine Clay Lenses, slightly compact, structureless, inclusions: few roots & rootlets; very abrupt-smooth lower boundary
V	69-90	10 YR 5/3 brown, Silty Clay Microstratigraphy, compact, structureless; moist, sticky & plastic; inclusions: very few roots & rootlets; very abrupt-smooth lower boundary
VI	87-104 @2.5m	10 YR 6/4 light yellowish brown, Fine Sand Microstratigraphy with Very Fine Clay Lenses, slightly compact, structureless, inclusions: few roots & rootlets; very abrupt-smooth lower boundary
VII	90-104	10 YR 4/4 - 5/2 dark yellowish brown to grayish brown Sandy Clay Loam Very Fine Microstratigraphy, loose to slightly compact, structureless, inclusions: very few roots & rootlets, a few charcoal flecks, and one Kukui nut at base; very abrupt-smooth/discontinuous lower boundary
VIII	104-137	N 4/0, N 2.75/0 dark gray, very dark gray/black Silty Clay Microstratigraphy, slightly compact, structureless; moist, sticky & plastic; inclusions: very few roots & rootlets; very abrupt-smooth lower boundary
IX	137-148	10 YR 3/1 very dark gray, Silty Clay, slightly compact, structureless; moist, sticky & plastic; inclusions: preserved organic material (possibly leaves); abrupt-smooth lower boundary
X	100-160 @ 7.4 m	5 GY 4/1 dark greenish gray Clay Loam, slightly compact, structureless, inclusions: charcoal flecking; abrupt-smooth lower boundary
XI	160-185	N 5/0 gray Coarse Sand, loose, structureless, no inclusions, abrupt-smooth lower boundary



Figure 72. Photograph of T-3 from Yucha et al. (2009)

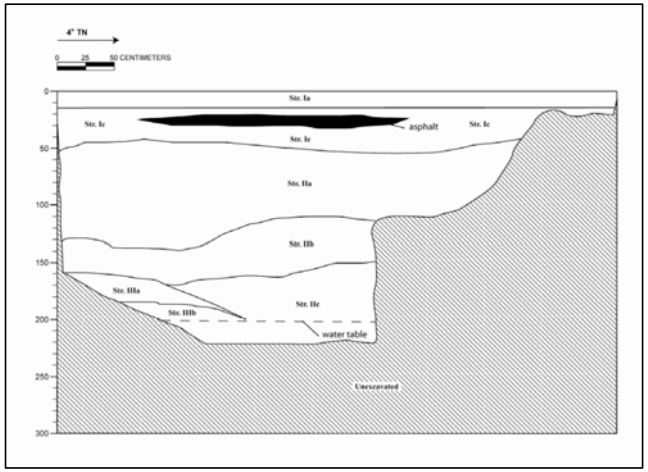


Figure 73. Profile of T-3 from Yucha et al. (2009)

Table 16. Stratigraphic Description of T-3 from Yucha et al. (2009)

Stratum	Depth (cmbs)	Description
Ia	0-15	Concrete Slab
Ic	15-50	Fill; 10 YR 3/3, dark brown; clay loam; weak medium crumb structure; friable moist consistency; slightly plastic; no cementation; terrestrial origin; very abrupt lower boundary; smooth topography. Contains construction debris and 1950's-era trash
IIa	50-135	Fill; 10 YR 4/3 brown; fine sand; structureless; loose moist consistency; non-plastic; no cementation; marine origin; abrupt lower boundary; smooth topography. Contains 90% crushed coral/coral cobbles. Land-reclamation fill.
IIb	110-165	Fill; 10 YR 5/3 brown; sandy clay; strong fine granular structure; non-sticky wet consistency; slightly plastic; no cementation; mixed origin; abrupt lower boundary; smooth topography. Land-reclamation fill.
IIc	150-BOE*	Hydraulic Fill; 10 YR 5/1 gray; clay; strong fine single grain structure; very sticky wet consistency; plastic; no cementation; mixed origin; abrupt lower boundary; wavy topography. Land-reclamation fill
IIIa	160-185	10 YR 3/1 very dark gray; clay loam; moderate medium crumb structure; non-sticky wet consistency; slightly plastic; no cementation; terrestrial origin; clear lower boundary; wavy topography. Contains land snail shells, rootlets, and decomposing organic material. Previous land surface.
IIIb	185-BOE*	10 YR 3/3 dark brown; clay loam; moderate medium crumb structure; non-sticky wet consistency; slightly plastic; no cementation; terrestrial origin; abrupt lower boundary; wavy topography. Contains land snail shells, rootlets, and charcoal flecking. Previous land surface.



Figure 74. Photograph of Profile 3 from Sroat et al. (2011)

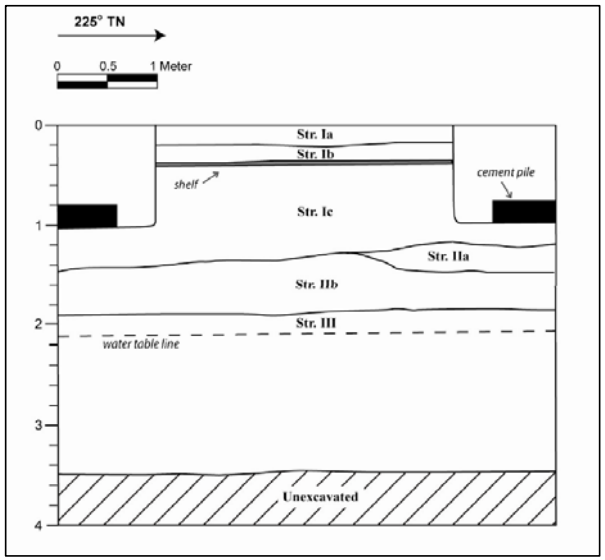


Figure 75. Profile 3 from Sroat et al. (2011)

Table 17. Stratigraphic Description of Profile 3 from Sroat et al. (2011)

Stratum	Depth (cmbs)	Description
Ia	0-20	Fill; 10 YR 8/2 (very pale brown); coral; coarse, structureless; dry, hard consistency; no cementation; non-plastic; marine sediment; very abrupt and smooth topography; imported crushed coral fill
Ib	20-37	Fill; 2.5 YR 3/6 (dark red); gravel; coarse, structureless; dry, very hard consistency; no cementation; non-plastic; terrestrial sediment; very abrupt and smooth topography; imported gravel fill
Ic	37-143	Fill; 10 YR 4/2 (dark grayish brown); sandy clay loam; moderate, medium to coarse, crumb structure; dry, slightly hard consistency; weak cementation; slightly plastic; terrestrial and marine sediment; abrupt and smooth topography; terrigeous fill mixed with crushed coral and sand
IIa	120-150	Fill; 10 YR 6/6 (brownish yellow); clay; moderate, fine, granular structure; wet, sticky consistency, no cementation; plastic; terrestrial and marine sediment; abrupt and broken topography, hydraulic dredge fill
IIb	129-190	Fill; 10 YR 3/2 (grayish brown); clay; moderate, fine, granular structure; wet, very sticky consistency; no cementation; very plastic; terrestrial and marine sediment; very abrupt and wavy topography; hydraulic dredge fill
III	129-not visible	Natural; 10 YR 3/2 (very dark grayish brown); clay loam; moderate, fine, crumb structure; moist, friable consistency; no cementation; slightly plastic; terrestrial and marine sediment; natural wetland sediment with organic material



Figure 76. Photograph of T-5 from Pammer et al. (2014)

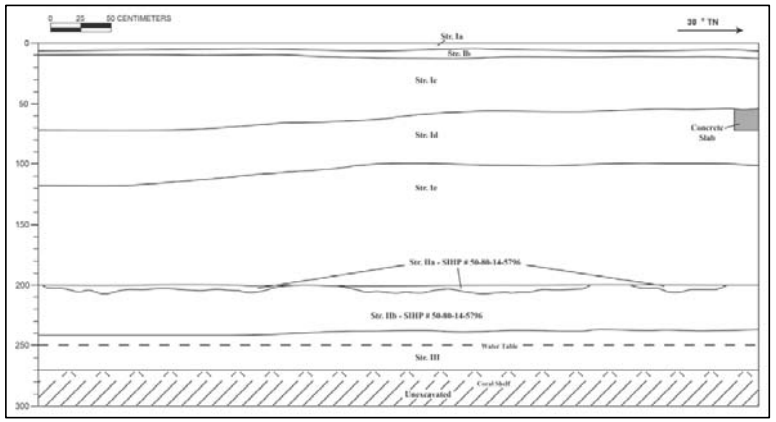


Figure 77. Profile of T-5 from Pammer et al. (2014)

Table 18. Stratigraphic Description of T-5 from Pammer et al. (2014)

Stratum	Depth (cmbs)	Description
Ia	0–5	Fill; 10YR 2/1, black; old ashalt surface
Ib	5–10	Fill; 5YR 4/3, reddish brown; gravelly sandy clay; moderate, medium, blocky structure; dry slightly hard consistency; no cementation; slightly plastic; terrigenous origin; very abrupt boundary; smooth topography; imported fill, asphalt base course
Ic	10–70	Fill; 10YR 4/3, brown; gravelly sandy loam; structureless single-grain; dry loose consistency; no cementation; non-plastic; marine origin; abrupt boundary; smooth topography; imported fill
Id	55–115	Fill; 10YR 4/6, pale yellowish brown; loamy sand; structureless single-grain; dry loose consistency; no cementation; non-plastic; mixed origin; abrupt boundary; smooth topography; imported crushed coral fill
Ie	100–200	Fill; 10YR 6/3, pale brown; silty sand; structureless single-grain; moist loose consistency; no cementation; non-plastic; marine origin; abrupt boundary; smooth topography; imported hydraulic (dredge) fill
IIa	200–205	SIHP # -5796, wetland sediment; 10YR 2/2, very dark brown; silty clay; weak, fine, crumb structure; moist friable consistency; no cementation; plastic; mixed origin; clear boundary; irregular/broken topography; natural agricultural wetland sediment with peat material; freshwater snail shells observed
IIb	200–240	SIHP # -5796, wetland sediment; 2.5Y 3/4, very dark gray; silty clay; weak, fine, blocky structure; moist loose consistency; no cementation; non-plastic; mixed origin; abrupt boundary; smooth topography; natural agricultural wetland sediment; freshwater snail shells observed
III	235–270 (BOE)	Natural; 5Y 5/1, gray; gravelly/deteriorated coral bedrock; structureless single-grain; wet slightly sticky consistency; weak cementation; marine origin; deteriorating coral bedrock shelf

Table 19. SIHP # -5796 Features

Feature #	Type	Previous documentation
A	Pond	Pammer et al. (2014)
B	Berm remnant	Pammer et al. (2014)
C	Berm remnant	Pammer et al. (2014)
D	Berm remnant	Pammer et al. (2014)
E	Berm remnant	Pammer et al. (2014)

Several wetland sediment (SIHP # -5796) samples were taken from Trench 14 for radiocarbon, snail, and pollen analyses. The upper portion (Stratum IIa) of SIHP # -5796 in Trench 14 yielded a 2-sigma calibrated date range of AD 1790 to 1950 (52.5 % probability), while the lower portion (Stratum IIb) yielded a 2-sigma calibrated date range of AD 1480 to 1650 (95.4 % probability). A sample of the pond sediment (Stratum IId) in Trench 14 yielded a 2-sigma calibrated date range of AD 1800 to 1930 (70.2 % probability). Snail analysis identified both native and introduced species of freshwater snails in the lower wetland sediments (Stratum IIb) from Trench 14. Meanwhile, the pollen analysis of the wetland sediments identified an abundance of sedges and grasses, typical of a marshland environment. Based on the results of the pollen and radiocarbon analyses, the study concluded that the wetland surface may have been utilized for taro cultivation.

Morriss and Hammatt (2015) also observed natural materials, overlaid by land reclamation fill sediments, consisting of wetland sediments and marine sediment formed atop the degrading coral shelf (Figure 78, Figure 79, and Table 20). The wetland sediments were determined to be a portion of the previously identified wetland surface (SIHP # -5796) and were observed within all five test excavations at an average depth of between 1.96 and 2.59 m below the existing surface. They contained decomposing organics, freshwater and brackish water snails, charcoal flecking, and, in some test excavations, seeds (possibly of *'akulikuli* or *olonā*). Although pond deposits and a large sand berm associated with SIHP # -5796 were identified in an adjacent property (Pammer et al. 2014), no similar deposits or features were observed within the project area. Additionally, there was no evidence of the former *lo'i* wall shown on a late nineteenth century map. Based on the current findings, as well as those from the adjacent Pammer et al. (2014) study, it seems probable the wetland deposits (SIHP # -5796) are still extant throughout the majority of the project area.

The current project also found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796). The current study encountered the site in seven of the ten subsurface excavations (T-1 through T-3, T-5 and STP-3 through STP-5), and found it to consist of similar materials as identified in the previous studies. The agricultural wetland sediments were encountered at an average depth of between 0.8 m and 1.4 m below the existing surface. The sediments were typically presented as very dark gray to black clay rich materials containing decomposing organics, rootlets, freshwater and brackish water snails, charcoal flecking, and, in some test excavations, *ruppia maritima* seeds. Although pond deposits and a large sand berm associated with SIHP # -5796 were identified in an adjacent property during a previous study (Pammer et al. 2014), no similar deposits or features were observed within the current project area. Similar features to the *paukū/kuāuna* feature (SIHP # -6407 Feature A) documented in LCA 1775 and identified by Borthwick et al. (2002), were also not identified during the current project.

Six column samples (three each from T-1 and T-2) of the agricultural wetland sediment (SIHP # -5796) from Stratum V were submitted for pollen and radiocarbon analysis. The upper portion (S-1) of SIHP # -5796 in T-1 yielded a 2-sigma calibrated date range of AD 1490 to 1670 (95.4% probability), while the middle portion (S-2) yielded a 2-sigma calibrated date range of AD 1720 to 1820 (50.7% probability) and the lower portion (S-3) yielded a 2-sigma calibrated date range of AD 1460 to 1640 (95.4% probability). The upper portion (S-4) of SIHP # -5796 in T-2 yielded a 2-sigma calibrated date range of AD 1390 to 1450 (85.1% probability), the middle portion (S-5) yielded a 2-sigma calibrated date range of AD 1420 to 1520 (91.4% probability) and the lower portion (S-6) yielded a 2-sigma calibrated date range of AD 1380 to 1440 (66.0% probability). The



Figure 78. Photograph of TE-5 from Morriss and Hammatt (2015)

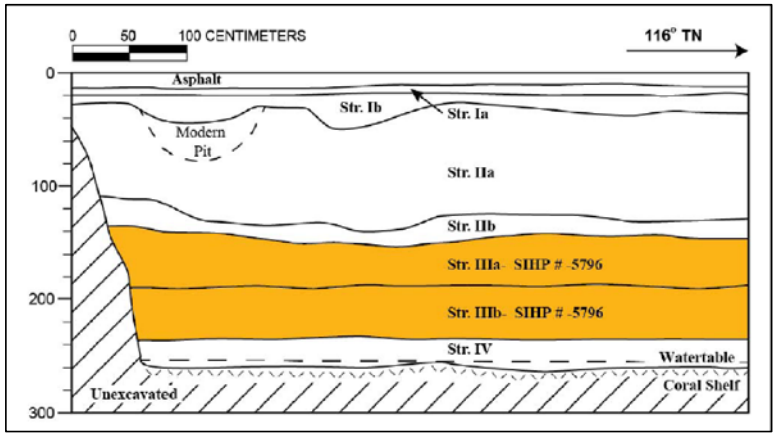


Figure 79. Profile of TE-5 from Morriss and Hammatt (2015)

Table 20. Stratigraphic Description of TE-5 from Morriss and Hammatt (2015)

Stratum	Depth (cmbs)	Description
N/A	0–15	Asphalt
Ia	10–19	Fill; 10YR 3/1, very dark gray; extremely gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt boundary, smooth topography; imported basalt gravel base course utilized for construction of the existing asphalt surface
Ib	30–140	Fill; 2.5Y 4/4, olive brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt boundary; wavy topography; imported fill associated with construction of the existing asphalt surface
Modern Pit	34-79	Modern pit; 10YR 5/4, yellowish brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt boundary; wavy topography; modern pit associated with the deposition of Stratum Ib
IIa	30–140	Fill; 10YR 6/4, light yellowish brown; gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt boundary; wavy topography; common fine to medium roots observed; imported crushed coral fill related to historic land reclamation
IIb	110–155	Fill; GLEY 1 6/N, gray; silty clay; structureless, massive; moist, firm consistency; plastic; mixed origin; clear boundary; smooth topography; imported hydraulic-dredged fill related to historic land reclamation
IIIa	135–190	Natural; 2.5Y 3/1, very dark gray; loamy clay; weak, fine, blocky structure; moist, friable consistency; slightly plastic; mixed origin; clear boundary; smooth topography; few fine to medium roots observed; charcoal flecking observed; decomposing organics and land snails observed; naturally deposited wetland sediment associated with SIHP # -5796
IIIb	190–235	Natural; 2.5Y 3/2, very dark grayish brown; loamy clay; weak, fine, blocky structure; moist, friable consistency; slightly plastic; marine origin; clear boundary, smooth topography; common fine to coarse roots observed; high content of decomposing organics; naturally deposited wetland sediment associated with SIHP # -5796
IV	235–260	Natural; 2.5Y 4/1, dark gray; very gravelly silty clay; weak, fine, blocky structure; wet, slightly sticky consistency; slightly plastic; mixed origin; lower boundary not visible; naturally deposited marine sediment formed by the decomposing coral shelf

results indicate that most of the material sent for analysis was utilized during the pre-Contact era, while the results from Sample 2 (the middle portion of Stratum V) suggest some mixing and use during post-Contact times. The results of the pollen analysis by Phillips (2016) support a marshland environment:

> Sedge pollen dominated all samples, reflecting the marshlands and fields described in historic accounts of the area. Subdominant were grass pollen of both regular- and large-sized grains. In both locations, sedge pollen percentages were consistent within the sampled columns, suggesting marsh environments persisted throughout the time span represented by the samples. Varying grass pollen frequencies could reflect changing farming strategies and/or land use in and around the project area. The large grass pollen grains likely come from *ko* or *laiki*. A spike and then decline in charcoal concentration in the middle and upper portion of the sample column of Trench 1 reflects an increase in land clearance, possibly followed by a fallow period (Phillips 2016: 4).

Furthermore, “No unequivocal historical introductions were identified (Phillips 2016: 2).” This information does not contradict the date ranges obtained from the radiocarbon analysis.

In summary, SIHP # -5796 represents the original pre-Contact to early twentieth century agricultural wetland. According to background research and previous archaeological studies, it is likely wetland sediments similar to those encountered within the project area exist beneath the fill throughout the surrounding Waikīkī area. The site remained a natural agricultural and wetland habitat until it was covered during early twentieth century land reclamation fill events. The record of human modification of these sediments spans from pre-Contact and post-Contact traditional Hawaiian farming practices, primarily in the form of taro cultivation, but also including bananas, sugarcane, and other utilitarian crops. In the nineteenth and early twentieth centuries, the agricultural focus shifted more to rice and bananas. SIHP # -5796 was previously determined significant under Hawai‘i state historic property significance criterion “d” (have yielded, or may be likely to yield information important for research on prehistory or history) pursuant to HAR §13-284-6 (Pammer et al. 2014). The historic property may reflect land use activities in Waikīkī during the pre- and post-Contact period (i.e., wetland agriculture, fishpond aquaculture, and historic rice or banana cultivation) and has the potential to offer insight into these practices.

6.2 SIHP # 50-80-14-9757

FORMAL TYPE:	Ala Wai Canal
FUNCTION:	Water control, recreation
NUMBER OF FEATURES:	3 (non-contributing)
AGE:	Historic (1921-1928)
TEST EXCAVATIONS:	N/A
TAX MAP KEY:	[1] 2-3-(various plats), 2-6-(various plats), and 2-7-036
LAND JURISDICTION:	State of Hawai‘i
PREVIOUS DOCUMENTATION:	Maly et al. (1994)

SIHP # -9757, the Ala Wai Canal, is a stone and concrete drainage canal. The Ala Wai Canal was constructed from 1921 to 1928 by Hawaiian Dredging Company and is approximately 3,000 m long with a width varying between 50 m and 76 m (see Section 3.1.3.1). The depth is variable depending upon the amount of siltation that occurs. The Ala Wai Canal was constructed to drain water from the low-lying swamp areas of Waikīkī in order to create more land for development. Three bridges (non-contributing features) span the canal at Ala Moana Boulevard, Kalākaua Avenue, and McCully Street.

The current project proposes to conduct horizontal drilling across/below the Ala Wai Canal in the vicinity of University Avenue/Kalaimoku Street. There are also proposed plans to remove existing Hawaiian Electric cables from the Ala Wai Canal in the vicinity of Kaiolu Street.

The Ala Wai Canal (SIHP # -9757) is listed on the Hawaii Register of Historic Places and was evaluated as eligible for inclusion in the National Register of Historic Places under Criterion A (associated with events that have made an important contribution to the broad patterns of our history) at the local level of significance (see National Register Form in Appendix A). It is assessed as significant pursuant to HAR 13-284-6 under Criterion a (associated with events that have made an important contribution to the broad patterns of our history) and Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history). The Ala Wai Canal is significant for its role in the urban residential and commercial development of Waikīkī during the twentieth century as well as its development into a world class tourist destination.”

Section 7 Summary and Interpretation

At the request of Hawaiian Electric, CSH has prepared this AISR for the Ala Wai 46kV Underground Cables Relocation project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMKs: [1] 2-6-017; 2-7-013, 014, and 036.

The project area consists of paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks. The current project area is located in a completely urbanized setting, mostly along roadways. Portions of the Ala Wai Canal, Ala Wai Neighborhood Park, and Ala Wai Elementary School are also located within the current project area. The purpose of the testing was to assess the stratigraphy within the proposed project area, determine the extent of undisturbed natural deposits (i.e., wetland deposits and marine sand), and assess the likelihood of encountering significant cultural deposits within the project area.

During the pre-Contact period, Waikīkī was a center of population, chiefly residence, and political power on O‘ahu. Beginning in the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. Following Western Contact, Waikīkī went through a period of depopulation as a result of Honolulu’s rise to preeminence and the devastating effects of western diseases. Traditional land uses in Waikīkī continued up until the end of the nineteenth century when the coastal fishponds were finally filled in and the remaining taro fields were planted with rice.

Previous archaeology indicates much of the sediments in the area are fill deposits related to the construction of the Ala Wai Canal during the 1920s. Subsurface cultural deposits identified in the vicinity of the project area include human burials, pre- and post-Contact cultural layers, buried fishponds, ditches, and other remains of extensive wetland agriculture, trash pits, and construction debris. Natural wetland sediments (SIHP # -5796) dated to the pre- and post-Contact periods were identified below crushed coral and hydraulic (dredged) reclamation fill deposits in areas adjacent to the current project area. These sediments are likely to be encountered throughout the present project area.

The fieldwork component of this AIS was conducted between 21 December 2015 and 20 January 2016 by eight CSH archaeologists, Trevor Yucha, B.S., Scott Belluomini, B.A., Nifae Hunkin, B.A., Megan Hawkins, M.A., Nigel Kingsbury, B.A., Jesse Davis, B.A., Alison Welser, M.A., and Thomas Martel III, B.A., under the general supervision of Hallett Hammatt, Ph.D. This work required approximately 23 person-days to complete. In general, fieldwork included 100% pedestrian inspection of the project area, GPS data collection, and subsurface testing.

Two historic properties, SIHP # -5796 (original wetland surface) and SIHP # -9757 (Ala Wai Canal), were identified as being within the project area.

The general stratigraphy observed consists of a modern asphalt surface and associated base course or modern landscape A horizon, overlying generic fills, overlying early twentieth century land reclamation fills (crushed coral and hydraulic [dredged] fill), overlying natural deposits including a buried A horizon (SIHP # - 5796) , overlying a C horizon. The water table was observed in all ten excavations, typically encountered within the lower portion of the observed natural

sediments, but the coral shelf was only identified at the base of T-1. The observed fill materials consisted primarily of crushed coral and hydraulic (dredged) deposits, related to historic land reclamation activities during construction of the Ala Wai Canal in the 1920s.

The observed natural materials consisted of wetland deposits and marine deposits formed atop the degrading coral shelf. The wetland deposits were determined to be a portion of the previously identified wetland surface (SIHP # -5796) and were observed within all but one of the excavations in the Waikīkī Kai portion of the project area, and in none of the excavations in the Waikīkī Waena portion of the project area. The wetland deposits were observed at an average depth of between 0.8 m and 1.4 m below the existing surface. The deposits contained decomposing organics, freshwater and brackish water snails, charcoal flecking, and, in some test excavations, *ruppia maritima* seeds. Although pond deposits and a large sand berm associated with SIHP # -5796 were identified in an adjacent property during a previous study (Pammer et al. 2014), no similar deposits or features were observed within the current project area. Similar features to the *paukū/kuāuna* feature (SIHP # -6407 Feature A) documented in LCA 1775 and identified by Borthwick et al. (2002) were also not identified during the current project. Based on the current findings, as well as those from the adjacent Pammer et al. (2014) study, it seems probable the wetland deposits (SIHP # -5796) are still extant throughout the majority of the project area, specifically in the Waikīkī Kai portion.

No historic or traditional Hawaiian cultural materials were found within any of the test excavations.

Section 8 Significance Assessments

Historic property significance is evaluated and assessed based on the five State of Hawai‘i historic property significance criteria. To be considered significant, a historic property must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and meet one or more of the following broad cultural/historic significance criteria (in accordance with HAR §13-284-6):

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; or

e. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with 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.

Two previously documented historic properties were identified within the current project area. SIHP # -5796 is a pre-Contact to early twentieth century natural wetland surface that may have been utilized for agriculture, aquaculture, and rice or banana cultivation. It has been documented in nearby portions of Waikīkī., and was previously determined significant under Criterion “d” (have yielded, or may be likely to yield information important in prehistory or history) pursuant to HAR §13-284-6 (Pammer et al. 2014). The historic property may reflect land use activities in Waikīkī during the pre- and post-Contact period (i.e., wetland agriculture, fishpond aquaculture, and historic rice or banana cultivation) and has the potential to offer insight into these practices.

The Ala Wai Canal, designated SIHP # -9757, is a stone and concrete drainage canal constructed from 1921-1928 and is assessed as significant under Criterion “a” (be associated with events that have made an important contribution to the broad patterns of our history), and under Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history) pursuant to HAR 13-284-6. It is listed on the Hawaii Register of Historic Places and was evaluated as eligible for inclusion in the National Register of Historic Places under Criterion A (associated with events that have made an important contribution to the broad patterns of our history) at the local level of significance (see National Register Form in Appendix A). The Ala Wai Canal is significant for its role in the urban residential and commercial development of Waikīkī during the twentieth century as well as its development into a world class tourist destination.

Section 9 Project Effect and Mitigation Recommendations

9.1 Project Effect

The proposed project will potentially affect the two historic properties, SIHP #s -5796 and -9757, identified within the project area. CSH's project specific effect recommendation is "effect, with agreed upon mitigation commitments." The recommended mitigation measures will reduce the project's potential effect on significant historic properties.

9.2 Mitigation Recommendations

This AIS represents a good faith effort to identify and document the historic properties located within the project area. The results of this AIS indicate the culturally modified wetland (SIHP # -5796), is present at an average depth of approximately 0.89 m below the surface, beneath several strata of early twentieth century land reclamation and hydraulic fill. SIHP # -5796 was documented with a detailed written description, photographed in profile, radiocarbon dated, and analyzed for pollen. No further archaeological work is recommended for SIHP # -9757, Ala Wai Canal.

In order to mitigate adverse impacts to subsurface archaeological historic properties identified within the project area, it is recommended that project construction proceed under an archaeological monitoring program. This monitoring program will facilitate the identification of any additional historic properties that might be discovered during project construction and will provide additional information regarding SIHP # -5796 within the project area. An archaeological monitoring plan will be submitted to the SHPD for review and acceptance.

Table 21. Archaeological Historic Property Integrity, Significance, and Mitigation Recommendations

SIHP #	Test Excavation	Formal Type/ Description	Integrity							Significance		Mitigation Recommendation
			Location	Design	Setting	Materials	Workmanship	Feeling	Association	"d"	"a" and "d"	
50-80-14-5796	T-1 through T-3, T-5 and STP-3 through STP-5	Original wetland surface	Y	N	N	Y	Y	N	N			Archaeological monitoring
50-80-14-9757	N/A	Ala Wai Canal	Y	Y	Y	Y	Y	Y	Y			No further archaeological work

Section 10 References Cited

Armstrong, R. Warwick (editor)
1983 *Atlas of Hawai‘i*. University of Hawaii Press, Honolulu.

Beckwith, Martha W.
1940 *Hawaiian Mythology.* Yale University Press, New Haven, Connecticut.

Bishop Museum
1989 *Hawaiian Fishpond Study Islands of O‘ahu, Moloka‘i and Hawai‘i.* Applied Research Group, Bernice Pauahi Bishop Museum, Honolulu.

Bishop [Bernice Pauahi] Museum Archives
1924 Photograph of the creation of the Ala Wai Canal (circa 1924). Bishop Museum Archives, Honolulu.
1927 Aerial photograph of the completed Ala Wai Canal. Bishop Museum Archives, Honolulu.

Bishop, S.E.
1881 Hawaii Government Survey map. Registered Map 1398. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Bliss, William R.
1873 *Paradise in the Pacific*. Sheldon & Company, New York.

Borthwick, Douglas, Anthony Bush, Rodney Chiogioji, and Hallett H. Hammatt
2002 *Archaeological Inventory Survey of an Approximately 71,000-sq.ft. Parcel in Waikīkī, Waikīkī Ahupua‘a, Kona District, Island of O‘ahu.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Brown, DeSoto
1989 *Hawaii Goes to War: Life in Hawaii from Pearl Harbor to Peace.* Editions Limited, Honolulu.

Bush, Anthony B., John P. Winieski, and Hallett H. Hammatt
2002 *Archaeological Monitoring Report for the Waikīkī Anticrime Lighting Improvement Project Phase II (TMK 2-6-1, 2-6-2, 2-6-3, 2-6-6, 2-6-15, 2-6-16, 2-6-18, 2-6-19, 2-6-22, 2-6-23, 2-6-26, 2-6-27).* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Chamberlain, Levi
1957 Tour Around O‘ahu: 1828. In *Sixty-Fifth Annual Report of the Hawaiian Historical Society for the Year 1956*, pp. 2541. Hawaiian Historical Society, Honolulu.

Chinen, Jon J.
1958 *The Great Mahele, Hawaii’s Land Division of 1848*. University of Hawaii Press, Honolulu.

Cleghorn, Paul
1996 *The Results of an Archaeological Inventory Survey at the Proposed Kalākaua Plaza, Waikīkī, O‘ahu, Hawai‘i (TMK 2-6-16:23, 25-26, 28, 61, and 69)*. Pacific Legacy, Inc., Kailua, Hawai‘i.

Coulter, John Wesley and Chee Kwon Chun
1937 *Chinese Rice Farmers in Hawaii*. UH Research Publication Number 16. University of Hawaii Press, Honolulu.

Esh, Kelly and Hallett H. Hammatt
2004 *Archaeological Monitoring Report for Ala Wai Boulevard Improvements, Waikīkī Ahupua‘a, Kona District, Island Of O‘ahu, TMK 2-6:14, 15, 16,17, 20, 21, 24, 25, 28, 29.* Cultural Surveys Hawai‘i, Inc., Kailua Hawai‘i.
2006 *Archaeological Monitoring Report for Kūhiō Avenue (Kalākaua to Ka‘iulani), Waikīkī Ahupua‘a, Honolulu District, O‘ahu Island, Hawai‘i, TMK [1] 2-6-015, to 022: various parcels).* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Feeser, Andrea
2006 *Waikiki: A History of Forgetting & Remembering*. University of Hawai‘i Press, Honolulu.

Florida Museum of Natural History
2014 *Ceramic Technology Laboratory.* Electronic document. http://www.flmnh .ufl.edu/ceramiclab/home/ (accessed 11 February 2016).

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawai‘i Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Foreign Testimony
1846-1853 *Foreign Testimony of Kuleana Claims to Quiet Land Titles in the Hawaii Islands.* Hawai‘i State Archives, Honolulu.

Gagne, Wayne C. and Linda W. Cuddihy
1990 Vegetation. In *Manual of the Flowering Plants of Hawai‘i, Vol. 1 and 2*, edited by Warren L. Wagner, Derral R. Herbst, and S. H. Sohmer, pp. 45-114. Bishop Museum and University of Hawai‘i Presses, Honolulu, Hawai‘i. (Cited in Phillips 2016).

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte
2013 Online Rainfall Atlas of Hawai‘i. *Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1.* Electronic document, http://rainfall.geography.hawaii.edu (accessed 10 April 2014).

Google Earth
2013 Aerial photographs of Hawai‘i. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Gosser, Dennis and Sara Collins
2014 *Archaeological Monitoring Report In Support of Traffic Infrastructure lmprovements at the Intersection of Kuhio Avenue and Namahana Street, Honolulu, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu, Hawai'i. TMK: (1) 2-6-015:001; 2-6-016:033-036, 046*. Pacific Consulting Services, Inc., Honolulu.

Grant, Glen
1996 *Waikīkī Yesteryear*. Mutual Publishing, Honolulu.

Hawai‘i Land Survey Division
1922 Helu Land Court Application 537, Map 1. On file at Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Hawai‘i State Archives
n.d. Nineteenth century photograph of Waikīkī and fishponds. Hawai‘i State Archives, Honolulu.

Hawai‘i TMK Service
2014 Tax Map Key [1] 2-6-017, 7-013, 014, and 036. Hawai‘i TMK Service, Honolulu.

Hawaiian Historical Society
1890s Photograph of rice fields in Waikīkī. Hawaiian Historical Society, Honolulu.

Higgins, J.E.
1904 *The Banana in Hawaii.* Hawaii Agricultural Experiment Station, Bulletin No. 7. Hawaiian Gazette Company, Ltd., Honolulu.

Honolulu Star-Bulletin
1928 The Whole World Knows Waikiki. *Honolulu Star-Bulletin* 17 October: 2:1-16.

‘Ī‘ī, John Papa
1959 *Fragments of Hawaiian History as Recorded by John Papa ‘I‘i.* Bishop Museum Press, Honolulu.

Johnson, Donald D.
1991 *The City and County of Honolulu: A Governmental Chronicle.* University of Hawaii Press, Honolulu.

Kailihiwa, Solomon H. and Paul L. Cleghorn
2003 *Archaeological Monitoring of Waikīkī Water System Improvements (Part IV, Units 1 and 2) on Portions of Lau‘ula Street, Waikolu Way and Royal Hawaiian Avenue, Waikīkī, Island of O‘ahu (TMK 2-6-018, 019, 022).* Pacific Legacy, Inc., Kailua, Hawai‘i.

Kanahele, George S.
1995 *Waikīkī 100 B.C. to 1900 A.D. An Untold Story*. Queen Emma Foundation Honolulu.

LaChance, Frederick and Hallett H. Hammatt
2014 *Archaeological Monitoring Report for the Beachwalk to Ala Moana Park Sewer Project, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu, TMKs: (1) 2-3-034:033, 2-3-037:001 and 002, 2-6, and 2-7-036 (various parcels).* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Lebo, Susan A.
1997 *Native Hawaiian and Euro-American Culture Change in Early Honolulu, Archaeological Data Recovery, Harbor Court Property, Site No. 50-80-14-2456, Honolulu, Hawai‘i.* With contributions by P. Christiaan Klieger, Stephan D. Clark, Leslie L. Hartzell, Heidi A. Lennstrom, Boyd Dixon, Mary F. Riford, and Tracy Tam Sing. Anthropology Department, Bernice Pauahi Bishop Museum, Honolulu.

LeSuer, C. Celeste, Matt McDermott, Rodney Chiogioji, and Hallett H. Hammatt
2000 *An Archaeological Inventory Survey of King Kalākaua Plaza Phase II, Waikīkī, Waikīkī Ahupua‘a, Kona District, Island of O‘ahu, Hawai‘i*. Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Lima, Pulama and Hallett H. Hammatt
2014 *Burial Site Component of a Data Recovery Plan for the Royal Hawaiian Center Re-Development Project, Waikīkī Ahupua‘a, Kona District, O‘ahu TMK: [1] 2-6-002:18.* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Maly, Kepa, Leta Franklin, and Paul H. Rosendahl
1994 *Archaeological and Historical Assessment Study, Convention Center Project Area, Land of Waikiki, Kona District, Island of O‘ahu (TMK 2-3-35 and 2-3-36:118, 024, 025)*. Paul H. Rosendahl, Inc., Hilo, Hawai‘i.

Maryland Archaeological Conservation Lab
2012 *Diagnostic Artifacts of Maryland*. Electronic document. http://www.jefpat.org/diagnostic/Index.htm (accessed 11 February 2016).

McIntosh, James D. and Paul L. Cleghorn
2004 *Archaeological Inventory Survey for the Proposed Developments at Launiu Street, Waikīkī, Hawaii (TMK: 2-6-17; 68, 70, 71, 72, 73)*. Pacific Legacy, Inc. Kailua, Hawai‘i.

McMahon, Nancy
1994 *Inadvertent Burial Discovery on April 28, 1994: Intersection of Kalākaua and Kuamo‘o Streets, Waikīkī, Kona, O‘ahu.* State Historic Preservation Office, Kapolei, Hawai‘i.

Menzies, Archibald
1920 *Hawai‘i Nei 128 Years Ago*. Honolulu.

Moore, P.D., J.A. Webb and M.E. Collinson
1991 *Pollen Analysis*. Blackwell Scientific Publications, London. (Cited in Phillips 2016)

Monsarrat, M.D.
1897 Map of Honolulu. Registered Map 1910. Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.

Morriss, Veronica and Hallett H. Hammatt
2015 *Archaeological Inventory Survey for the Beachwalk Wastewater Pumping Station Project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu TMK: [1] 2-6-018:011.* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Nakamura, Barry
1979 The Story of Waikīkī and the “Reclamation” Project. Thesis, Masters of Arts in History, University of Hawai‘i, Honolulu.

Native Register
1846-1848 *Native Register of Kuleana Claims to Quiet Land Titles in the Hawaii Islands.* Hawai‘i State Archives, Honolulu.

Native Testimony
1846-1852 *Native Testimony of Kuleana Claims to Quiet Land Titles in the Hawaii Islands.* Hawai‘i State Archives, Honolulu.

Newton, L.C.
1939 *Who’s who of the Island of Hawaii, [1938]: a biographical and statistical record of men and women on the Island of Hawaii, Territory of Hawaii, U.S.A*. L.C. Newton, Honolulu.

O’Leary, Owen, Rodney Chiogioji, Anthony Bush, Douglas F. Borthwick, and Hallett H. Hammatt
2006 *Archaeological Assessment of 0.5-Acres of the Royal Kāhili Condo Property, Waikīkī, Kona District, Island of O‘ahu.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Onwueme, Inno
1999 *Taro Cultivation in Asia and the Pacific.* RAP Publication: 1999/16. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific. Bangkok, Thailand. (Cited in Phillips 2016).

Pacific Commercial Advertiser
1865 O‘ahu and its Agricultural Prospects. No. 1 and No. 2. *Pacific Commercial Advertiser.*

Pammer, Michelle F., David W. Shideler, and Hallet H. Hammatt
2014 *Archaeological Inventory Survey for the 2139 Kūhiō Avenue Project Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu Island TMK: (1) 2-6-018:043, 045-048.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Park, Valerie and Sara L. Collins
2010 *Archaeological Monitoring Report in Support of the Ala Wai Garden Plaza Project, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu, State of Hawaii TMKs (1) 2-6-016: 056-060.* Pacific Consulting Services, Inc., Honolulu.

Petrey, Whitney, Douglas F. Borthwick, and Hallett H. Hammatt
2008 *Archaeological Monitoring Report for the City and County of Honolulu’s Emergency Sewer Bypass Project, Ala Wai to Magic Island, Waikīkī Ahupua‘a, Kona District, Island of O‘ahu TMK: [1] 2-3-034, -036, 037; 2-6-017, -018; 2-7-036.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Phillips, Bruce G.
2016 *Pollen Analysis of the WAIKIKI 179 Project*. EcoPlan Associates, Inc. (Prepared for Cultural Surveys Hawai‘i, Inc.)

Pope, W.T.
1926 *Banana Culture in Hawaii.* Hawaii Agricultural Experiment station, Bulletin No. 55. Hawaiian Gazette Company, Ltd., Honolulu.

Pukui, Mary Kawena
1983 *‘Ōlelo No‘eau, Hawaiian Proverbs & Poetical Sayings.* Bishop Museum Special Publication No. 71. Bishop Museum Press, Honolulu.

Pukui, Mary K. and Samuel H. Elbert
1986 *Hawaiian Dictionary.* Second edition. University of Hawaii Press, Honolulu.

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini
1974 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.

Ruby, Laura
2005 *Mō‘ili‘ili: The Life of a Community*. Mō‘ili‘ili Community Center, Honolulu.

Sanborn Fire Insurance
1927 Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai‘i State Archives, Honolulu.
1950a Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai‘i State Archives, Honolulu.
1950b Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai‘i State Archives, Honolulu

Scott Cummings, Linda
2013 *Pollen Analysis of Soil Samples from the 2139 Kuhio Avenue Parking Lot Project, Waikīkī, Hawai‘i*. PaleoResearch Institute Technical Report 13-077. (Prepared for Cultural Surveys Hawai‘i, Inc.) (Cited in Phillips 2016)

Stearns, H.T.
1978 *Quaternary Shorelines in the Hawaiian Islands*. Bishop Museum Bulletin 237. Bishop Museum Press, Honolulu.

Sroat, Ena, Douglas F. Borthwick, and Hallett H. Hammatt
2011 *Archaeological Monitoring Report for the Waikīkī Shopping Plaza Redevelopment Project, Waikīkī, Kona District, O‘ahu, [TMK: (1) 2-6-019:056, 061]*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Tulchin, Todd, Douglas Borthwick, and Hallett H. Hammatt
2004 *Archaeological Data Recovery Report For Site 50-80-14-6407 Feature A At An Approximately 71,000-Sq. Ft. Parcel In Waikīkī Ahupua‘a, Kona District, Island Of O‘ahu (TMK 2-6-16: 2, 4, 6, 7, 8, 12-19, 62, 64, 70, 75, 76, and 77)*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

United States Congress
1894 *Hawaiian Islands.* Report of the Committee on foreign relations, United States Senate, with accompanying testimony and executive documents transmitted to Congress from January 1, 1893, to March 10, 1894. Subject index. Government Printing Office, Washington, D.C.

University of Chicago
1853 Sketch of Waikīkī. University of Chicago, Illinois.

UHCOH (University of Hawai‘i Center for Oral Histories)
1985 *Waikīkī, 1900 – 1985: Oral Histories. Vols. I and II*. University of Hawai‘i at Mānoa, Honolulu.

U.S. Army Corps of Engineers
1910 U.S. Army Corp of Engineers Map of Waikīkī. Copies available from U.S. Army Corp Engineers Building 230, Fort Shafter, Hawai‘i.

U.S. Army War Department
1919 U.S. Army War Department Fire Control Map, Honolulu Quadrangle. USGS Information Services, Denver, Colorado.

1933 U.S. Army War Department Fire Control Map, Honolulu Quadrangle. USGS Information Services, Denver, Colorado.

1943 U.S. Army War Department terrain map, Honolulu and Diamond Head Quadrangles. USGS Information Services, Denver, Colorado.

U.S. Department of Agriculture
2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

USGS (U.S. Geological Survey)
1953 Honolulu USGS 7.5-minute topographic quadrangle. USGS Information Services, Denver, Colorado.

1978 USGS Orthoimagery, Honolulu Quad (aerial photograph). USGS Information Services, Denver, Colorado.

1998 Honolulu USGS Survey 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

Vancouver, George
1798 *A Voyage of Discovery to the North Pacific Ocean, and Round the World . . . Performed in the Years 1790-1795.* Robinson and Edwards, London.

Von Tempski, Armine
1940 *Born in Paradise*. Buell, Sloan and Pearce, New York.

Wagner, Warren L., Derral Herbst, and Sara H. Sohmer
1990 *Manual of the Flowering Plants of Hawaii.* Volume 1. Bishop Museum Special Publication 83. University of Hawaii Press, Honolulu.

Waihona ‘Aina
2000 *The Māhele Database*. Electronic document, http://waihona.com (accessed 1 February 2016).

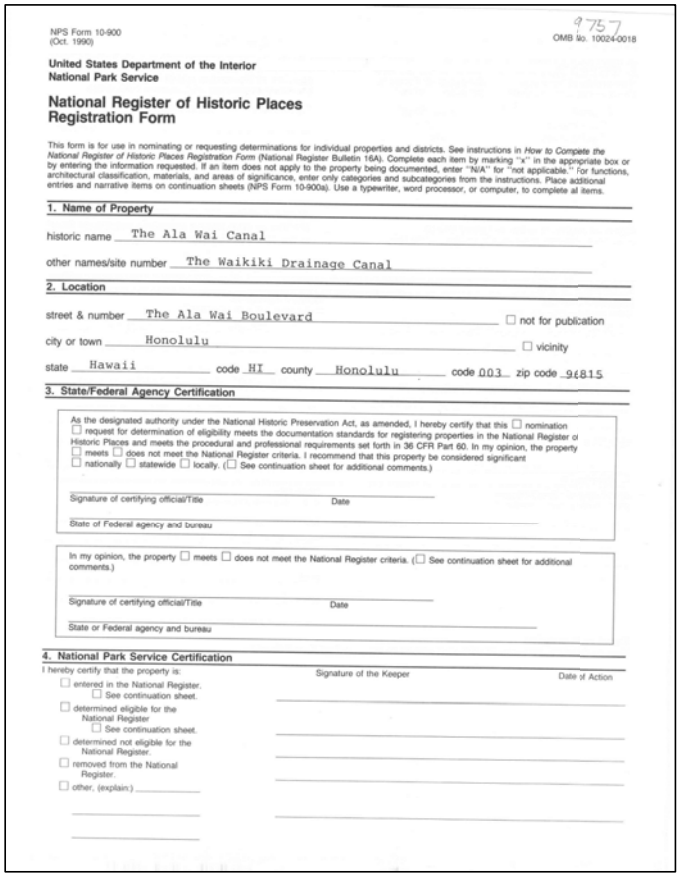
Wall, Walter A.
1887 Map of Honolulu. Hawai‘i Land Survey Division, State of Hawai‘i, Department of Accounting and General Services, Honolulu.

Wall, Walter E.
1893 Map of Honolulu. Registered Map 1690. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Welch, Walter Leslie and Leah Brodbeck Stenzel Burt
1994 *From Tinfoil To Stereo: The Acoustic Years of the Recording Industry, 1877-1929*. University of Florida Press, Gainesville, Florida.

Yucha, Trevor, Douglas Borthwick, and Hallett H. Hammatt
2009 *Archaeological Inventory Survey Report for the Proposed Waikīkī Shopping Plaza Redevelopment Project, Waikīkī, Kona District, O‘ahu, TMK: [1] 2-6-019:056, 061*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Appendix A National Register of Historic Places Inventory Nomination Form for the Ala Wai Canal



NPS Form 10-900
(Oct. 1990)

9757
OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete al items.

1. Name of Property

historic name The Ala Wai Canal

other names/site number The Waikiki Drainage Canal

2. Location

street & number The Ala Wai Boulevard ☐ not for publication

city or town Honolulu ☐ vicinity

state Hawaii code HI county Honolulu code 003 zip code 96815

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☐ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State of Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

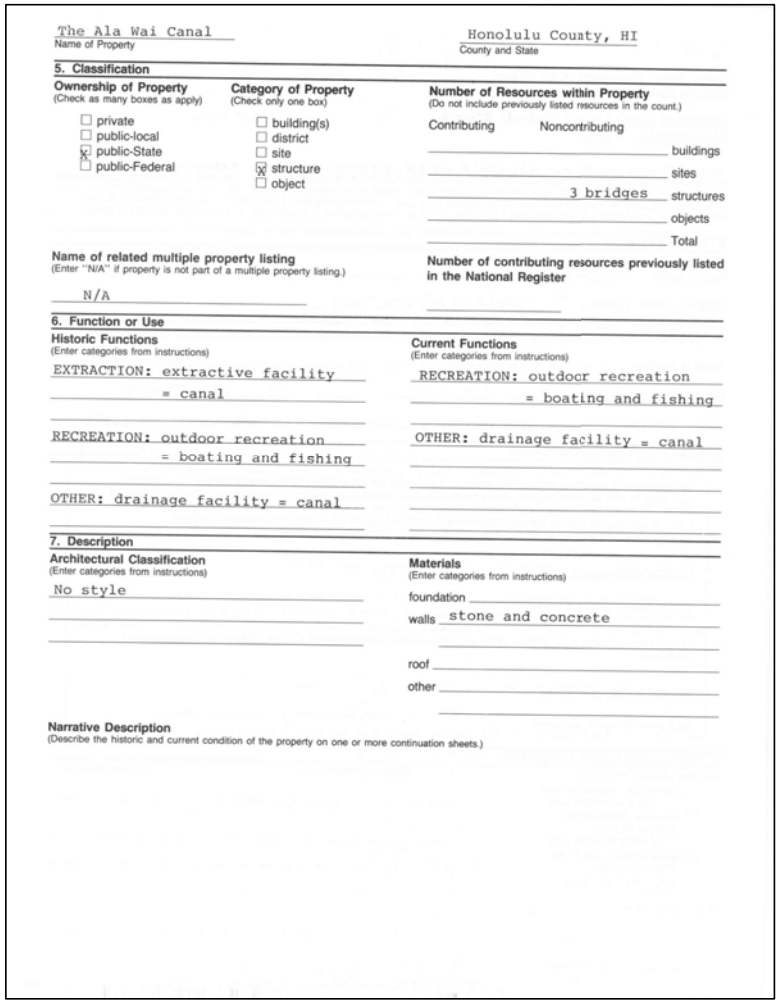
Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

☐ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____



The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

5. Classification

Ownership of Property (Check as many boxes as apply)
☐ private
☐ public-local
☒ public-State
☐ public-Federal

Category of Property (Check only one box)
☐ building(s)
☐ district
☐ site
☒ structure
☐ object

Number of Resources within Property (Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
3 bridges		structures
		objects
		Total

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register

6. Function or Use

Historic Functions (Enter categories from instructions)
EXTRACTION: extractive facility = canal
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

Current Functions (Enter categories from instructions)
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

7. Description

Architectural Classification (Enter categories from instructions)
No style

Materials (Enter categories from instructions)
foundation
walls stone and concrete
roof
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] **B** Property is associated with the lives of persons significant in our past.
- [ ] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] **A** owned by a religious institution or used for religious purposes.
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
COMMUNITY PLANNING
AND DEVELOPMENT
SOCIAL HISTORY

Period of Significance
1921-1928

Significant Dates

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
Walter F. Dillingham, builder

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [X] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [ ] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [ ] State Historic Preservation Office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Name of repository: _____

The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

10. Geographical Data

Acreage of Property 48.5 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	03	62365	2353500
2	03	62050	2354875
3	03	62012	2354750
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Erica Steele
organization N/A date May 12, 1992
street & number 3735 Diamond Head Circle telephone (808) 734-3225
city or town Honolulu state Hawaii zip code 96815

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name Department of Land and Natural Resources
street & number Kalanimoku Building telephone _____
city or town Honolulu state HI zip code 96813

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7 Page 1

The Ala Wai Canal
Honolulu County, HI

Description

People smile at her beauty, but sometimes they wrinkle their noses at her aroma.
Joggers sweat their way along her banks. Sunbathers perch on her concrete shores. Lovers watch the reflection of the moon on her surface. Ancient fishermen probe her murky depths for the tasty mullet.
She is the Ala Wai Canal - a delight to tourist and Islanders alike.
But she is much more than an open space next to the sky-crowding high rises. On any given day she is a health clinic, market, rendezvous and serious playground.

Ron Youngblood
November 27, 1969

The Ala Wai Canal is a 2-mile long man-made waterway of variable depth and width located in the Waikiki district of Honolulu. The canal is fed by the Manoa-Palolo drainage ditch which drains from the Manoa and Palolo valleys, as well as a number of smaller streams, drainage ditches and storm sewers which also drain into the canal. It forms the boundary of the Waikiki district, separating Waikiki from the Makiki, Moilili and Ala Moana areas of the city. Since its construction in 1928 the canal has been used for recreational purposes which include boating (motoring, rowing and canoe paddling) and fishing.

Constructed by the Hawaiian Dredging Company between 1921 and 1928, the canal was designed to drain low-lying wetlands in Waikiki and to provide fill that would reclaim over six hundred acres of land in the district. The canal was dredged by the "Kewalo" and consists of two straight segments joined at Kalakaua Avenue by a 45 degree elbow. The first segment of the canal, which opens to the ocean at the Ala Wai Boat Harbor, is 750 meters long and 50 meters wide. The second segment extends 2350 meters from Kalakaua Avenue to Kapahulu Avenue and is 76 meters wide.

There are three venues by which one can cross the waterway - the Ala Moana bridge, the Kalakaua bridge and the McCully bridge. When the Ala Wai Canal was originally constructed, only temporary bridges crossed it, to allow the dredge "Kewalo" to move freely about the area. Upon completion of the dredging, the Kalakaua bridge was built in 1929 by R.E. Woolley; it is a graceful multiple-arch reinforced concrete bridge. Subsequently, the McCully bridge and the bridge at Ala Moana Boulevard were added.

The length of the *makai* (ocean) side of the canal is spanned by a concrete tree-lined sidewalk, which is a popular site for jogging. Only a short stretch of the *mauka* (mountain) portion of the canal has a public walkway between the Kalakaua and Ala Moana bridges and on either side of the canal is a tranquil tree-lined footpath, the makai side of which is run by a graceful concrete arched railing. Sixteen stairwells which run the makai length of the

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7 Page 2

The Ala Wai Canal
Honolulu County, HI

Description (continued)

canal drop down from the sidewalk to the canal's surface. These additions to the canal landscape were made after the completion of the canal.

A municipal golf course, an elementary school, and a park run along the mauka side of the canal and are among the many changes bordering that side of the canal since the original construction of the Ala Wai. In addition, several high-rise apartment buildings have also been built. The surrounding visual landscape of the canal has seen enormous changes as the Waikiki, McCully and Moilili districts have developed over the years: the landscape has been transformed from an agricultural area into a residential neighborhood and finally, into a congested maze of high-rise condominiums and hotels. These alterations have had a dramatic effect upon the overall integrity of the canal landscape.

Nonetheless, there have been no significant changes to the structure of the canal itself since its original construction. Over the years, the original retaining walls contructed of stone have necessitated some repairs. In 1950 work was done to prevent crumbling masonry from falling into the canal. A new concrete facing was placed in front of the original loose stone wall. In 1992 in ongoing work the Harbors Division (the State agency responsible for the canal) is currently reinforcing portions of the wall. Some portions of the wall are being replaced because of deterioration. The main concern for the integrity of the canal is the health of its waters due to problems of siltation and water pollution caused by the sediments deposited into the canal by streams and storm drains. The sediment has necessitated occasional draining. While the original depth of the canal at the time of its construction was 10 to 25 feet, in 1990 the average depth of the canal was between 6 and 10 feet. Because of this, the canal has been dredged twice since its original construction, once in 1966 and again in 1978. It would appear ready to be dredged again, considering the current very shallow depth of water in the canal.

Despite the problem of pollution the Ala Wai "water sports park" continues to be heavily used by Waikiki residents and visitors, with an estimated daily year-round use by some 4,000 people in 1986. Throughout its history the canal has been a popular site for boating and fishing, and its banks are frequented by joggers and walkers. The Ala Wai Canal has been considered "one of the best courses for crew races in the U.S." and has been used by visiting crew's for training, including the Yale Olympic crew on their way to the games in Melbourne, Australia in 1956. The canal is used regularly by local outrigger canoe clubs, and has been for many years. Until the 1970s numerous commercial boating operations operated along the Ala Wai. For many years fishing has been a popular activity along the banks of the Ala Wai; archival photos show fishermen's perches lining the sides of the canal. Today the perches are gone, though it is not uncommon to see people hanging a line into the Ala Wai's murky waters.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7, 8 Page 3

The Ala Wai Canal
Honolulu County, HI

Description (continued)

The Ala Wai Canal provides an important aesthetic dimension to the Waikiki neighborhood with its open space and tranquil waters. While the land surrounding the Ala Wai has undergone incredible charge in the last 71 years, the environment at the canal has remained relatively constant.

Statement of Significance

The Ala Wai Canal is historically significant because of its pivotal role in the development of the Waikiki district, first as a residential neighborhood and soon after as a world-renowned resort area. The reclamation project in Waikiki, made possible by the dredging of the Ala Wai Canal, made a significant contribution to the eventual development of the State's tourism-based economy. Without the reclamation of wetlands and fishponds in Waikiki used for agriculture and aquaculture farming through 1920, Waikiki as we know it today, with its 75,000 visitors a day and the $70 million in property taxes it generates for the city, would not have been possible. The structure, which the original proposer of the canal, Lucius E. Pinkham envisioned as a great lagoon to be used for boating and recreational purposes, remains in the midst of so much change, relatively unchanged, and continues to be used regularly used by paddlers and fishermen.

Historical Background and Significance:

Since the 1500s, "Waiatite" was the seat of government for Hawaiian royalty on the island of Oahu. From that time forward Waikiki was also a documented rich and productive agricultural region, until 1921 when construction of the Ala Wai Canal began. For centuries large *loko* (fishponds) and taro *lo'i* (terraces) were fed by the many springs that flowed in Waikiki (literally, "spouting waters") and amply supplied the native Hawaiians living in the area with food. Only in the 1830s and 40s, due to a severe drop in the native population brought on by the introduction of Western diseases, did the wetlands and fishponds fall into an unproducive state. By the late 1800s and early 1900s the wetlands were again fruitful, and native Hawaiian farmers were joined by immigrant farmers who grew rice in the Waikiki area to sell to immigrant workers on the plantations.

Even after 1809, when Kamehameha I moved his court to Honolulu, Waikiki continued to be a favored haunt of Hawaiian royalty. The area was also increasingly popular with the growing number of *haole* (foreigners) living in Honolulu toward the turn of the century. As Waikiki's popularity began to grow, the value of the area could not go unnoticed for long and the community began to develop and change. The wetlands (referred to by many as "swamp lands") could, in the eyes of many in Honolulu, be put to better use than raising ducks and growing rice - but only if the land could be "reclaimed" (filled in).

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 4

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Bath houses began to be established, the first in 1881. In 1903, the Honolulu Rapid Transit Company inaugurated a service between Honolulu and Waikiki, providing easier access to the area. By 1921, the year construction of the Ala Wai Canal began, five major hotels had been constructed in Waikiki. One project that had considerable influence was the reclamation of Fort DeRussy in the Waikiki area. In the first decade of the twentieth century, the U.S. Department of War acquired 73 acres of land in Waikiki; from 1909 to 1911 the Qaartermaster Corps was assigned the task of filling "a portion of the fish ponds which covered most of the fort (Fort DeRussy)." This was the first reclamation of land in the area.

Increased public concern over the mosquito problem and the potential spread of contagious and infectious diseases in Hawaii was one of the most important factors leading to the construction of the Ala Wai and the Waikiki Reclamation Project. The mosquito was accidentally introduced to Hawaii in 1826, and the Waikiki wetlands provided an ideal breeding ground for these insects. In 1909 W. C. Hodby, chief quarantine officer of the U.S. Public Health and Marine-Hospital Service, published a report entitled "The Outlook for Quarantinable Diseases in the Territory of Hawaii." In it he urged a "relentless and unceasing war against mosquitoes..." The Sanitary Commission, created by the Legislature in 1911 to address increasing concern over the danger of contagious and infectious disease introduced in Hawaii, reported that "certain swamps and low lands must be filled in order to protect our public health." With the construction of the Ala Wai Canal the mosquito-breeding wetlands were drained and filled, eliminating what many considered to be a potentially serious health hazard.

One final factor that led to the construction of the canal was the concern over the draining of wetlands on to the shores of Waikiki's beaches, at a time when bathing was becoming increasingly popular and there were a growing number of visitors to Hawaii's beaches. The proposed drainage canal would carry the runoff away from the Waikiki beaches.

The original proposal to build the Ala Wai Canal was put forward in 1906 by Lucius E. Pinkham, then president of the Board of Health of the Territory of Hawaii. In a report to the board, Pinkham recommended the reclamation of the Waikiki district of the city of Honolulu, proclaiming that the lands in Waikiki were in a deleterious and unsanitary condition. He proposed to fill in what he termed swamp lands to create an "attractive and charming" residential neighborhood . This reclamation of 625 acres would be accomplished by the construction of a "great lagoon" that would yield the necessary fill material and "create a quite marvelously beautiful, unique district, a Venice in the midst of the Pacific." He envisaged that the canal would be used for boating, providing an ideal course for racing. Thus while the canal would serve a recreational purpose upon its completion, the primary reason for its construction was to provide the necessary fill for adjacent lands and to drain runoff from the Manoa, Makiki and Palolo valleys away from Waikiki's beaches. While the proposal was shelved

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 5

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

for a number of years, upon his appointment as governor of the Territory by then-president Woodrow Wilson in 1913, Pinkham devoted much of the energy of his four-year term to the implementation of his Waikiki plan.

In 1917 under Act 102, S.L. 1917, $5,000 was appropriated to the Superintendent of Public Works to do a complete survey, map and plans for the area in Honolulu "between King Street and the sea beach, and between Kapahulu road and Sheridan street." This would become the complete area of the reclamation project in the 1920s.

Also in 1917, Act 231 was passed authorizing Governor Pinkham to appoint a commission to devise a plan for the reclamation and improvement of this area of land. The plan was to include a "main lagoon or canal" for drainage and "to receive and take care of the natural flood waters of said area."

Under Governor Pinkham, the legislature appropriated $100,000 for the excavation of the canal and passed Act 14, S.L. 1918 authorizing the Superintendent of Public Works to "acquire for public use, by condemnation, purchase, exchange or otherwise, all necessary lands and rights of way for the purpose of digging and constructing a portion of the drainage canal or lagoon..." Many of the lands in Waikiki were acquired by a practice of land condemnation. Under a 1896 law, Act 61, the Territory of Hawaii's Board of Health could judge whether any land was unsanitary and require the owners to take the necessary steps to improve the land. This usually meant filling the land. While this practice was no great hardship for property owners who were interested in developing their land for residential or commercial purposes, for wetland farmers it essentially meant the eradication of their livelihood. In addition, if under the law land owners were financially unable to fill the land, or unwilling, the government could undertake the improvement and cover the cost through a lien placed on the property. Through this process many wetland farmers in Waikiki lost their land and livelihood.

By June 1920, 85 percent of the land required for the building of the canal had been acquired and bids to dredge the canal were solicited. In December 1920, Lyman Bigelow, Superintendent of Public Works advertised for bids in the Honolulu Star-Bulletin. On December 23, 1920 the bids were opened and the contract for the project was awarded to the Hawaiian Dredging Company, owned by Walter F. Dillingham. Dillingham's bid was one of only two bids received by the Territory for the project.

In the same year under Act 220, S.L. 1921 a resolution was issued on October 14 declaring construction of the Waikiki Drainage Canal "necessary for the proper drainage and sanitation" of Waikiki and appropriating $600,000 for the canal. Act 221 confirmed the boundaries of the reclamation project and provided for a commission to plan for boulevards, streets and parks within the district.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 6

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Two contracts were negotiated between the Territory of Hawaii and Hawaiian Dredging Company to contract for the construction of the canal. Unit 1, Job No. 2979 entitled, "Proposal for Dredging a Drainage Canal and Filling and Reclaiming Certain Unsanitary Lands at Waikiki" was the primary agreement which consisted of dredging a canal 60 feet wide some two miles inland from the "sea beach at Ala Moana Road up to and intercepting the Apuakehau Stream" and called for the construction of "a dyke 6 feet high and 10 feet wide at the top along the entire makai (south) side of this Canal." The contract for Unit 2, Job No. 2986, the "Second Unit of the Waikiki Reclamation and Sanitation Project at Waikiki" called for a canal to be dredged "from the sea beach at Ala Moana Road to a point about 500 feet toward the reef."

Construction was begun in 1921, and by January of 1922 Hawaiian Dredging Company had completed the first phase of the project, Unit 2, and was beginning work on Unit 1, Contract 2979. The hydraulic dredge "Kewalo" was used by Hawaiian Dredging Company to dredge the canal. Because of the size of the dredge it could not successfully operate in a width of 60 feet so the canal had to be cut to an approximate width of 150 feet.

By mid-1923 the "Kewalo" had cut its way almost 6,500 feet towards Kapahulu Road, cutting a channel approximately 135 feet wide and 10-20 feet deep. The Superintendent of Public Works, Lyman H. Bigelow, reported that the canal "has now intercepted Apuakehau Stream which flowed by the Outrigger Club and all the filthy waters which previously flowed on to this fine swimming beach have been diverted and now flow out to the sea by way of the canal."

By mid-1924 the canal was 150 feet wide and had been dredged "its entire length" to Kapahulu Road. In his annual report to the Governor in 1924, Bigelow stated that the canal had been excavated its entire length ending at Kapahulu Road. Due to a lack of funds the Diamond Head end of the canal, called for in Lucius Pinkham's original proposal, was put on hold until "some later date, when funds are made available." Pinkham had recommended that the canal should exit back out to the ocean at Kapiolani Park, with tides gates at the both entrances to be closed at high tide and "the waters thus forced through the lagoon to exit at the Ala Moana bridge." This portion of the canal was in fact never completed, though in 1967 the local Rotary club and other civic groups brought the idea up again - with no success.

In order to provide the additional fill material necessary to bring the Waikiki Reclamation Project to completion Act 248, S.L. 1923 was passed authorizing the widening of the canal by 100 feet.

The canal acquired its name in 1925 when the City Planning Commission requested that citizens of Honolulu submit suitable names for the renaming of the Waikiki drainage canal. Jennie Wilson, wife of Mayor Wilson, suggested the name Ala Wai, Hawaiian for "waterway."

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 7

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

The "Kewalo" headed back to McCully Street to begin dredging fill for the McCully tract, a vast area of pondfields and fishponds. By mid-1927 the filling of the McCully tract was completed and the canal was 250 feet wide almost to Kapahulu Road.

In 1928 the "Kewalo" exited the canal in and the construction of the Ala Wai was thus completed. That same year a supplement in the Honolulu Advertiser noted the dramatic increase in the value of land. According to V. Von Holt, president of the realty company Whitney & Von Holt, Ltd., land values had gone from $500 an acre for a piece of agricultural property prior to the construction of the canal to up to $4 a square foot for business property in 1928. With a great increase in available property, numerous residential development projects were undertaken in Waikiki. The number of visitors was also on the rise since the beginning of the reclamation project. Between 1921 and 1927, the number of visitors to Waikiki doubled from 8,000 to 17, 451 according to the Hawaii Visitors Bureau. In addition, in 1927 a total of 19,567 "one-day tourists" visited Hawaii's beaches as they travelled on cruise ships stopping in the islands. This same year the visitor's bureau launched its largest ever campaign to promote Hawaii and "put Waikiki and other attractions of the islands on the resort map," aggressively promoting Hawaii's "third industry" - tourism. Today tourism is the state's number one industry and Waikiki is at its core.

The Ala Wai Canal easily merits inclusion on the National Register of Historic Places, for local and state significance. This project allowed Waikiki to be transformed from an agriculturally productive region to a tourist mecca, upon which the state's economy has become increasingly dependent. Today, Waikiki's 450 acres generate $70 million in property taxes for the city annually, roughly one-third of the total property taxes received by the city. Property values in the region have skyrocketed, from an average of $840 an acre in 1917 to $22 million in 1990. Given the history of the reclamation project and resultant changes in the Waikiki district over the last 70 years, it is impossible not to conclude that the construction of the Ala Wai Canal has had a momentous impact on the development of the surrounding community and its economy, and on the economy of the entire state.

However, despite the significance of the structure, the building of the Ala Wai Canal and the reclamation project tells a sad story. The story is one in which many farmers lost their land and livelihood through a questionable practice of land condemnation and where a tranquil paradise, such as Waikiki was at the close of the 19th century, has been transformed into bustling, recreational playground with no sense of the history of the community from which it came. In fact the Ala Wai Canal is one of the only reminders of the spirit of Waikiki as it was in 1921.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9 Page 8

The Ala Wai Canal
Honolulu County, HI

Bibliography

"Canal Course Highly Praised." *Honolulu Star-Bulletin & Advertiser*, March 31, 1951.

"City Workers To Strengthen Canal's Banks." *Honolulu Advertiser*, June 30, 1950.

Finstick, Sue Ann. "The Ala Wai Canal." Term paper, University of Hawaii, 1990.

Hawaii (Territory) Board of Health. *Reclamation of the Waikiki District of the City of Honolulu, Territory of Hawaii: Recommendations--Maps--Plans and Specifications, by L.E. Pinkham, President Board of Health.* Honolulu: Hawaiian Gazette, 1906.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1915.* Honolulu: Star-Bulletin, 1915.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1916.* Honolulu: Star-Bulletin, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1917.* Honolulu: Paradise of the Pacific, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1918.* Honolulu: New Freedom Press, 1918.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1919.* Honolulu: Paradise of the Pacific, 1919.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1920.* Honolulu, 1920.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1921.* Honolulu: Paradise of the Pacific, 1921.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1922.* Honolulu: Star-Bulletin, 1922.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9 Page 9

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1923*. Honolulu: Star-Bulletin, 1923.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1924*. Honolulu: Star-Bulletin, 1924.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1925*. Honolulu: Star-Bulletin, 1925.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1926*. Honolulu: Star-Bulletin, 1926.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1927*. Honolulu: Star-Bulletin, 1927.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1928*. Honolulu: Star-Bulletin, 1928.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1929*. Honolulu: The Printshop Company, Ltd., 1929.

Hibbard, D. and D. Franzen. *The View From Diamond Head: Royal Residence to Urban Resort*. Honolulu: Editions Limited, 1987.

Honolulu, Hawaii. Bernice Pauahi Bishop Museum. Dillingham Archives, Files W-12, W-14, W-15, W-16.

Lum, Walter and Richard Cox. "The Ala Wai Canal: From Wetlands to World-famous Waikiki." *Irrigation and Drainage Proceedings 1991*. Honolulu: IR Div/ASCE, 1991.

Miller, Jacqueline. Ecological Studies of the Biota of the Ala Wai Canal. Honolulu: 1975.

Nakamura, Barry. "Waikiki and the Reclamation Project." Master's thesis, University of Hawaii, 1979.

"New Struggle Over Ala Wai Canal Use." *Honolulu Advertiser*, May 21, 1986.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9, 10 Page 10

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

"Opposition Swamps Canal Entrepreneur." *Honolulu Advertiser*, June 4, 1986.

"Realtor Sees Big Growth At Waikiki." *Honolulu Advertiser*, October 17, 1928.

"She's Lady of Many Moods." *Honolulu Advertiser*, November 27, 1969.

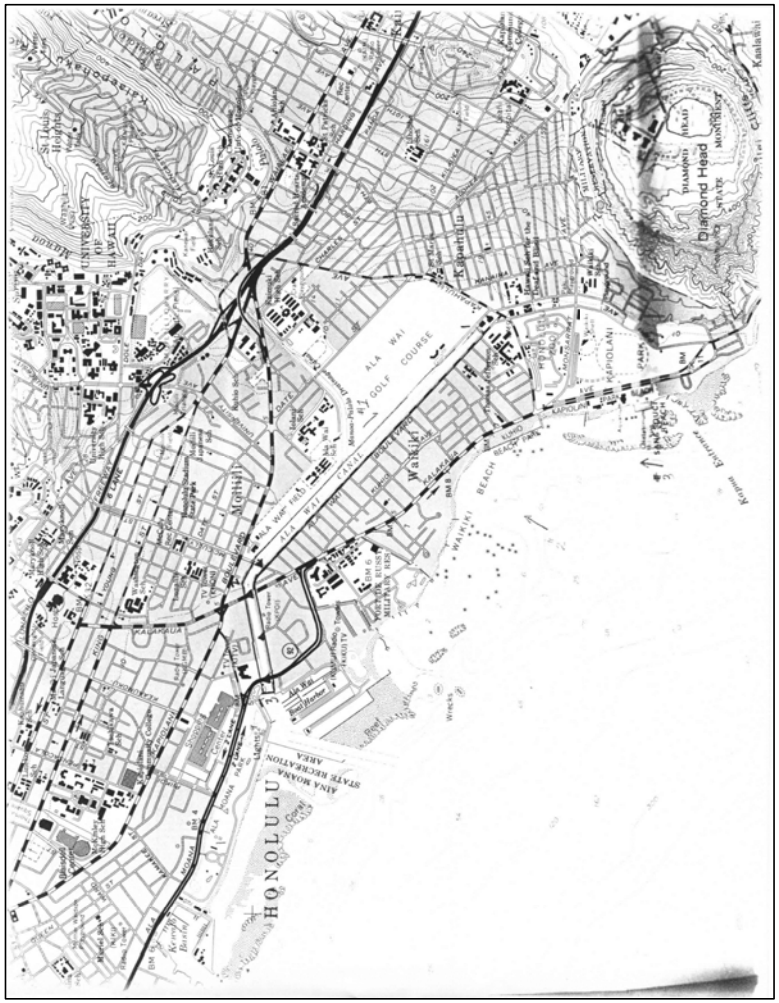
"Waikiki Magic Sends Lure World Over." *Honolulu Advertiser*, October 17, 1928.

Verbal Boundary Description

The boundary of the nominated property is delineated by the polygon whose vertices are marked by the following UTM reference points: 1) 03 623625/2353500, 2) 03 620500/2354875, 3) 03 620125/2354750.

Boundary Jusitification

The boundary of the nominated property includes the entire parcel of land historically associated with the canal ~~as well as the adjacent boulevards on the makai side of the canal~~. This area makes up the recreational "water park" that is the Ala Wai Canal today.



Appendix B Pollen Analysis (Phillips 2016)

Pollen Analysis of the WAIKIKI 179 Project

By Bruce G. Phillips
EcoPlan Associates, Inc.

Introduction

In advance of the relocation of HECO Ala Wai 46kV underground cables, Waikīkī Ahupua‘a, Honolulu (Kona) District, Island of O‘ahu, Cultural Surveys Hawai‘i (CSH) investigated SIHP #50-80-14-5796, an organic soil horizon (Stratum V) consisting of agricultural and non-agricultural wetland sediments, peat, and pond sediments and berms dating from pre-Contact times to the early 1900s. Subsequent to these efforts, six soil samples from two trenches were selected for pollen and charcoal particle analyses, with the goal of characterizing vegetation communities at the time of deposition, changes in these communities over time, the presence of cultivars at the sites, and the role of fire in landscape management.

The project area is situated on low-lying coastal flats, approximately 0.5 miles from the shoreline, *makai* of the Ala Wai Canal; elevation ranges approximately 5 feet above mean sea level. Annual rainfall averages 24 to 31 inches (Giambelluca et al. 1986). Soils in the project area are classified as Fill Land (NRCS 2016).

Prior to urban development, natural vegetation along the coastline would have primarily been characterized as Coastal Dry communities, having elevations less than 50 feet and rainfall less 47 inches per year (Gagne and Cuddihy 1990). Local edaphic conditions determine the makeup of various herblands, grasslands, shrublands, forests, and mixed communities. In turn, these communities can be further differentiated based on dominant species, such as *'Aki 'aki* Grassland dominated by *Sporobolus virginicus*. Many areas once covered with extensive grasslands are now dominated by alien species, such as *kiawe* (*Prosopis pallida*) forests.

Coastal Wet communities occur on all of the main islands. Native examples, however, were much disturbed by the early Hawaiians as nutrient-rich floodplains, marshes, and lowland riparian areas were turned into fishponds and irrigated farmlands (*lo'i*) for the cultivation of *kalo* or taro (*Colocasia esculenta*). Historically, taro, sugarcane, bananas, and rice were grown in and around the project area. Common natural constituents would have included members of the sedge family (Cyperaceae) and grass family (Poaceae).

Methods

Sediment samples were sent to the Palynology Laboratory, Texas A&M University, College Station, for pollen extractions. Sample bag contents were mixed thoroughly, and 10 gram subsamples were taken. 18,500 grains of *Lycopodium* were added to estimate pollen concentration. Samples were then treated with 10 percent hydrochloric acid to reduce carbonates, followed by a swirl-and-decant step (Mehringer 1967):136–137) to reduce the heavier matrix fraction (greater than 180 µm). Silicates were reduced by a hydrofluoric acid treatment of approximately 20 hours. Heavy liquid flotation in zinc bromide (with a specific gravity of 1.9)

1

was followed by acetolysis to further reduce organics. The remaining residues were washed with water and alcohol, stained with saffranin, and suspended in glycerol.

At EcoPlan Associates laboratories, extracts were mounted and examined at a viewing power of 400X on an Olympus BHTU compound microscope. Two hundred or more pollen grains and spores were counted. Identifications were aided by EcoPlan reference material and by keys (Selling 1946, 1947; Moore, et al. 1991). Each fossil pollen grain was identified to the genera level when possible. If a grain could not be differentiated from similar genera, it was identified only to the family level. Pollen grains that were broken, corroded, or degraded beyond recognition were assigned to the "degraded" category. Percentages of types were calculated for each sample. Pollen concentrations were calculated with the following formula:

$$\text{Concentration (grains/gram)} = \frac{\text{pollen grains counted}}{\text{tracers counted}} \times \frac{\text{tracer concentration}}{\text{sample weight}}$$

Charcoal particles were measured using a 10 X 10 grid square pattern eyepiece reticle (cf. Galehouse 1971). *Lycopodium* tracers were recorded and the concentration of charcoal particles was determined with the formula:

$$\text{Concentration (mm}^2\text{/gram)} = \frac{\text{charcoal area}}{\text{tracers counted}} \times \frac{\text{tracer concentration}}{\text{sample weight}}$$

Results and Discussion

All samples had enough identifiable pollen grains for 200-grain counts. Overall, 13 types of pollen and spores were identified (Table 1). Sedge was dominant, comprising 50 percent or more of the assemblage in all samples (Tables 2 and 3). Grasses (both regular- and large-sized grains) and monolete fern spores were subdominants. In general, the composition of the assemblage reflected wetlands dominated by sedge. An abundance of regular-sized grass pollen grains potentially represented plant succession on landscapes cleared for agriculture or habitation and then abandoned (Gagne and Cuddihy 1990). *Nui* (coconut) was the only Polynesian introduction. No unequivocal historical introductions were identified. It is possible that common large grass pollen grains represented *laiki* (rice) and/or *ko* (sugarcane) farming in the area, or the collection of *pili* grass (*Heteropogon contortus*). In practice, *laiki*, *ko*, and *pili* grass have common traits under light microscopy and cannot be distinguished (Moore et al. 1991); SEM is required. Considering the traditional and historical land use of the area large grass pollen grains are considered either *laiki* or *ko*, although *pili* is also a possibility.

Charcoal concentrations in Trench 1 were sporadic. At the base of the column (S-3), charcoal concentration was comparable to those of Trench 2. Then, a spike in charcoal (S-2) content suggested increase burning in the sample area. Afterward, a sharp decline in charcoal (S-1) indicated much reduced activity in the area. In contrast, charcoal concentrations within the Trench 2 sample column were consistent, suggesting regular land use in the area represented.

In pre-contact early contact times, the wetlands along the O‘ahu coastline were ideal for traditional Hawaiian *kalo* (taro; *Colocasia*) farming in *lo‘i* pondfields. With the arrival of Europeans, sandalwood forests were harvested, grazing animals were introduced, and grasslands encroached on upland areas surrounding the project area. In the latter half of the 19th Century, Chinese and other foreign laborers were brought to the islands to support the growing sugar industry. To suite their tastes, many pond fields were leased and turned to *laiki* cultivation in the 1880s. By the early decades of the 20th Century, *laiki* farming was on the decline. During this time, sugarcane became a major crop on suitable terrain beyond the wetlands. Around the 1920s, the area was filled with crushed coral and reclaimed dredge fill. Urbanization followed.

Historical documents indicate that the project was used at various times for growing *ko*, *laiki*, *kalo*, and *mai‘a* (bananas; *Musa*). Although *kalo* and *mai‘a* pollen grains were not found in the current analysis, this does not necessarily mean they were not grown in the area. This is due primarily to the ecology of both plants, but also the nature of farming (Onwueme 1999). First, *kalo* rarely blooms and sets seed naturally. Some varieties have never been known to flower. Furthermore, like other members of the Araceae (arum family), *kalo* produces relatively small quantities of pollen when in bloom. Second, *kalo* is harvested at a time when the edible corm has its highest nutritional content and is most viable for propagation. This occurs before flowering. *Mai‘a* have sterile male flowers and produce no pollen (Kepler and Rust 2011). Rather, the plants propagate asexually by means of corms or "shoots". In contrast, grasses produce pollen in abundance. *Laiki* grains (rice) are the goal of cultivation and the plants go through an entire life cycle before harvest, potentially depositing large amounts of pollen in the surrounding sediments. Given the history of the location and suitability of the environment, it is possible that the large grass pollen grains in Stratum V represent *laiki* farming in the project area It is possible, however, that some of the large grass pollen grains blew in from *ko* fields surrounding the site.

Previously, Scott Cummings (2013) conducted pollen analysis on three samples from a trench along Kuhio Avenue, less than 200 m *makai* of Trenches 1 and 2 of the current project. Historic maps indicate bananas were farmed in the area. All samples were dominated by sedge pollen; grass pollen was subdominant. The data indicated that a sedge/grassland marsh was present during the interval represented by the samples. A single *kalo* pollen grain showed that taro was farmed at some point. Large grass grains were interpreted as *Saccharum*-type, suggesting *ko* fields either in the project area or nearby. These data are comparable to the current project pollen assemblage, particularly the dominance of sedge and grass pollen. Although no *kalo* pollen was found in the current analysis, the strong presence of large grass pollen grains indicates *ko* and/or *lakai* farming in the area, as was suggested by Scott-Cummings (2013).

Summary and Conclusions

Six samples from two trenches were analyzed. All samples contained sufficient amounts of pollen for 200-grain counts. The percentages of degraded grains were relatively low in all samples, suggesting that the data are a reasonably accurate representation of the original pollen assemblage.

Sedge pollen dominated all samples, reflecting the marshlands and fields described in historic accounts of the area. Subdominant were grass pollen of both regular- and large-sized grains. In both locations, sedge pollen percentages were consistent within the sampled columns, suggesting marsh environments persisted throughout the time span represented by the samples. Varying grass pollen frequencies could reflect changing farming strategies and/or land use in and around the project area. The large grass pollen grains likely come from *ko* or *laiki*. A spike and then decline in charcoal concentration in the middle and upper portion of the sample column of Trench 1 reflects an increase in land clearance, possibly followed by a fallow period.

References

Gagne, Wayne C. and Linda W. Cuddihy
1990 Vegetation. In *Manual of the Flowering Plants of Hawai'i, Vol. 1 and 2*, edited by Warren L. Wagner, Derral R. Herbst, and S. H. Sohmer, pp. 45-114. Bishop Museum and University of Hawai'i Presses, Honolulu, Hawai'i.

Giambelluca, T.W., Nullet, M.A., and Schroeder, T.A.
1986 *Rainfall Atlas of Hawai'i*, Report R76, Hawai'i Division of Water and Land Development, Department of Land and Natural Resources, Honolulu.

Galehouse, Jon
1971 Point Counting. In *Procedures in Sedimentary Petrology*, edited by R.E. Carver, pp. 385-407. Wiley Publishing, New York.

Kepler, Angela Kay and Francis G. Rust
2011 *The World of Bananas in Hawaii: Then and Now*. University of Hawai'i Press, Honolulu.

Mehringer, Peter
1967 Pollen Analysis of the Tule Springs Area, Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H.M. Wormington and D. Ellis, pp. 130-200. Anthropological Papers 13. Nevada State Museum, Carson City, Nevada.

Moore, P.D., J.A. Webb and M.E. Collinson
1991 *Pollen Analysis*. Blackwell Scientific Publications, London.

Natural Resource Conservation Service
2016 Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed April 25, 2016.

Onwueme, Inno

1999 *Taro Cultivation in Asia and the Pacific*. RAP Publication: 1999/16. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific. Bangkok, Thailand.

Scott Cummings, Linda
2013 Pollen Analysis of Soil Samples from the 2139 Kuhio Avenue Parking Lot Project, Waikīkī, Hawai'i. PaleoResearch Institute Technical Report 13-077. (Prepared for Cultural Surveys Hawai'i, Inc.)

Selling, O. H.
1946 *Studies in Hawaiian Pollen Statistics, Part I. The Spores of the Pteridophytes*. Bernice P. Bishop Museum Special Publications 37.
1947 *Studies in Hawaiian Pollen Statistics, Part II. The Pollens of the Hawaiian Phanerograms*. Bernice P. Bishop Museum Special Publications 37.

Table 2. Raw Data

					Trees			Shrubs and Herbs											Ferns		Charcoal	
Sample No.	Tracer	Sum	Degraded	Unknown	*Cocos nucifera*	*Myrsine*	*Pritchardia*	Asteraceae, high-spine	Asteraceae, low-spine	Cheno-Am	Cyperaceae	Euphorbiaceae	Fabaceae	Liliaceae	Malvaceae	*Nama*	Poaceae	Poaceae, large	Solanaceae	Trilete spore	Monolete spore	Charcoal	Tracer
1	3	200	18				1	1	3	1	105	1		1			34	19	1	3	12	336	3
2	12	202	21	2	1	1	1		4	7	102				1		32	15		2	13	874	3
3	7	200	13	1		2	1		4	9	100	1	2		1	2	47	2	1	4	10	673	3
4	8	200	11	2				2	2	10	127	2		1			20	14			9	596	3
5	7	200	12	2				1		6	117	3		1		1	20	27	1		9	697	3
6	11	200	13		2	1		2	3	5	121						23	16	1	1	12	703	3

Table 1. Pollen and spore types.

Type	Common Name	Plant Community
	Trees	
*Cocos nucifera**	*Niu;* coconut	Costal Mesic Forests
Myrsine	*Kolea*	Lowland Dry to Mesic Forests
Pritchardia	*Loulu*	Costal Mesic Forests
	Herbs and Shrubs	
Asteraceae, High spine	Sunflower family, *Helianthus* -type	Disturbed habitats
Asteraceae, Low spine	Sunflower family, *Ambrosia* -type	Disturbed habitats
Cheno-Am	*Aweowco*	Coastal Dry Shrublands
Cyperaceae	Sedge family	Coastal Dry Sedgelands
Euphorbiaceae	Spurge family	Lowland Dry Shrublands
Fabaceae	Pea family	Coastal Dry Grasslands anc Shrublands
Liliaceae	Lily family	Coastal Mesic Shrublands to Forests
Malvaceae	Hibiscus family	Widespread
Nama	*Hinahina*	Coastal Dry Herblands
Poaceae	*Aki aki*; Grass family	Coastal Dry Grasslands, Sedgelands, and Mixed Communities
Poaceae, Large	Grass family; possibly *laiki*, rice (*Oryza*); *ko,* sugarcane (*Saccharum*); or *pili* (*Heteropogon contortus*)	Coastal Dry Grasslands
Solanaceae	Nightshade family	Coastal Dry Grasslands anc Shrublands
	Ferns	
Monolete spore	Ferns	Coastal to Lowland Mesic Forests
Trilete spore	Ferns and fern allies	Coastal to Lowland Mesic Forests

*Polynesian introduction

Table 3. Transformed Data. (Percent, unless otherwise indicated).

							Trees			Shrubs and Herbs												Ferns		
Sample No.	Trench	Depth (cmbs)	Concentration (grains per gram)	Types per sample	Degraded	Unknown	*Cocos nucifera*	*Myrsine*	*Prosopis*	Asteraceae, high-spine	Asteraceae, low-spine	Chenopodium	Cyperaceae	Euphorbiaceae	Fabaceae	Liliaceae	Malvaceae	*Nama*	Poaceae	Poaceae, large	Solanaceae	Trilete spore	Monolete spore	Charcoal (mm^2 per gram)
1	1	82-89	123,333	12	9.0				0.5	0.5	1.5	0.5	52.5	0.5		0.5			17.0	9.5	0.5	1.5	6.0	39.6
2	1	95-100	31,142	11	10.4	1.0	0.5	0.5	0.5		2.0	3.5	50.5				0.5		15.8	7.4		1.0	6.4	102.9
3	1	113-119	52,857	14	6.5	0.5		1.0	0.5		2.0	4.5	50.0	0.5	1.0		0.5	1.0	23.5	1.0	0.5	2.0	5.0	79.3
4	2	93-103	46,250	9	5.5	1.0				1.0	1.0	5.0	63.5	1.0		0.5			10.0	7.0			4.5	70.2
5	2	103-113	52,857	10	6.0	1.0				0.5		3.0	58.5	1.5		0.5		0.5	10.0	13.5	0.5		4.5	82.1
6	2	113-123	33,636	11	6.5		1.0	0.5		1.0	1.5	2.5	60.5						11.5	8.0	0.5	0.5	6.0	82.8

APPENDIX C

CULTURAL IMPACT ASSESSMENT

Final

Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu TMKs: [1] 2-6-017; 2-7-013, 014, and 036 (various parcels)

Prepared for
Hawaiian Electric Company

Prepared by
Brittany Beauchan, M.A.,
Victoria S. Creed, Ph.D.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: WAIKIKI 184)

July 2016

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph.: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Cultural Impact Assessment Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMKs: [1] 2-6-017; 2-7-013, 014, and 036 (Beauchan et al. 2016)
Date	July 2016
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: WAIKIKI 184
Agencies	State of Hawai‘i, Department of Health, Office of Environmental Quality Control (DOH/OEQC)
Land Jurisdiction	State of Hawai‘i
Project Proponent	Hawaiian Electric Company (Hawaiian Electric)
Project Funding	Hawaiian Electric
Project Location	The project area is located on portions of Hīhīwai Street, Ala Wai Boulevard, Kālaimoku Street, Kai‘olu Street, University Avenue, Ala Wai Neighborhood Park, Ala Wai Canal, and Ala Wai Elementary School in Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu. The project area is depicted on a 1998 Honolulu U.S. Geological Survey (USGS) quadrangle.
Project Description	The current project is of irregular shape and consists of relocation of underground sub-transmission line cables that connect to Hawaiian Electric’s Waikiki Substation located on Kai‘olu Street. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the cables west of the existing route and utilize horizontal drilling to cross under the Ala Wai Canal. On the *makai* (seaward) side of the canal, open trenching will be used to install a ductbank/cable system that will be routed from Kalaimoku Street along Ala Wai Boulevard to Kai‘olu Street and will connect to the Waikiki substation. On the *mauka* (inland) side of the Ala Wai Canal, open trenching will be used to install a ductbank/cable system that will be routed from the Ala Wai Neighborhood Park parking lot along Hihiwai Street to a utility pole near the intersection with Kamoku Street. Cables will also be pulled through an existing ductbank system from the park to a utility pole located on University Avenue near Kapi‘olani Boulevard. There will be removal of existing cables from Ala Wai Elementary School and Ala Wai Canal, roughly in line with Kai‘olu Street. Pole replacement will occur near the intersections of University Avenue and Kapi‘olani Boulevard and Hīhīwai Street and Kamoku Street. There will also be staging areas on Kālaimoku Street, University Avenue, and in the Ala Wai Neighborhood Park.

Project Acreage	The current project area includes approximately 4.05 hectares (10.0 acres).
Document Purpose	This CIA was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai‘i significance criterion “e,” pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance criterion “e” refers to historic properties that “have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with 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” (HAR §13-275-6 and §13-284-6). The document will likely also support the project’s historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS §6E-8 and HAR §13-284.
Results of Background Research	Background research for this project yielded the following results (presented in approximate chronological order): 1. Waikīkī was comprised of a vast system of irrigated taro fields which spanned from Waikīkī Kai through Waikīkī Waena, and into the valleys of Mānoa. The Waikīkī marshland was an excellent place to grow taro, even better than the revered areas of Kāne‘ohe and Kahalu‘u on the windward side of O‘ahu. 2. The Waikīkī area was full of aquatic resources including hundreds of fishponds that dotted the shoreline of the *ahupua‘a* (land division usually extending from the uplands to the sea) 3. Six *heiau* (pre-Christian place of worship) are said to have been associated with the Waikīkī area: Papa‘ena‘ena Heiau, Helumoa Heiau, Kapua Heiau, Kūpalaha Heiau, Kamauakapu Heiau, and Kulanihakoi Heiau (Thrum 1907:44). Thrum also mentions the Wizard Stones of Kapaemāhū at Waikīkī. The Wizard Stones were unearthed in the late 1800s on the premises of the Cleghorn family. According to *mo‘olelo* (oral traditions), four soothsayers from the court of a Tahitian king came to Hawai‘i and helped to heal many people. Four large stones were gathered

	from the vicinity of a “bell rock” in Kaimukī and erected in Waikīkī to commemorate them–two at their habitation and two at their bathing place in the sea. The chief of the wizards, Kapaemahu, named his stone after himself, and a virtuous young chiefess was sacrificed and placed beneath the stone. Today they are located at Kūhiō Beach Park (Thrum 1907:139–141). 4. During the first part of the twentieth century, Waikīkī evolved into a world tourist destination. Hawaiian Dredging Company, owned by Mr. Dillingham, doing most of the dredging and filling of the non-military section of Waikīkī. Barry Nakamura, in a dissertation paper, presents the cultural context for the change from the Hawaiian viewpoint. 5. The intensive development of the Waikīkī area from the early twentieth century through the early twenty-first century has resulted in an entirely modified landscape in which the original wetlands have been filled in and surfaced with paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks.
Results of Community Consultation	CSH attempted to contact NHOs, agencies, and community members. Below is a list of individuals who shared their *mana‘o* (thought, opinions) and *‘ike* (knowledge) about the project area and Waikīkī Ahupua‘a: 1. Paulette Ka‘anohi Kaleikini, cultural descendant and owner of ‘Ōiwi Cultural Resources 2. Barbara Makua, *kupuna* (elder) and resident of Waikīkī 3. Jan Becket, author, photographer, and retired teacher from Kamehameha Schools. Kona Moku Representative, Council of Hawaiian Civic Club’s Committee on the Preservation of Historic Sites and Cultural Properties 4. Andrea Feeser, author and researcher of *Waikīkī: A History of Forgetting and Remembering*
Impacts and Recommendations	Based on information gathered from the cultural and historical background, and the community consultation, potential impacts were identified and the following preliminary recommendations were made. 1. Previous archaeological studies have indicated the presence of two State Inventory of Historic Properties (SIHP # 50-80-14-9757, the Ala Wai Canal and SIHP # -5796, culturally modified wetland sediments) within the current project area. Previous archaeological studies conducted in the vicinity of the current project area have identified four historic properties (SIHP # -4890, an inadvertent burial discovery of at least one individual; SIHP # -6680, ponded field sediment; SIHP # -6407, subsurface cultural layer; and SIHP # -4970, *‘auwai* (channel)) within an approximate 225 to 450-

	meter radius of the current project area. Additionally, archaeological inventory survey (AIS) fieldwork conducted within the current project area did not encounter *iwi kūpuna* (ancestral bones) despite the fact Waikīkī is known to have burials. Participants have also indicated there is a possibility of *iwi kūpuna* in the vicinity of the project area. During community consultation with Paulette Ka‘anohi Kaleikini and Andrea Feeser, the two interviewees articulated that *iwi kūpuna* and other cultural finds may be present in the vicinity of the project area. 2. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended. 3. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Table of Contents

Management Summary i

Section 1 Introduction 1

1.1 Project Background 1
1.2 Document Purpose 1
1.3 Scope of Work 9
1.4 Environmental Setting 9
1.4.1 Natural Environment 9
1.4.2 *Lepo* (Soils) 10
1.4.3 *Ua* (Rain) 10
1.4.4 *Makani* (Wind) 14
1.4.5 *Kahawai* (Streams) 15
1.4.6 *Ke Kai ame ka Moana* (Seashore and Ocean) 16
1.4.7 Built Environment 17

Section 2 Methods 18

2.1 Archival Research 18
2.2 Community Consultation 18
2.2.1 Scoping for Participants 18
2.2.2 “Talk Story” Sessions 18
2.2.3 Interview Completion 19

Section 3 *Ka‘ao* and *Mo‘olelo* (Legends and Stories) of Waikīkī 20

3.1 *Ka‘ao* and *Mo‘olelo* 20
3.1.1 Nā Pōhaku ‘Ola Kapaemāhū a Kapuni (Wizard Stones) 20
3.1.2 Kamō‘ili‘ili (the pebble lizard) 21
3.1.3 Kalamakua and His Romantic Meeting with Keleanuinoho‘ana‘api‘api (“Great Kelea who flutters”) 22
3.1.4 The Shark God Ka‘ehu 23
3.2 *Wahi Pana* (Legendary or Storied Places) 24
3.2.1 ‘Āpuakēhau 25
3.2.2 Hamohamo 25
3.2.3 Waikīkī Waena and Waikīkī Kai 26
3.2.4 Kālia ‘Ili 29
3.2.5 Kaluaokau ‘Ili 31
3.2.6 Helumoa ‘Ili 31
3.2.7 Kapua ‘Ili 33
3.2.8 *Heiau* 33
3.2.9 Nā Pōhaku ‘Ola Kapaemāhū a Kapuni 35
3.2.10 Healing Waters of Kawehewehe 37
3.2.11 Trails 37
3.3 *‘Ōlelo No‘eau* (Proverbs) 39
3.3.1 *‘Ōlelo No‘eau* #2255 39
3.3.2 *Ōlelo No‘eau* #110 40
3.3.3 *Ōlelo No‘eau* #1321 40
3.3.4 *‘Ōlelo No‘eau* #285 40
3.3.5 *‘Ōlelo No‘eau* #1378 40

3.3.6 *‘Ōlelo No‘eau* #1493 40
3.3.7 *‘Ōlelo No‘eau* #1734 41
3.3.8 *‘Ōlelo No‘eau* #1772 41
3.4 *Oli* (Chant) 41
3.4.1 Chant of Papa‘ena‘ena 41
3.5 *Mele* (Song) 42
3.5.1 O‘ahu 42
3.5.2 Ku‘u Pua i Paoakalani (My Flower at Paoakalani) 42
3.5.3 Waikīkī Hula 43
3.5.4 Waikiki 44

Section 4 Traditional and Historical Accounts of Waikīkī 46

4.1 Pre-Contact to Early 1800s 46
4.1.1 Aquaculture 48
4.1.2 Agriculture and Subsistence 48
4.2 Mid-to Late 1800s and the Māhele 49
4.2.1 Rice Cultivation 58
4.2.2 Banana Cultivation 59
4.3 1900s 64
4.3.1 Ala Wai Canal 68
4.3.2 Development of Waikīkī 73
4.3.3 Post-1950 Modern Land Use 74
4.3.4 ‘Iolani School Olympic Rowing Team 74

Section 5 Previous Archaeological Research 79

5.1.1 McMahon 1994 84
5.1.2 Cleghorn 1996 84
5.1.3 LeSuer et al. 2000 84
5.1.4 Borthwick et al. 2002 84
5.1.5 Bush et al. 2002 85
5.1.6 Kailihiwa and Cleghorn 2003 85
5.1.7 Tulchin et al. 2004 85
5.1.8 McIntosh and Cleghorn 2004 85
5.1.9 Esh and Hammatt 2004 85
5.1.10 O’Leary et al. 2006 85
5.1.11 Esh and Hammatt 2006 86
5.1.12 Petrey et al. 2008 86
5.1.13 Yucha et al. 2009 86
5.1.14 Park and Collins 2010 86
5.1.15 Sroat et al. 2011 86
5.1.16 LaChance and Hammatt 2014 86
5.1.17 Gosser and Collins 2014 86
5.1.18 Pammer et al. 2014 87
5.1.19 Lima et al. 2014 87
5.1.20 Morriss and Hammatt 2015 87
5.1.21 Martel and Hammatt 2016 87
5.2 Historic Property Descriptions 88
5.2.1 SIHP # 50-80-14-5796 88
5.2.2 SIHP # 50-80-14-9757 105

Section 6 Community Consultation 106

6.1 Introduction 106
6.2 Community Contact Letter 106
6.3 Community Contact Table 110
6.4 *Kama‘āina* Interviews 129
6.4.1 Email Correspondence with Paulette Ka‘anohi Kaleikini 129
6.4.2 Summary of Barbara Makua Interview 131
6.4.3 Summary of Jan Becket Interview 137
6.4.4 Summary of Andrea Feeser Interview 153
6.5 Summary of *Kama‘āina* Interviews 157

Section 7 Traditional Cultural Practices 163

7.1 Gathering of Plant and Food Resources 163
7.2 Religious Practice and Burials 165
7.3 *He‘e Nalu* 166

Section 8 Summary and Recommendations 167

8.1 Results of Background Research 167
8.2 Results of Community Consultations 167
8.3 Non-Cultural Community Concerns and Recommendations 168
8.4 Impacts and Recommendations 168

Section 9 References Cited 169

Appendix A National Register of Historic Places Inventory Nomination Form for the Ala Wai Canal 180

Appendix B Dr. Richard Kelley Response Letter 195

Appendix C Sheleigh Christina Ka‘āhiki Solis Resource List 196

Appendix D Authorization and Release Forms 206

D.1 Barbara Makua 206
January 30, 2016 206
Febraury 4, 2016 207
D.2 Jan Becket 208
February 18, 2016 208
D.2 Andrea Feeser 209
March 10, 2016 209

List of Figures

Figure 1. Portion of the 1998 Honolulu USGS 7.5-minute topographic quadrangle showing the location of the project area....2
Figure 2. Tax Map Key (TMK) [1] 2-6-017 showing the project area (Hawai‘i TMK Service 2014)....3
Figure 3. TMK: [1] 2-7-013 showing the project area (Hawai‘i TMK Service 2014)....4
Figure 4. TMK: [1] 2-7-014 showing the project area (Hawai‘i TMK Service 2014)....5
Figure 5. TMK: [1] 2-7-036 showing the project area (Hawai‘i TMK Service 2014)....6
Figure 6. Aerial photograph of the project area (Google Earth 2013)....7
Figure 7. Aerial photograph depicting the proposed work plans and project area (Google Earth 2013)....8
Figure 8. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972) on a 2013 Google Earth aerial photograph, indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001)....11
Figure 9. Detail of an 1887 map of Honolulu by Wall, showing the current project location. The division between Waikīkī Kai and Waikīkī Waena is roughly through the bottom third of the project area....27
Figure 10. Nineteenth century photo of Waikīkī and fishponds, likely taken from Kālia (Hawai‘i State Archives n.d.)....30
Figure 11. 1853 sketch of Waikīkī with view to Diamond Head (University of Chicago) (note close proximity of houses to the shore)....30
Figure 12. Photograph of the healing wizard stones of Kapaemahu....36
Figure 13. Map depicting project area in red and trails from Punchbowl Street to Waialae as described by ‘Ī‘ī (1959:93)....38
Figure 14. Aerial photograph of Waikīkī with overlay of areas historically known to be *lo‘i kalo* (green), streams (blue), and fish ponds (teal) (Google Earth 2012; image courtesy of Mr. Peter Young 2013)....50
Figure 15. Portion of an 1881 Hawaiian Government survey map by S.E. Bishop showing the location of land claims within the project area....52
Figure 16. Portion of a 1922 LCA 537, Map 1 showing the locations of LCAs in the Waikīkī Kai portion of the project area, with more detail than the 1881 S.E. Bishop map (Hawai‘i Land Survey Division)....53
Figure 17. Aerial photograph showing the locations of Kuleana LCAs (Google Earth 2013) within the project area....54
Figure 18. Photo of rice fields in Waikīkī in the 1890s; *mauka* is Mānoa Valley (Hawaiian Historical Society)....60
Figure 19. Portion of an 1893 Wall map of Honolulu, showing distribution of rice fields in and around the current project area....60
Figure 20. Portion of 1910 U.S. Engineers map of Waikīkī showing the project area; note the in-filling of the fishponds within the southern portion of Fort DeRussy....61
Figure 21. A 1910 photograph of the banana fields at Olohana Street, located approximately one block west of the current project area, showing the irrigation and drainage systems required for lowland banana cultivation (photo by Ray Jerome Baker; adapted from LeSuer et al. 2000)....62

Figure 22. A 1920 aerial photograph of Kālia to Ala Moana showing the project area located within the Waikīkī wetlands; note the banana crop fields in the foreground and the rice fields in the background (from Grant 1996)....63
Figure 23. Portion of an 1897 map by M.D. Monsarrat, showing the project area in relation to Pi‘inaio Stream, the fishponds of Kālia, and the growing road network including Waikīkī Road (Kalākaua Avenue), Beach Road (Ala Moana Boulevard), and Kālia Road....65
Figure 24. Portion of 1919 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area; note the remaining fishponds west of the project area....66
Figure 25. Portion of 1933 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area, the complete in-filling of the Kālia wetlands, and the development of the Ala Wai Canal. Three ponds are depicted to the north of the project area that have not been filled at this time....67
Figure 26. Portion of 1943 U.S. Army War Department topographic map, Honolulu and Diamond Head Quadrangles, showing the project area; three ponds depicted to the north of the project area have not been filled at this time....69
Figure 27. Portion of 1953 Honolulu USGS topographic quadrangle showing the project area and the complete in-filling of Pi‘inaio Stream which was replaced by Ala Moana Boulevard; note the three ponds to the north of the project area have been filled by this time....70
Figure 28. 1978 USGS aerial orthophotograph, Honolulu Quadrangle, showing the project area....71
Figure 29. Creation of the Ala Wai Canal showing floating dredge line, ca. 1924 (Bishop Museum Archives)....72
Figure 30. 1927 aerial photo of the completed Ala Wai Canal showing the reclamation of the Kālia area within Waikīkī with coral fill (dredge and pipe in foreground) (Bishop Museum Archives)....72
Figure 31. 1927 Sanborn Fire Insurance map showing the newly created lots in the Waikīkī Kai portion of the project area....75
Figure 32. 1950a Sanborn Fire Insurance map showing the new apartments in the Waikīkī Kai portion of the project area....76
Figure 33. 1950b Sanborn Fire Insurance map showing the Waikīkī Waena portion of the project area....77
Figure 34. Previous archaeological studies in the vicinity of the current project area (Google Earth 2013)....82
Figure 35. Previously designated archaeological sites in the vicinity of the project area (Google Earth 2013)....83
Figure 36. A 2013 aerial photograph (Google Earth) showing the location of the test trenches within the current project area (Martel and Hammatt 2016)....90
Figure 37. Sample profile of T-3 from LaSuer et al. (2000)....91
Figure 38. General stratigraphic description of T-3 from LaSuer et al. (2000)....91
Figure 39. Photograph of T-3 from Yucha et al. (2009)....93
Figure 40. Profile of T-3 from Yucha et al. (2009)....93
Figure 41. Photograph of Profile 3 from Sroat et al. (2011)....95
Figure 42. Profile 3 from Sroat et al. (2011)....95
Figure 43. Photograph of T-5 from Pammer et al. (2014)....98
Figure 44. Profile of T-5 from Pammer et al. (2014)....98

Figure 45. Photograph of TE-5 from Morriss and Hammatt (2015).....101
Figure 46. Profile of TE-5 from Morriss and Hammatt (2015).....102
Figure 47. Community consultation letter, page one.....107
Figure 48. Community consultation letter, page two.....108
Figure 49. Unobstructed view of Diamond Head taken from apartment building located along the Ala Wai Canal (Photo courtesy of Mrs. Barbara Makua).....136
Figure 50. Photograph of damaged *pā* (enclosure) at Wa‘ahila Ridge, view to south. The Waikīkī skyline is partially visible in background. (Photo courtesy of Jan Becket 1998).....138
Figure 51. Photograph of portion of *makai* facing basalt stone wall, note prominent *pōhaku* in middle ground (Photo courtesy of Jan Becket 1998).....139
Figure 52. Photograph of damaged portion of west-facing basalt stone wall; note the ramp created by mountain bikers to jump over the prominent *pōhaku* pictured in middle ground (Photo courtesy of Jan Becket 2002).....140
Figure 53. Photograph documenting portion of a homeless encampment within the Wa‘ahila cultural site (Photo courtesy of Jan Becket 2012).....141
Figure 54. General view of Wa‘ahila Ridge State Recreation Park; trail to cultural site located southwest of parking lot, view to northeast.....142
Figure 55. General view of Diamond Head and *makai* portion of Waikīkī Ahupua‘a (taken from trail); view of project area obscured by vegetation, view to southeast.....143
Figure 56. General view of a portion of the trail traveled during Mr. Becket’s and CSH’s *huaka‘i* to the Wa‘ahila Ridge cultural site, view to north.....144
Figure 57. General view of a portion of a dry, intermittent stream.....146
Figure 58. General view of a portion of a dry, intermittent stream.....146
Figure 59. General view of homeless encampment utilizing site features to anchor tents and tarps, view to southeast.....148
Figure 60. General view of homeless encampment utilizing site features to anchor tents and tarps, view to south.....149
Figure 61. General view of current site conditions; note the entirety of the cultural site covered by tents and tarps, view to south.....150
Figure 62. Sketch of Site 5463 (Rosendahl 1996:22).....151

List of Tables

Table 1. Land Claims Located within the Project Area.....55
Table 2. Previous Archaeological Studies in the Vicinity of the Project Area.....79
Table 3. Historic Properties Identified within the Current Project Area.....88
Table 4. Stratigraphic Description of T-3 from LaSuer et al. (2000).....92
Table 5. Stratigraphic Description of T-3 from Yucha et al. (2009).....94
Table 6. Stratigraphic Description of Profile 3 from Sroat et al. (2011).....96
Table 7. Stratigraphic Description of T-5 from Pammer et al. (2014).....99
Table 8. SIHP # -5796 Features.....100
Table 9. Stratigraphic Description of TE-5 from Morriss and Hammatt (2015).....103
Table 10. Results of Community Consultation.....110

Section 1 Introduction

1.1 Project Background

At the request of Hawaiian Electric Company (Hawaiian Electric), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared a cultural impact assessment (CIA) for the Ala Wai 46kV Underground Cables Relocation project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMKs: [1] 2-6-017; 2-7-013, 014, and 036. The approximately 4.05-hectare (10.0-acre) project area is of irregular shape and consists mostly of active roadways along portions of University Avenue, Hīhīwai Street, Ala Wai Boulevard, Kālaimoku Street, and Kai‘olu Street as well as Ala Wai Neighborhood Park, Ala Wai Canal, and Ala Wai Elementary School. The project area is depicted on a portion of the 1998 U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), tax map plats (Figure 2 through Figure 5), and a 2013 aerial photograph (Figure 6).

The current project is of irregular shape and consists of relocation of underground sub-transmission line cables that connect to Hawaiian Electric’s Waikiki Substation located on Kai‘olu Street. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the cables west of the existing route and utilize horizontal drilling to cross under the Ala Wai Canal. On the *makai* (seaward) side of the canal, open trenching will be used to install a ductbank/cable system that will be routed from Kālaimoku Street along Ala Wai Boulevard to Kai‘olu Street and will connect to the Waikīkī substation. On the *mauka* (inland) side of the Ala Wai Canal, open trenching will be used to install a ductbank/cable system that will be routed from the Ala Wai Neighborhood Park parking lot along Hihiwai Street to a utility pole near the intersection with Kamoku Street. Cables will also be pulled through an existing ductbank system from the park to a utility pole located on University Avenue near Kapi‘olani Boulevard. Existing cables will be removed from Ala Wai Elementary School and Ala Wai Canal, roughly in line with Kai‘olu Street. Pole replacement will occur near the intersections of University Avenue and Kapi‘olani Boulevard and Hīhīwai Street and Kamoku Street. There will also be staging areas on Kālaimoku Street, University Avenue, and in Ala Wai Neighborhood Park (Figure 7).

1.2 Document Purpose

This CIA was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project’s potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control’s *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai‘i significance criterion “e,” pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance criterion “e” refers to historic properties that:

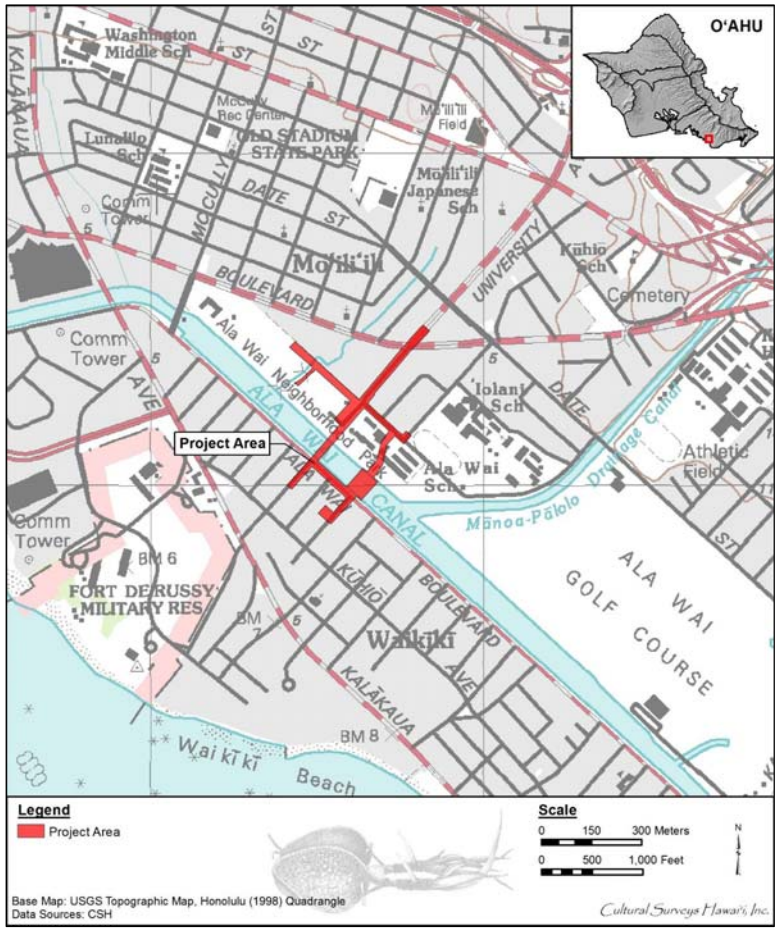


Figure 1. Portion of the 1998 Honolulu USGS 7.5-minute topographic quadrangle showing the location of the project area

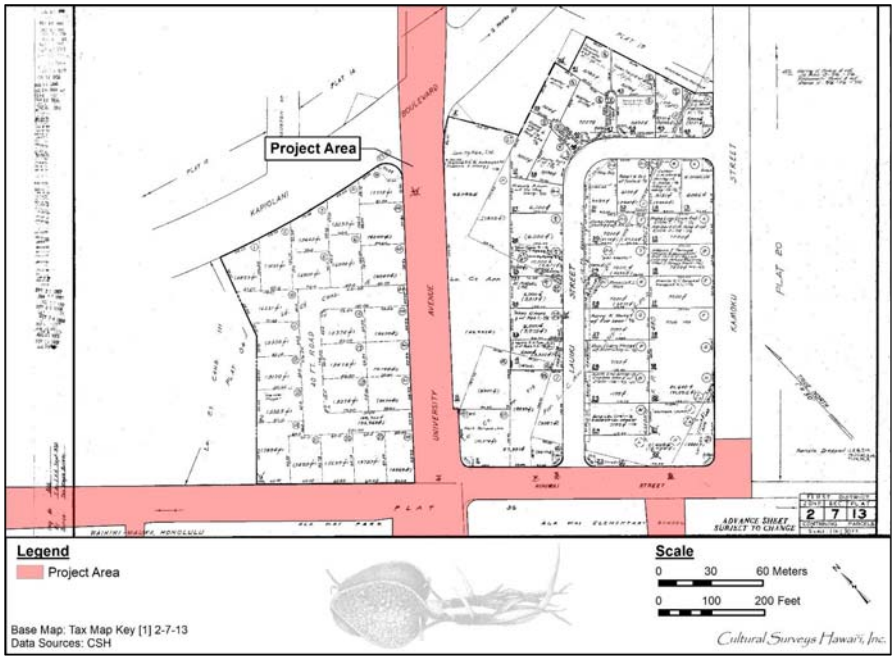


Figure 3. TMK: [1] 2-7-013 showing the project area (Hawai‘i TMK Service 2014)

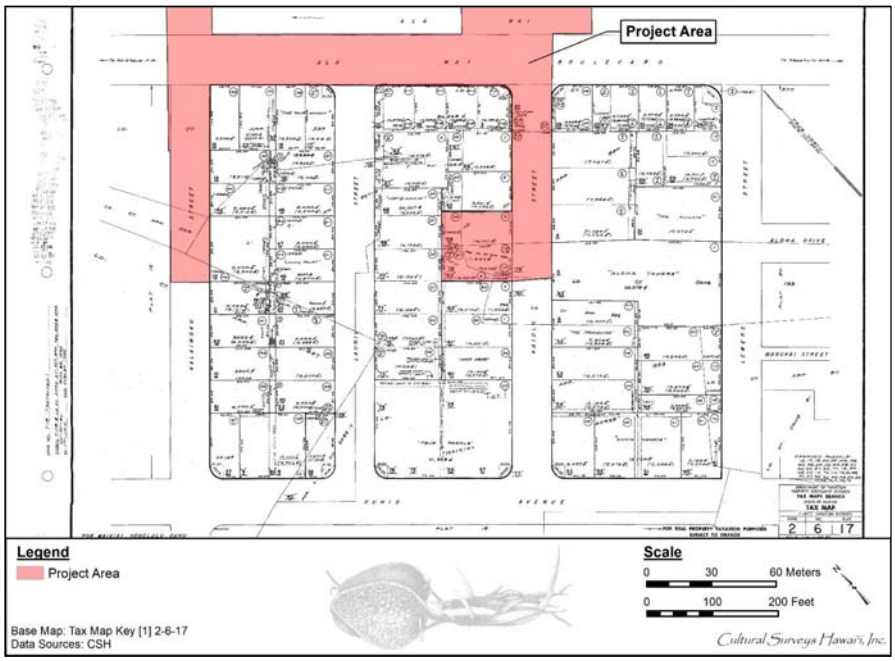


Figure 2. Tax Map Key (TMK) [1] 2-6-017 showing the project area (Hawai‘i TMK Service 2014)

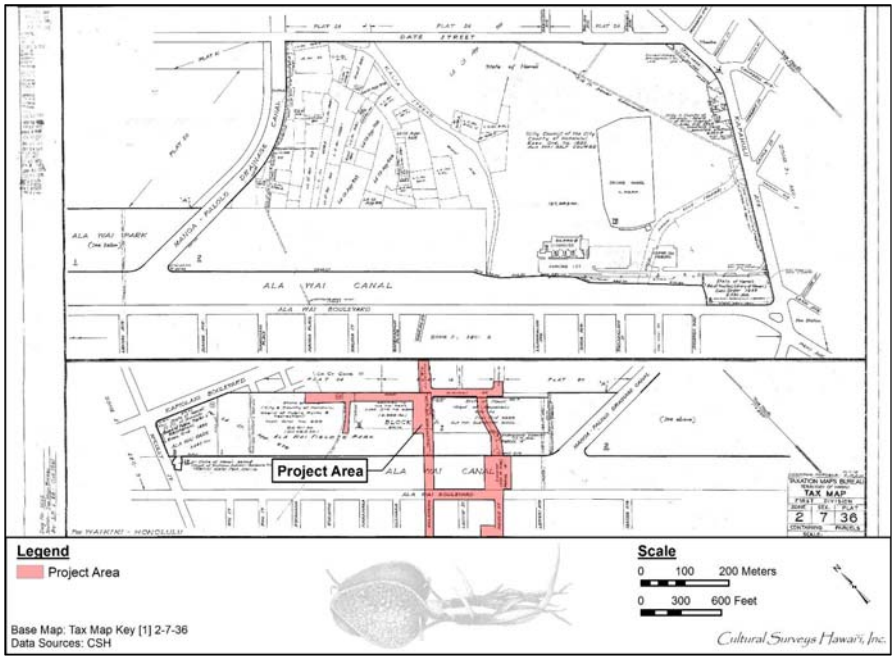


Figure 5. TMK: [1] 2-7-036 showing the project area (Hawai‘i TMK Service 2014)

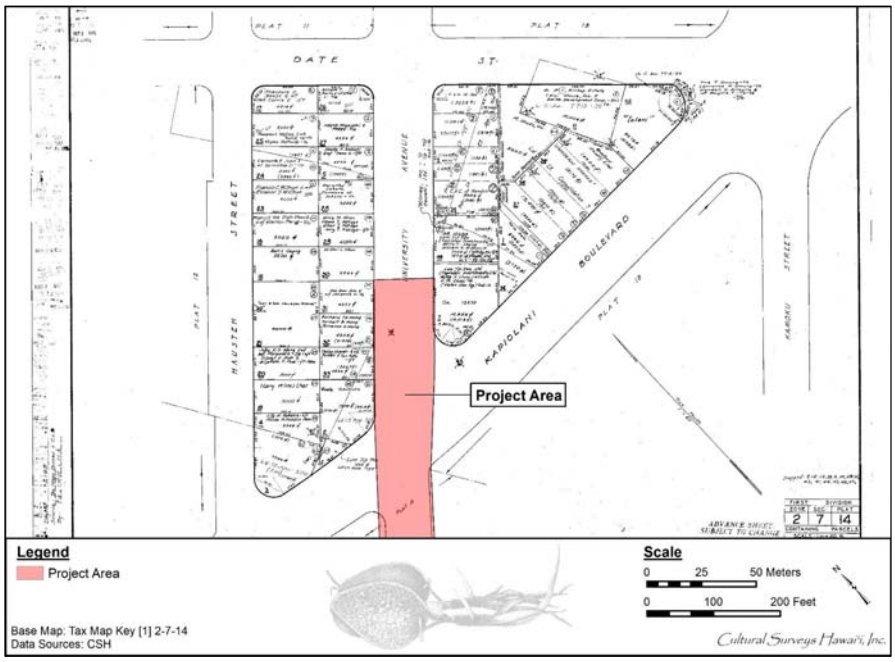


Figure 4. TMK: [1] 2-7-014 showing the project area (Hawai‘i TMK Service 2014)

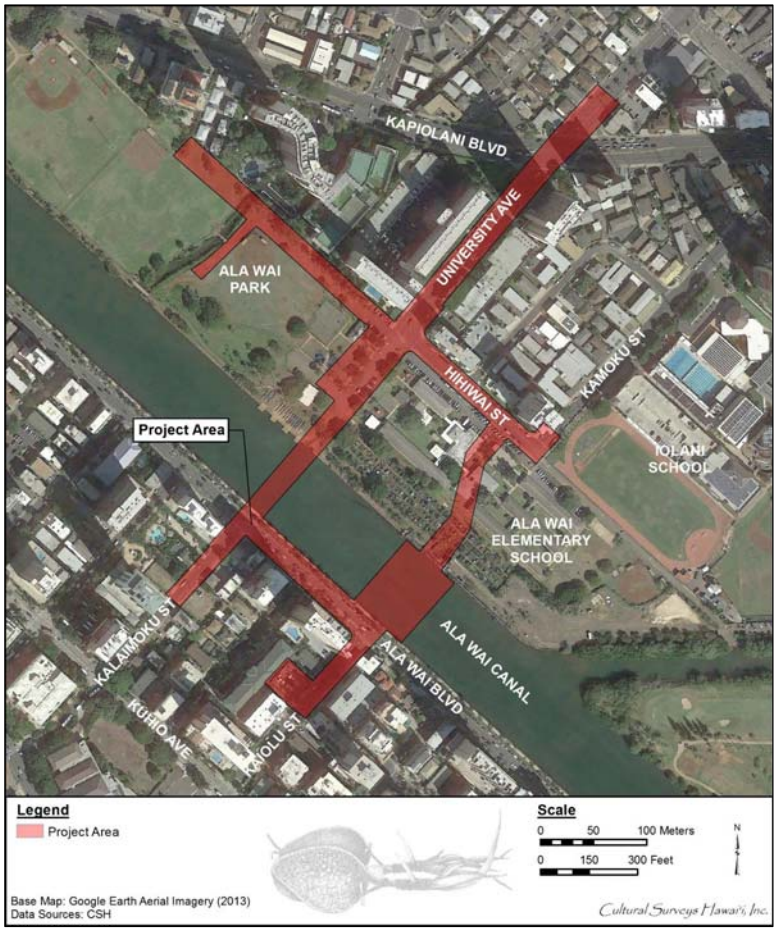


Figure 6. Aerial photograph of the project area (Google Earth 2013)

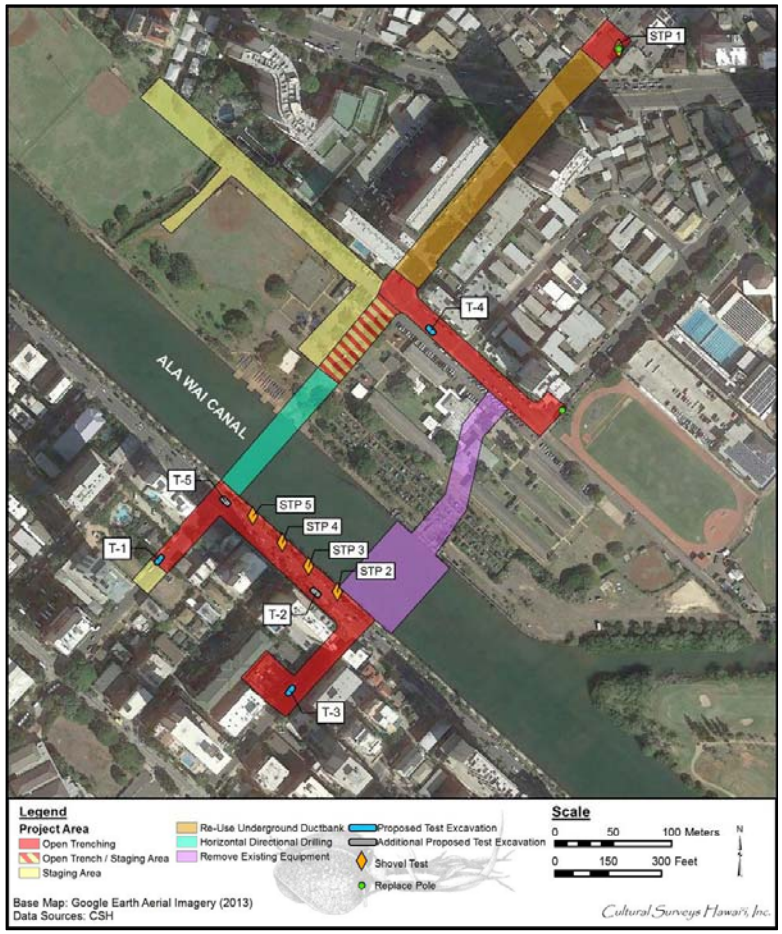


Figure 7. Aerial photograph depicting the proposed work plans and project area (Google Earth 2013)

> have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with 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 [HAR §13-275-6 and §13-284-6].

The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project's environmental review.

1.3 Scope of Work

The scope of work for this CIA includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports for the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work within and near the subject parcel that may be relevant to reconstructing traditional land use activities, and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices in or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area is situated along the southeastern coast of O‘ahu. The Honolulu leeward coastal plain is stratified with late-Pleistocene coral reef substrate overlaid with calcareous marine beach sand, terrigenous sediments, and/or stream-fed alluvial deposits (Armstrong 1973:36). Terrigenous sediments are formed and deposited on land, or are materials derived from land mixed with purely marine material. The modern Honolulu District shoreline configuration is primarily the result of three factors: the rising sea level following the end of the Pleistocene (Stearns 1978); the 1.5-2.0 m highstand of the sea during the mid- to late Holocene; and pre- and post-Contact human landscape modification. The plain of Waikīkī is flat and generally less than 4.5 m (15 feet [ft]) above sea level. Lands within the project area are relatively level with an elevation of approximately 1 m (3 ft) above mean sea level (AMSL).

During the Pleistocene Sangamon Interglacial Stage (130,000-114,000 years before present), the sea level was at least 8 m (25 ft) higher than today (Stearns 1978). This led to the deposit of fossil reef limestone in southern coastal O‘ahu. The rise and retreat of the sea level led to the formation of interbedded marine and terrestrial deposits miles inland of the present shoreline. This limestone, called the Mō‘ili‘ili Karst, which is composed of detritus, calcareous sand, reef dwelling organisms, and coralline algae, is subject to dissolution from water. This dissolution has formed a series of connected and isolated caves under the Mō‘ili‘ili area (O'Hare et al. 2007:10–11).

Throughout this underground karsic flows numerous streams. Karsic springs were also known to feed the numerous ponds and marshland that once occupied 2,000 acres of Waikīkī Ahupua‘a (Kanahele 1986:5–6).

Although invisible to human eyes, streams, via the karsic system, flow under the surface of Waikīkī. Hydrological studies have shown that probably as much water flows below ground as above. Traditional accounts claim that in many places water spouted up from under the ground, feeding the marshland environment and contributing to the endowment of Waikīkī with its Hawaiian name, literally translated as "water spurting from many sources," (Kanahele 1995:8). The original marshland landscape surrounding the current project area, however, has been significantly altered by pre-Contact modifications in addition to historic and modern-era development.

Waikīkī has little or no naturally occurring vegetation. Beginning in the 1940s, following the construction of the Ala Wai Canal, various civic clubs planted numerous introduced species within the project area (Cocke 2013). Landscaping ornamentals and exotics still proliferate in and around the project area, and include species such as plumeria (*Plumeria rubra*), Manila Palm (*Adonidia merrillii*), banyan (*Ficus benghalensis*), MacArthur palm (Ptychosperma macarthurii), Brassaia (Schefflera), Alexander palm (*Archontophoenix alexandrae*), date palm (*Phoenix dactylifera*), African tulip (Spathodea campanulata), *‘opiuma* (*Pithecellobium dulce*), fern (*Pteridophyte*), and a variety of grasses. Indigenous species within the project area include coconut or *niu* (*Cocos nucifera*).

1.4.2 *Lepo* (Soils)

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), sediments within the project area consist of Fill land, mixed (FL) (Figure 8). Fill lands are described as follows:

> . . . [a] land type occur[ing] mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources […] This land type is used for urban development including airports, housing areas, and industrial facilities. [Foote et al. 1972:31]

1.4.3 *Ua* (Rain)

The project area receives between 23 and 31 inches (600-800 mm) of rainfall per year (Giambelluca et al. 2013), and sits in the leeward rain shadow of the Ko‘olau Mountains (Armstrong 1973:56). Although rain tends to skirt around Waikīkī today, largely due to thermodynamics and the rising of heat from numerous concrete surfaces, there exist rains traditionally known to be specific to Waikīkī. These rains are known as the Makahuna rain and the Wa‘ahila rain, respectively.

The Makahuna rain, a rain of Pālolo, O‘ahu and of Waikīkī at large, is mentioned in a chant by the goddess Hi‘iaka during her travels across the islands (Akana and Gonzalez 2015:169; Ho‘oulumahiehie 2008:291). While calling out to the *mo‘o* (lizard-like creature or water spirit) Pahoa, Hi‘iaka pronounces:

> 1. ‘O ‘oe ia, e Pāhoa

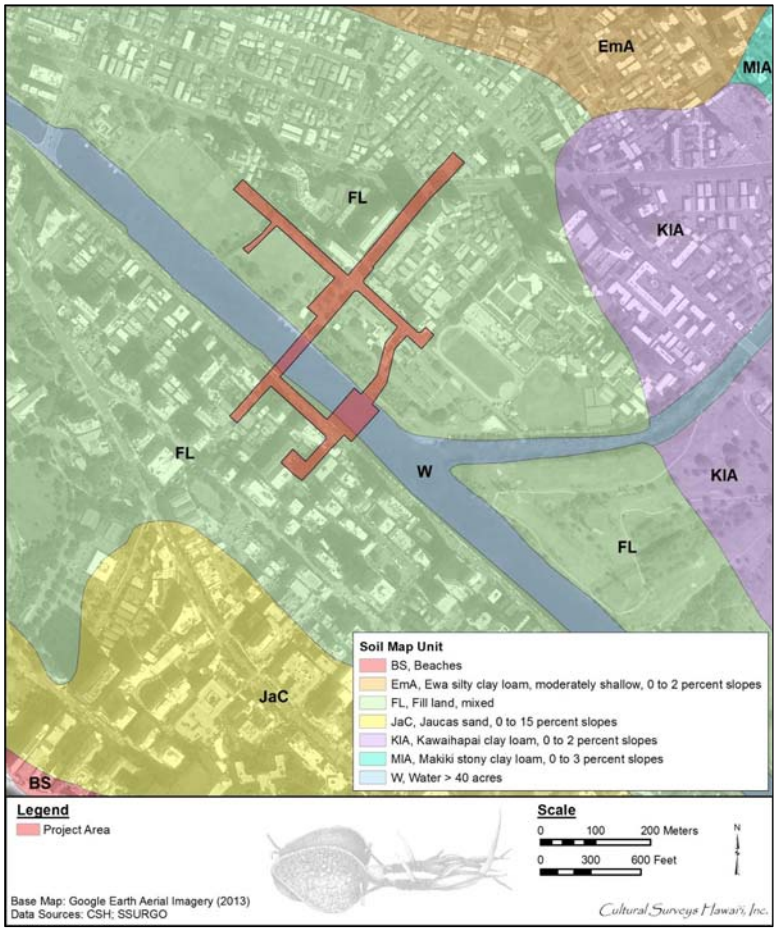


Figure 8. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972) on a 2013 Google Earth aerial photograph, indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001)

Wahine noho ua Makahuna o Pālolo
Ho‘olono mai ana ‘o ka leo
Leo ualo a kama hele.

It is you, O Pāhoa
Woman who dwells in the Makahuna rain of Pālolo
Listening to the voice
The beckoning call of the traveler
[Akana and Gonzalez 2015:169]

In the longer version of the chant uttered by Hi‘iaka, she calls out to the *mo‘o*:

It is you, O Pāhoa
Woman who dwells in the Makahuna rain of Pālolo
Listening to the voice
The beckoning call of the traveler
Walking beneath the stifling sun, the crackling sun
The sun of Waikīkī
Simply stifling.
[Ho‘oulumāhiehie 2008:291]

The rain of Makahuna is mentioned on a second occasion in a *mele* (song) by Hi‘iaka; in this *mele* she remarks on hearing the clamor of people in the house she has just left in Waikīkī.

2. Ku‘u kane i ka makani Hauālia
‘O ka Makahuna i Hāwāwā ē
Wā ihola, ke wā wale maila nō
Ka ua hilahila moe awakea

My husband of the Hauālia wind
The Makahuna rain at Hāwāwā
Boisterous, making an uproar
The shy rain that settles down at midday
[Akana and Gonzalez 2015:169-170; Ho‘oulumāhiehie 2008:291]

Another rain associated with Waikīkī is the Wa‘ahila Ridge rain. This rain is described in the legend of Kaumana, later retold by Kelsey in “He moolelo” and submitted to *Ka Nupepa Kuokoa*, a Hawaiian language newspaper (Akana and Gonzalez 2015:279); the following is a translation of

Kelsey’s retelling of the legend of Kaumana, as well as his descriptions of the Wa‘ahila Ridge rain:

> Dear Ka Nupepa Kuokoa, Honolulu, O‘ahu—While I was at Honolulu, I heard a good kupua (supernatural being) story about Kaumana, a kupua who turned to stone along the ridge between Pālolo and Mānoa.
>
> I wrote down the story in English, but it should be recorded in Hawaiian. My friend Mr. Stokes is the one who went to see Mr. Solomon Kauai, the person who shared this story. He lives on the upland side of the Wai‘alae road where it meets with Kapahulu, which heads toward Waikīkī from a certain place very close to the end of the ridge of Kaumana . . .
>
> If you could search for the actual legend, it would greatly please me, and should you print it in your newspaper, then send me a copy. Here is the story as I received it . . .
>
> Kaumana’s love for his youngest son surpassed his love for all others, so he began to swim to the other end of the pond to explain to his wife what he had done, and to lament his son.
>
> That night a strong wind blew, and the ocean was rough. The next day, lo and behold, the pond was no longer where it used to be, but instead there was sand, which made a good road to travel.
>
> However, this did not please Kaumana. It made him more regretful over his son, so he began to kill everyone who came with him from Lāhainā, including his wife and parents; all except his five servants, whose names were Kauawa‘ahila, Kauapalihala, Kauamakaiwi, Kauakuahine, and Kaualīlīlehua. He took them with him to live on the ridge between Pālolo and Mānoa.
>
> Kākuhihewa was the ruler of O‘ahu at this time. He was residing at Ulukou, where the Moana Hotel now stands, and his fishpond was inland of that, where we now see the duck-feeding pond. A heavy kuāua shower fell until the water broke the walls of the fishpond. And so the prophets and experts spoke with the ali‘i about Kaumana and his servants, the rains mentioned earlier.
>
> The experts quickly searched for a way to save the ali‘i’s fishpond, so they brought a black pig and placed it before Kaumana, continuing to pray. Kaumana knew his end was near, so he turned into stone, and it is said that this stone is still there to this day.
>
> Palihala is the high point on the seaward side of the valley of Awāwaloa. Palikuahine is the area overlooking Waiakeakua in Mānoa. Palilīlīlehua is on the other side facing Pālolo. Makaiwi is the land between Palihala and Kaumana.
>
> It was shown to me, where Fifth Avenue splits, close to the bridge. In the description by Mr. Emerson in the legend of Pele and Hi‘iaka, the ua Wa‘ahila is a gentle rain from Nu‘uanu to the area of Kauka (Judd) on Wyllie Street.
>
> [Akana and Gonzalez 2015:278–279]

The rain of Wa‘ahila is also mentioned in a *mele* by Hi‘iaka; in this *mele* she remarks on leaving a house filled with noisy people playing the game of *kilu* (a game of skill utilizing stone quoits) in Waikīkī (Akana and Gonzalez 2015:280):

> 27. Ku‘u kāne i ka ua noe
> Noe hāli‘i a ka Wa‘ahila
> Ho‘ohila ka mana‘o, wehi i ka lau
> Lau a ke aloha e pi‘i ana i ka liko
> Wā ihola, ke wā wale maila nō
>
> My husband of the misty rains
> Blanketing fall of the Wa‘ahila showers
> Abashed, yet adorned by the outpour
> An outpouring of love, rising to brightness
> Boisterous, an uproar
> [Akana and Gonzalez 2015:280; Ho‘oulumāhiehie 2008:291]

1.4.4 *Makani* (Wind)

Northeasterly trade winds prevail throughout the year, although their frequency varies from more than 90% during the summer months to 50% in January; the average annual wind velocity is approximately 10 miles per hour (O’Hare et al. 2009:8). Each small geographic area on O‘ahu had a Hawaiian name for its own wind, rain, and seas. The area of Waikīkī was no exception to this naming practice.

A wind of Waikīkī is identified in the *Wind Gourd of La‘amaomao*. Within this resource, the names of the winds of O‘ahu are listed in a chant concerning a powerful gourd called the wind gourd of La‘amaomao. When the gourd was opened, a specific wind could be called to fill the sails of a canoe and take the person in the desired direction. In a particular verse, the chanter calls out to the ‘Ōlauniu wind of Kahaloa (Nakuina 1990:140).

> The wind of Le‘ahi turns here and there,
> ‘Olauniu is of Kahaloa,
> Wai‘oma‘o is of Palolo,
> Kuehu-Iepo is of Kahua
> [Nakuina 1990:50]

‘Ōlauniu is literally translated as “coconut-leaf piercing,” although it is also noted to have “promiscuous”conotations (Pukui and Elbert 1986:20). The Kahaloa mentioned above refers to the beach area between the Royal Hawaiian Hotel and the Halekūlani Hotel (Alameida 1997). While the ‘Ōlauniu wind of Kahaloa is prominently noted in Nakuina’s *Wind Gourd of La‘amaomao*, an additional reference to a Waikīkī wind is located within *The Epic Tale of*

Hi‘iakaikapoliopele. A breeze at Kālia, the *‘ili* or land section located in the western section of Waikīkī, is described,

> 10. On the waves our boards have mounted
>
> To my love who has gone
>
> The star of that smooth strata, oh
>
> Beloved is the shoreline breeze at Kālia
>
> I await your return
>
> [Ho‘oulumahiehie 2008:277]

1.4.5 *Kahawai* (Streams)

The earliest recorded surface watercourse flowing from Mānoa Valley and feeding the Waikīkī area was the Mānoa Kāhiko Stream. It was an extremely deep channel that flowed down the middle of the valley, passed by the ‘Ewa edge of the current ‘Iolani School swimming pool, and reached the sea in the Royal Hawaiian Hotel area. Over geological time, despite many rises of the sea level and deposits of coralline sand, the stream has continued to cut the above channels to the sea. “Later the Mō‘ili‘ili Flow diverted the Mānoa-Kālia Stream from the center of the valley to the Diamond Head-side interface of that flow and the Wa‘ahila spur” (Ruby 2005:24).

Before the construction of the Ala Wai Canal, the streams of Mānoa and Pālolo did not merge until deep within Waikīkī. Upon entering the plain of Waikīkī, the Mānoa Stream became the Kālia Stream, and the Pālolo Stream became the Pāhoa Stream (Kanahele 1995:7). According to Ruby, the *kahawai* (stream) of Kālia acquired its name due to the location of the mouth of the stream in the similarly named land section within Waikīkī (Ruby 2005:24). Ruby also noted that the *kahawai* of Pāhoa flows along one border of that same large land section (Kālia) (Ruby 2005:25). The two streams joined in the *‘ili* of Hamohamo (“rub gently” [as the sea on the beach]) and then divided into three new streams that flowed into the sea—Ku‘ekaunahi, ‘Āpuakēhau, and Pi‘inaio. Once in Waikīkī Kai, the *kahawai* were known as Muliwai Apuakēhau and Muliwai Ku‘ekaunahi, respectively (Ruby 2005:25). The land between these three streams was called Waikolu, meaning “three waters” (Kanahele 1995:7–8).

The streams mentioned above cut their path *makai*, through the *ahupua‘a* (traditional major land division extending from the uplands to the sea) of Waikīkī, well into the early twentieth century, until they were subsequently rerouted and confined as lined channels, having both their natural banks and streambeds removed, during the construction of the Ala Wai Canal (Timbal and Maciolek 1978:11).

The Mānoa Stream is a confluence of multiple headwaters originating from upper Mānoa Valley. The Mānoa sub-basin watershed covers 6,150 acres and includes 12 miles of streams. There are six named tributary streams in the upper valley that merge at an elevation of 400 ft into the main Mānoa Stream: ‘Aihualama, Waihī, Lua‘alaea, Nāniu‘apo, Wa‘aloa, and Waiakeakua. Halfway down the center of the valley, the Sugar Loaf eruption has pushed the streambed to the extreme east of the valley. Before the construction of the Ala Wai Canal, the lower portion of the stream, called Kālia Stream, flowed in a westerly direction, then made a wide bend to the east where it joined the Pālolo Channel in the general vicinity of present-day Date Street, near the

mauka side of the Ala Wai Golf Course. *‘Auwai*, or irrigation ditches, once extended from this wide bend to water *lo‘i kalo* (irrigated taro terrace) and rice paddies.

In the 1930s, after the completion of the Ala Wai Canal, the course of the lower stream was pushed to the east (the course of the Pālolo Stream was also pushed to the west) to form an artificial Mānoa/Pālolo Channel that now empties into the Ala Wai Canal (Oceanit 2004:7).

1.4.6 *Ke Kai ame ka Moana* (Seashore and Ocean)

The last century has seen the area of Waikīkī Kai, including the seashore and extending to the offshore areas, extensively altered. According to a report produced by Robert L. Wiegel evaluating the coastal area of Waikīkī, most of the Waikīkī shore at the beginning of the twentieth century was “a narrow ribbon of carbonate sand between wetlands and the wide fringing reef, and there were mud flats where Ala Moana Beach Park was constructed” (Wiegel 2008:3). He further elaborates that the subsurface geology of the Waikīkī “coastal plain is a complicated mix of horizons/lenses of lagoonal deposits, marsh deposits, sand and coralline debris, coral ledges, alluvium, cemented sand, cinder, clinker, tuff, and basalt” (Wiegel 2008:6 citing data in Ferrall 1976 and Noda 1994). The continual transformation of the Waikīkī coastline into an “intensively used urban beach” (Wiegel 2008:3) has resulted in its current conditions. The Waikīkī Kai area or *kahakai* (beach) currently consists of a narrow and “thin layer of carbonate sand, several miles long, and fronted by a gently sloping fringing coral reef a few thousand feet wide. The beach faces southwest, toward the bight of Mamala Bay” (Wiegel 2008:3).

Traditionally, however, the seashore and ocean area of this region was vitally important for resource extraction in the early days of settlement. Fishermen along the coast maintained a respected status within traditional Hawaiian society; Kanahele asserts that “early Hawaiians regarded fishing as the oldest, and hence the most prestigious of professions (Kanahele 1995:17).

The seashore at Waikīkī was used from earliest recorded histories for surfing as well. The *kahuna* (priest) were in charge of all rites pertaining to surfing and they signaled to the people by flying a kite that the surf was running. Pā‘ao, the first priest to reach the Hawaiian Islands, “was a member of the highest order of the priesthood called Kanalu, or The Surf, which made surfing a ‘religious affair’” (Kanahele 1995:53). While Pā‘ao is not known to have come to O‘ahu, his priests did. When Kamehameha I was at Waikīkī, the houses of the *kahuna* were right at the shore of his compound.

Surfing saw a revival in Waikīkī in the beginning of the twentieth century. The revival was due in part to the emergence of the Waikīkī beachboys and was fueled by the dedication of these men to the traditional practice of Hawaiian watersports:

> While their livelihood came from giving surf instructions and outrigger canoe rides, their lifestyle encompassed everything connected to the ocean and beaches. Skilled at surfing and steering a canoe, they could also read the water and weather conditions, they knew the tides, winds and currents and they were familiar with the many different types of *limu* (seaweed) and fish. Many were expert fishermen and made their living fishing in the tourism off-season. [hawaiihistory.org 2016]

Surfing is still widely practiced throughout the Waikīkī area today by both *kama‘āina* (native born) and tourists alike.

Robert N. Bowen also noted use of the Waikīkī coastline and ocean for traditional burials. He claims more than 300 bodies were carried out to sea from Waikīkī in one day during the several measles epidemics in 1848. “Previously, sea disposal was used for people claiming sea dwelling *‘aumakua* (family or personal gods), but here it seems to have been used during the epidemic, when large scale disposal was necessary” (Bowen 1981:38).

Historical and literary references are also made to the seashore of Waikīkī being a landing place for traditional canoes, as well as a landing place for chiefs set on conquering O‘ahu. Kahekili came with a fleet of war canoes that reached from Ka‘alawai to Kawehewehe. “[T]hey entered the harbor of Waikiki” (Kamakau 1992:135). Kamehamea’s massive *peleleu* (long, broad, or wide) fleet of 800 double-hulled war canoes landed at Waikīkī in 1794 and the *wa‘a peleleu* (war fleet) covered the beaches from Wai‘alae to Waikiki” (Kamakau 1992:172). The *peleleu* fleet arrived again at O‘ahu in 1803 to prepare to conquer Kaua‘i, and shortly thereafter a cholera epidemic broke out leaving many of Kamehameha’s men dead. Kamehameha called off the expedition and the 20 *wa‘a peleleu* “were left to rot in the sun on the shores of Waikīkī” (Keala Kai n.d.).

1.4.7 Built Environment

The first major modifications to the natural landscape of the project area within Kālia were undertaken following the translocation of the O‘ahu royal seat to Waikīkī in the 1400s. The natural wetlands of Waikīkī were transformed into a large network of fishponds, *‘auwai*, bunds, and agricultural fields such as taro *lo‘i* (terraced ponds), banana and sugarcane plantings, and coconut groves.

Subsequent intensive historic development of the project area has resulted in an entirely modified landscape in which the original wetlands have been filled in and surfaced with paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks. The current project area is located in a completely urbanized setting, mostly along roadways. Portions of Ala Wai Canal, Ala Wai Park, and Ala Wai Elementary School are also located within the current project area.

Section 2 Methods

2.1 Archival Research

Research centers on Hawaiian activities including *ka‘ao* (legends), *wahi pana* (storied places), *‘ōlelo no‘eau* (proverbs), *oli* (chants), *mele*, traditional *mo‘olelo* (stories), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawai‘i State Archives, the Bishop Museum Archives, the University of Hawai‘i at Mānoa’s Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau.org 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawai‘i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona ‘Aina Corporation’s Māhele database (Waihona ‘Aina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of ‘Āina website (Ava Konohiki 2015).

2.2 Community Consultation

2.2.1 Scoping for Participants

The cultural department commences our consultation efforts by utilizing our previous community contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kama‘āina*, cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior’s NHO list), and community groups. CSH also contacts agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response to the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

2.2.2 “Talk Story” Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their *‘ike* (knowledge) and *mana‘o* (thought, opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

“Talk Story” sessions range from the formal (e.g., sit down and *kūkā* [consultation, discussion] in the participant’s place of choice over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, CSH also conducts group interviews, which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewees’ answers. Group interviews are always transcribed and notes are taken. Recorded

interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) adding missing details to *mo'olelo*.

CSH seeks *kōkua* (assistance) and guidance in identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupua'a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana* [storied sited], archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka'ao* and *mo'olelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

2.2.3 Interview Completion

After an interview, CSH cultural researchers create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the interview summary to the interviewee for review and ask that they make any necessary edits. Once the interviewee has made those edits, CSH incorporates their *'ike* and *mana'o* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant's interview summary, and any photos taken during the interview. We also include a thank you card and honoraria.

It is important that CSH cultural researchers cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their *'ohana* (family). CSH researchers feel this is an important component to building relationships and being part of an *'ohana* and community.

"*I ulu no ka lālā i ke kumu*—the branches grow because of the trunk," is an *'ōlelo no'eau* (#1261) shared by Mary Kawena Pukui with the simple explanation: "Without our ancestors we would not be here" (Pukui 1983:137). As cultural researchers, we often lose our *kūpuna* but we do not lose their wisdom and words. We routinely check obituaries and gather information from other community contacts if we have lost our *kūpuna*. CSH makes it a point to reach out to the *'ohana* (family) of our *kūpuna* who have passed on and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference. All field activities are performed in a manner so as to minimize impact to the natural and cultural environment in the project area. Where appropriate, Hawaiian protocol may be used before going on to the study area and may include the *ho'okupu* (offering) of *pule* (blessing), and *oli*. All participants on field visits are asked to respect the integrity of natural and cultural features of the landscape and not remove any cultural artifacts or other resources from the area.

Section 3 *Ka'ao* and *Mo'olelo* (Legends and Stories) of Waikīkī

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained teachings while interweaving elements of Hawaiian lifestyles, genealogy, history, relationships, arts, and the natural environment (Pukui and Green 1995:IX). According to Pukui and Green (1995), storytelling is better heard rather than read for much becomes lost in the transfer from the spoken to the written word and *ka'ao* (legends) are often full of *kaona* or double meanings.

Ka'ao are defined by Pukui and Elbert as a "legend, tale […], romance, [and/or], fiction" (1986:108). *Ka'ao* may be thought of as oral literature or legends, often fictional or mythic in origin, and have been "consciously composed to tickle the fancy rather than to inform the mind as to supposed events" (Beckwith 1970:1). Conversely, Pukui and Elbert define *mo'olelo* as a "story, tale, myth, history, [and/or] tradition" (1986:254). The *mo'olelo* are generally traditional stories about the gods, historic figures or stories which cover historic events and locate the events with known places. *Mo'olelo* are often intimately connected to a tangible place or space (*wahi pana)* (see Section 3.2 *Wahi Pana* (Legendary or Storied Places).

In differentiating *ka'ao* and *mo'olelo* it may be useful to think of *ka'ao* as expressly delving into the *wao akua* (realm of the gods), discussing the exploits of *akua* (gods) in a primordial time. *Mo'olelo* on the otherhand, reference a host of characters from *ali'i* (royalty), to *akua* (gods) and *kupua* (supernatural beings), to finally *maka'āinana* (commoners), and discuss their varied and complex interactions within the *wao kānaka* (realm of man). Beckwith elaborates, "In reality, the distinction between *ka'ao* as fiction and *mo'olelo* as fact cannot be pressed too closely. It is rather in the intention than in the fact" (Beckwith 1970:1). Thus a so-called *mo'olelo*, which may be enlivened by fantastic adventures of *kupua*, "nevertheless corresponds with the Hawaiian view of the relation between nature and man" (Beckwith 1970:1).

Both *ka'ao* and *mo'olelo* provide important insight into a specific geographical area, adding to a rich fabric of traditional knowledge. The preservation and passing on of these stories through oration remains a highly valued tradition. Additionally, oral traditions associated with the study area communicate the intrinsic value and meaning of a place, specifically its meaning to both *kama'āina* as well as others who also value that place.

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the project area. Many relate an age of mythical characters whose epic adventures inadvertently lead to the Hawaiian race of *ali'i* (chief) and *maka'āinana*. The *ka'ao* in and around the project area shared below are some of the oldest Hawaiian stories that have survived; they still speak to the characteristics and environment of the area and its people.

3.1 *Ka'ao* and *Mo'olelo*

3.1.1 Nā Pōhaku 'Ola Kapaemāhū a Kapuni (Wizard Stones)

Nā Pōhaku 'Ola Kapaemāhū a Kapuni, or the Life-giving Stones of Kapaemāhū and Kapuni, are commonly referred to as the Wizard Stones (Paglinawan 1997:1). According to various *mo'olelo*, four healers gifted in medicinal practices once came from Kahiki, most likely the sacred land of Raiatea. While some sources claim they were homosexuals, Tūtū Mary Kawena Pukui

asserts they were gender neutral. The wizards included Kapaemāhū, who, due to his neutral gender, could examine and heal both men and women; Kahoe, a diagnostician who could determine illness just by visual assessment; Kahaloa, who was able to breathe life into ill patients; and Kapuni, who could envelope his patients with his *mana* (power, authority) to overcome their illness (Paglinawan 1997:1).

> The wizards or soothsayers proved to be adept in the science of healing, and many wonderful cures by the laying on of hands are reported to have been effected by them, so that their fame spread all over this island (Oahu), as the ancients say, ‘from headland to headland,’ And their wisdom and skill was shown by many acts which gave them prestige among the people.
>
> . . . As an enduring reminder. The wizards agreed amongst themselves that the people should be asked to erect four monumental tablets, two to be placed on the ground of the habitation, and two at their usual bathing place in the sea. They gave their decision to the people as a voice from the gods, and instructed that the stones be selected from among those in the ‘bell rock’ vicinity of Kaimuki. [Thrum 1923: 262]

3.1.2 Kamō‘ili‘ili (the pebble lizard)

Waikīkī’s earliest *mo‘o* (lizard deity) was probably Kamō‘ili‘ili (literally, “the pebble lizard”) who was slain by Hi‘iaka, Pele’s sister. This *mo‘o* appears in numerous versions of the Hi‘iaka saga, including the version by Ho‘oulumāhiehie, which ran in the Hawaiian-language newspaper *Ka Na‘i Aupuni*.

The *mo‘o* also makes an appearance in the Hawaiian language newspaper *Ka Hoku o Hawaii*. The following *ka‘ao* was originally published on 18 September 1924 and details the journey of Hi‘iaka and Wahine‘ōmao on their quest to reunite Pele with her lover Lohi‘au. Auli‘i Mitchell discusses this *ka‘ao* in his notes regarding “He Moolelo Kaao no Hiiaka-i-ka-poli-o-Pele ka Wahine i Kahikina a ka La:”

> This is an ancient *ka‘ao*, although it is printed in the newspaper as a *mo‘olelo* (article). *Ka‘ao* translates to ‘myth’ or ‘legend.’ Notice these place names are still used today. This is key in being able to tell is it a legend or an historical account often called *mo‘olelo.* [Mitchell n.d., personal communication]

On this particular portion of their quest, the group has landed their canoe at Waikīkī and has begun to make their way *mauka* toward the area now known as Mō‘ili‘ili. This particular version describes their journey and encounter with the *mo‘o* Kamō‘ili‘ili.

> Hoomau aku la no lakou nei i ke hele ana a hiki i ko lakou nei hookokoke ana e pii aku I kahi kaola e pii aku ai a loaa aku kahi e ku nei ka Luakini o Kamoiliili, he hu ana o ka makani ka Lohiau i lohe me Wahineomao o ka lohe ana aku ike iho la laua i ka lilo ana o ko laua mau pepeiao i hope oia no oe o kekahi lima oolea loa e huki ana i ko laua mau pepeiao, a oia nohoi ke laua manawa i hooho ae ai me ka leo nui no ka nui loa mai o ka makou, ame ka weliweli.
>
> Auwe! Auwe! mokuna pepeiao o maua i ke nahu ia e keia mea ano e. E Hii e E Hii e Heaha keia. Ia wa no laua nei i lohe aku ai i na leo hokio e kani oeoe ana ma na

> wahi like ole, aole kana mai o ka ikuwa kupaianaha. Ua like loa me na leo o haneriol popoki e ki ana ae uwe aaka ana hoi me ke hoona na ana.
>
> Oiai na pepeiao o Wahineomao ame Lohiau e lilo ana i hope, ame kela mau leo wawalo weliweli a ku i ka hoomakaukau e kani ana, ia wa i olelo mai ai o Hiiaka ia laua nei.
>
> Aole kena he mau hooleleioua mai ua moe wai mai a kakou i ike mai nei i ke ku o ka ea o ka lepo, aka, mai kekahi moe wai o koa mai keia non aka inoa o Kamoilili. O kona Kaiana aina keia a kakou e hele nei, a mai hopohopo olua no keia mau mea a olua e ike nei. I kela wa no i pu ai al o ua Hiiaka nei i-kapoliopele i ka pa‘u, ona a paa i ka lima, a hoomau aku la no lakou nei i ka hele ana [*Ka Hoku o Hawaii*, 19 April:6 and 3 May 1927]

Kanahele (1995) provides a synopsis of the encounter among Hi‘iaka, Wahine‘ōmao, Lohi‘au, and the *mo‘o* Kāmo‘ili‘ili detailed in the above *ka‘ao*:

> Hi‘iaka and Wahine‘ōma‘o were escorting Lohi‘au (Pele’s lover-prince) back to Pele on the island of Hawai‘i. During the return journey they left their canoe at Waikīkī and walked up toward Kamō‘ili‘ili. When they arrived at the particular spot (said to be where the old stone church stood in the 1920s), a heavy gust of wind blew, and Wahine‘ōma‘o and Lohi‘au felt invisible hands pulling their ears back. They called to Hi‘iaka for help. She knew that it was the lizard god, Kamō‘ili‘ili, who did it and told the other gods to keep closely behind her. A short distance away, they met Kamō‘ili‘ili who wanted to fight. Hi‘iaka removed her outside skirt which concealed bolts of lightning and struck him with them. His body was cut to pieces and the pieces turned into the long, low hill across from Waikīkī’s Kūhiō School. [Kanahele 1995:42]

3.1.3 Kalamakua and His Romantic Meeting with Keleanuinoho‘ana‘api‘api (“Great Kelea who flutters”)

Surfing was one of the principal attractions of Waikīkī to both chiefs and commoners. Surfing was of such importance to Hawaiian society that it prompted the construction of a major *heiau* (pre-Christian place of worship) dedicated to the *nalu* or surf, and its riders. The “surfing *heiau*” of Papa‘ena‘ena, a terraced structure built at the foot of Lē‘ahi (Diamond Head), was where surfers came to offer their sacrifices in order to obtain *mana* (spiritual power) and knowledge of the surf. The *heiau* overlooked what surfers call today “First Break,” the start of the Kalahuawehe surfing course that extended to Kawewehi (the deep, dark surf) at Kālia.

Although most every level of society surfed, including women and children, *ali‘i* were the true masters of the sport. The best surfer among Waikīkī’s chiefs was Kalamakua (Kanahele 1995:57). “He came from a long ancestry of champion surfers whose knowledge, skill, and *mana* were handed down and passed on from generation to generation” (Kanahele 1995:57). His love affair with Keleanuinoho‘ana‘api‘api (Great Kelea who flutters) reaffirms the central role that surfing played in the history of Waikīkī (Kanahele 1995:57):

> One day this beautiful chiefess with ‘clear skin and sparkling eyes,’ who then resided in Wahiawā (in Central O‘ahu), was visiting Waikīkī with a few of her ladies-in-waiting. She entered the coconut grove and beach of Kawehewehe […]

which was located just east of the Halekūlani Hotel. Here is where the sick came to bathe and to be healed. They would wear *limu-kala* (seaweed) leis and leave them in the water as a request to the gods for forgiveness of past wrongs which was the cause of much illness.

The residents welcomed Keleanuinoho‘ana‘api‘api and offered her coconuts to eat. She remarked that Waikīkī was ‘the most pleasant place we have seen,’ to which her hosts replied, ‘This is a place for enjoyment. Over there is the *kou* grove of Kahaloa where one may view the surfing of the chiefs and of the *ali‘i nui* Kalamakua.’ Kahaloa, or ‘Long Place,’ was also a beach area located today between the Royal Hawaiian and Halekūlani hotels and noted for its fragrant *līpoa* seaweed. When she asked if she could borrow a surfboard, the Waikīkīans were surprised because they thought people from Wahiawā were only adept at ‘slicing *mo‘okilau* ferns and *pōpolo* stalk,’ not at surfing. They did not know that their visitor was originally from Maui where she surfed with all the chiefs. She was too beautiful to refuse and someone gave her a board.

Before she entered the water, she ‘rubbed off the red dirt of ‘Ewa from her feet so as to look fresh,’ and then paddled off like an expert, moving easily and noiselessly without the least heeling over. Instead of starting at the first break where *kama‘āina* (native born or old-time resident) surfers congregated, she went beyond and waited for a large wave. She let the first, second and third waves pass, and rode the fourth all the way to shore. The chiefs and commoners were so impressed with her skill and grace that they immediately joined in loud cheers of admiration.

Meanwhile, Kalamakua, who was working in his taro fields nearby asked his men who was causing the commotion. They replied that the people were amazed at the performance of a female surfer. A skilled surfer himself, Kalamakua rushed to the edge of the beach to see for himself. He recognized Kelea at once as the chiefess from Maui famed for her surfing prowess.

When she reached shore, he took hold of her board and asked, ‘Are you Kelea?’ ‘Yes,’ she answered. As she stood up, in naked splendor, he removed his feathered shoulder cape and wrapped it around her. Then he guided her to a *kapu* place and made her his *ali‘i wahine mō‘ī*, or queen. [Kanahele 1995:56–58]

3.1.4 The Shark God Ka‘ehu

In his book *Waikīkī: 100 B.C. to 1900 A.D. An Untold Story*, author George Kanahele discusses a particular legend concerning a man-eating shark in the waters off Waikīkī. In this *mo‘olelo* “the little yellow shark Ka‘ehu of Pearl Harbor who was endowed with magical power by his ancestor Kamohoali‘i, the shark god and brother of Pele” (Kanahele 1995:58) devises a plan to destroy the man-eating shark who threatens the people of Waikīkī:

One day Ka‘ehu called his shark friends to accompany him to Puna. On the way they stopped at Waikīkī where they met Pehu, a man-eating shark from Maui, who was swimming back and forth at Kalehuawehe in wait for an unsuspecting surfer.

Ka‘ehu asked what Pehu was doing there and he replied, ‘I‘m catching a crab for my breakfast.’ ‘We‘ll help you catch your crab,’ Ka‘ehu said, and told him to go

near the coral reef while he and his friends would drive them shoreward, allowing Pehu to catch this crab easily. He was pleased with the plan and swam close to the reef where he hid himself in its shadows.

Then Ka‘ehu told his friends, ‘We must kill this man-eater because he is destroying our people. Let’s try to push him into the shallow water.’

Soon two surfers appeared and when Pehu leaped to catch one, Ka‘ehu and his friends pushed the surfer aside and hurled Pehu over the reef into a deep hole in the coral. The more he thrashed about to escape, the more trapped he became.

When the surfers saw what had happened, they were not as afraid of Pehu and moved to the hole to kill him. As they cut into his body they discovered the remains of their own people. Out of respect, they delivered them to Pele‘ula (an area with many healing heiau located in Kou, now downtown Honolulu) and burned the remains. Ka‘ehu had many more adventures that had a similar objective, the punishment of other man-eaters from the great sea. [Kanahele 1995:58–59]

3.2 *Wahi Pana* (Legendary or Storied Places)

Wahi pana are legendary or storied places of an area. These legendary or storied places may include a variety of natural or human-made structures. Oftentimes dating to the pre-Contact period, most *wahi pana* are in some way connected to a particular *mo‘olelo*, however, a *wahi pana* may exist without a connection to any particular story. Davianna McGregor outlines the types of natural and human-made structures that may constitute *wahi pana*:

Natural places have mana, and are sacred because of the presence of the gods, the akua, and the ancestral guardian spirits, the ‘aumakua. Human-made structures for the Hawaiian religion and family religious practices are also sacred. These structures and places include temples, and shrines, or heiau, for war, peace, agriculture, fishing, healing, and the like; pu‘uhonua, places of refuge and sanctuaries for healing and rebirth; agricultural sites and sites of food production such as the lo‘i pond fields and terraces slopes, ‘auwai irrigation ditches, and the fishponds; and special function sites such as trails, salt pans, holua slides, quarries, petroglyphs, gaming sites, and canoe landings [McGregor 1996:22].

As McGregor makes clear, *wahi pana* can refer to natural geographic locations such as streams, peaks, rock formations, ridges, offshore islands and reefs, or they can refer to Hawaiian land divisions such as *ahupua‘a* or *‘ili*, and man-made structures such as fishponds. In this way, the *wahi pana* of Waikīkī tangibly link the *kama‘āina* of Waikīkī to their past. It is common for places and landscape features to have multiple names, some of which may only be known to certain *‘ohana* or even certain individuals within an *‘ohana*, and many have been lost, forgotten or kept secret through time. Place names also convey *kaona* (hidden meanings) and *huna* (secret) information that may even have political or subversive undertones. Before the introduction of writing to the Hawaiian Islands, cultural information was exclusively preserved and perpetuated orally. Hawaiians gave names to literally everything in their environment, including individual garden plots and *‘auwai*, house sites, intangible phenomena such as meteorological and atmospheric effects, *pōhaku* (rock, stone), *pūnāwai* (freshwater springs), and many others.

According to Landgraf (1994), Hawaiian *wahi pana* "physically and poetically describes an area while revealing its historical or legendary significance" (Landgraf 1994:v).

The ancient land division of Waikīkī ("water spurting from many sources" [Pukui et al. 1974:223]) extended west from the land area named Kou (old name for Honolulu) to Maunalua (Hawai'i Kai). On modern maps, the western boundary of the *ahupua'a* extends from Pi'ikoi and Sheridan streets, the *mauka* border extends from Tantalus to the peak of Kōnāhuanui, along the crest of the Ko'olau Range to the border with Maunalua. The ocean constituted the *makai* border, as it does today, but subsequent historic-era fill episodes have altered the location of the original coastline. The *ahupua'a* of Waikīkī historically consisted of a large marshland (Waikīkī Waena) fronted by a coastal area (Waikīkī Kai) (see Section 3.2.3 Waikīkī Waena and Waikīkī Kai).

3.2.1 'Āpuakēhau

There is a large body of oral-historical information about royal residences and other residential compounds belonging to various *ali'i* in Waikīkī Ahupua'a. According to Martha Beckwith, by the end of the fourteenth century Waikīkī had become "the ruling seat of the chiefs of O'ahu" (Beckwith 1940:383). "Kamehameha's houses were at Puaaliilii, makai of the old road, and extended as far as the west side of the sands of Apuakehau" ('Ī'ī 1959:17).

'Āpuakēhau is also mentioned in a legend as the home of the cruel chief 'Ōlohe, a master of *lua* (Hawaiian martial art) wrestling. The defeat of this chief led to the naming of the area now covered by Kapi'olani Park as Ka-lua-'Ōlohe, or "the *lua* fighting of 'Ōlohe" (Pukui et al. 1974:79):

> Loheloa came from Waipio on a huge log. He came first to Makapuu and then to Keauau Point, now called Leahi. He saw a strange glow like a ball of fire there. He asked for the chief Olohe and was told that the light was his.
>
> He saw some fishermen who told him to go away for he was scaring the fish. He called to Ku and Hina to bring them a school of fish which they did. The natives were grateful. He lifted his huge canoe and rested one end at Haula and the other at Namahana, against the hill. He told the people that he wanted to wrestle with their chief Olohe, a dogman who lived at Apuakehau, Waikiki. A messenger came to tell the chief who accepted the challenge. In the meantime the men were busy catching fish brought to them by Loheloa. A messenger was sent to bring Loheloa to the chief and Loheloa suggested that they wrestle in the open where they can be seen. He would bet his bones and his canoe on himself.
>
> Olohe and Loheloa fought on the field now known as Kapiolani Park. Olohe punched and raised a gale that flattened the ilima bushes. Loheloa slapped his ear hard enough to throw him in the air. The place he fell is called Kalua-Olohe (Olohe's pit) to this day. Loheloa won and the people shouted with joy over the defeat and death of their cruel chief. [Hainakolo, *Hawaii Holomua*, 21 July 1912, Oahu Place Names in Sterling and Summers 1978:279]

3.2.2 Hamohamo

Hamohamo translates as "rub gently, disappointment, failure" (Pukui et al. 1974:40) and is the name of a shoreline area of Waikīkī: "*Ua hō'ea i Hamohamo i kahi nui i ka 'ahu'awa* (arrived

empty-handed at the place of great disappointment)." The following *'ōlelo no'eau* help translate the *kaona* of this phrase famous among ancient Hawaiians.

> Two sayings explained by Pukui help translate this sentence. The first is 'Ho'i 'ōlohelohe i ke kula o Hamohamo (Going home destitute on the plain of Hamohamo)' (Pukui 1983:111, #1044). Hamohamo, a place in Waikīkī, is a play on the word 'hamo' or to 'rub.' Hands being rubbed together imply that one is empty-handed and therefore destitute. The second expression is 'Aia akula paha i Waikīkī i ka 'imi 'ahu'awa (Perhaps gone to Waikīkī to seek the 'ahu'awa sedge)' (Pukui 1983:6, #27). This saying plays on the words ahu (heap) and 'awa (sour) to indicate disappointment. [Desha 2000:396]

'Ōlelo No'eau #1044

> *Ho'i 'ōlohelohe i ke kula o Hamohamo.*
>
> Going home destitute on the plain of Hamohamo.
>
> Going home empty-handed. A play on *hamo* (rub), as in the act of rubbing the hands together to indicate that one is empty-handed. Hamohamo is a place in Waikīkī. [Pukui 1983:111]

'Ōlelo No'eau #27

The following *'ōlelo no'eau* is a classic Hawaiian play on words. Literally the saying is speaking about a sedge plant, *'ahu'awa* (*Cyperus javanicus*), found in Waikīkī. However, the original composer would have intended an alternative connotation. Breaking the word apart to *ahu* (heap) and *'awa* (sour), it now describes a heap of sour, in other words—disappointment found in Waikīkī. This is a clever Hawaiian way of saying something negative, without actually saying anything negative.

> *Aia aku la paha i Waikīkī i ka 'imi 'ahu'awa.*
>
> Perhaps gone to Waikīkī to seek the 'ahu'awa sedge.
>
> Gone where disappointment is met. A play on ahu (heap) and 'awa (sour). [Pukui 1983:6]

3.2.3 Waikīkī Waena and Waikīkī Kai

Historical and traditional sources sometimes make a distinction between Waikīkī Kai (coastal Waikīkī) and Waikīkī Waena (middle Waikīkī; "the middle land between the ocean and mountains") (Figure 9). The boundaries of Waikīkī Kai roughly coincide with the coastal area on the *makai* side of the Ala Wai ("fresh waterway") Canal and the area within and *makai* of Kapi'olani Park. The boundaries of Waikīkī Waena roughly coincide with the area between King Street/Wai'alae Avenue and the Ala Wai Canal, encompassing the neighborhoods of Kamō'ili'ili, Kaimukī, and Kapahulu (Ruby 2005:iv) (see Figure 1). The current project area extends through the boundaries of both Waikīkī Kai and Waikīkī Waena, with the boundary separating the two areas roughly correlating with the Ala Wai Canal, although an exact boundary has not been determined.

The distinction between Waikīkī Kai and Waikīkī Waena was more than geographical. Differences in land use and habitation patterns existed between the two areas during the pre- and

early post-Contact era. In the fourteenth century, the Waikīkī Kai region had become the residential and political power center of O‘ahu’s chiefly elite. Royal compounds, religious structures, villages (including the village of Waikīkī), fishponds, wetland taro patches, and coconut palms dotted the coastline and inner coastal areas of Waikīkī Kai. Additionally, the area of Waikīkī Kai was also comprised of distinct *‘ili* (land division, usually a subdivision of an *ahupua‘a*) lands, including (listed generally from west to east) Kālia (“waited for”), Pau (“finished”), Niukukahi (“coconut standing alone”), Loko Mo‘o (“lizard/water spirit pond”), Keōmuku (“the shortened sand”), Helumoa (“chicken scratch”), Ulukou (“kou tree grove”), Mookahi, Kaluaokau, Auaukai, Hamohamo (“rub gently”), Uluniu (“coconut grove”), Kapuni (“the surrounding”), Kekio, Kāneloa (“tall Kāne”), Kapua (“the flower”), and Kaluahole (“the āhole fish cavern”) (‘Ī‘ī 1959:92–94). By contrast, Waikīkī Waena comprised the intensively cultivated “plains” of greater Waikīkī, a broad expanse of largely marshy land with habitation and cultivation areas clustered along the many streams and springs flowing through the region from the valleys to the sea. This marshland was characterized by frequent inundation as well as herbaceous vegetation (i.e., lacking a persistent wooden stem above ground, such as *kalo* (taro; *Colocasia esculenta*)) adapted to these saturated soil conditions (Mitsch and Gosselink 2007:516).

The original Waikīkī marshland extended from the volcanic craters of Lē‘ahi (Diamond Head) and the Kaimukī craters (where the present day Kaimukī fire station is built) on the east, to present day Kapahulu Park, and continued along the foot of Mānoa Valley into the districts of Kamō‘ili‘ili and Makiki. The western edge of the marshland extended to the junction of present-day Wilder and Pi‘ikoi streets, before turning again to the sea. This marshland area was approximately 3 miles long and 1 mile wide, enclosing approximately 2,000 acres of land (Kanahele 1986:5–6).

Both Waikīkī Kai and Waikīkī Waena were highly watered lands. Underground water periodically gushed upwards through the region’s intermittently porous geological substructure of sediment, basaltic rock, and limestone (Kanahele 1995:8). In addition to these underground sources of water, surface water manifested as the Ku‘ekaunahi Stream, the ‘Āpuakēhau (“basket of dew”) Stream, and the Pi‘inaio Stream. The meaning of Ku‘ekaunahi has been lost over time, however, *kue* means “fishhook.” Just as the meaning of Ku‘ekaunahi has become lost over time, so has the meaning of Pi‘inaio as well. While the exact meaning of Pi‘inaio remains unknown, the term *pi‘ina* means “climb or ascend” (Pukui and Elbert 1986:327). It has also been conjectured that the term Pi‘inaio may be an allusion to going inland (*pi‘i*), to the location of a *naio* (bastard sandalwood; *Myoporum sandwicense*) tree, as may have commonly grown in the vicinity to a stream crossing place. These three streams originated in the area of Hamohamo, as offshoots of the Kālia and Pāhoa streams. Hamohamo, within Waikīkī Waena, later became the site of Queen Lili‘uokalani’s Waikīkī residence:

> Queen Lili‘uokalani owned a large tract of land in this part of Waikīkī, extending from the Ala Wai Canal to the beach between Lili‘uokalani Avenue and Wai Nani [“beautiful water” most likely referring to the Ku‘ekaunahi Stream that flowed through the Queen’s lands] Way, connecting with a 1,400-foot strip of beachfront land. [Acson 2003:7]

Queen Lili‘uokalani’s private residence in Waikīkī was Paoakalani (“royal perfume”); her residence was located between the current Paoakalani Street and Wai Nani Way on the *makai* side of the Ala Wai Canal.

Figure 9. Detail of an 1887 map of Honolulu by Wall, showing the current project location. The division between Waikīkī Kai and Waikīkī Waena is roughly through the bottom third of the project area.

3.2.4 Kālia ‘Ili

Kālia ‘Ili, located in the western section of Waikīkī, is a name used for the central portion of Mānoa Stream as well as the name of the coastal area where the Pi‘inaio Stream emptied into the ocean. The stream’s mouth was on the western end of the Waikīkī coast, where the Ala Moana Hotel and Shopping Center is now located.

Most of the current project area is located in the *‘ili* of Kālia. A Hawaiian saying talks about the pleasant portion of the coast of Kālia in Waikīkī (Pukui 1983:186):

Ke kai wawalo leo le‘a o Kālia The pleasing, echoing sea of Kālia.

The ribboned delta of Pi‘inaio Stream entered the ocean at Kālia, bringing fresh waters from the mountain valleys and creating an area of abundance. The plentiful land and marine resources encouraged the utilization and settlement of the area (Figure 10 and Figure 11). In oral history interviews of residents who lived in Waikīkī before the construction of the Ala Wai Canal, the abundant resources of the area are described.

> We lived at Kalia, where my dad was a net fisherman. He caught kala, mullet, and weke. He also caught squid [octopus]. There was limu eleele where Pi‘inaio Stream entered the ocean. Towards Fort DeRussy there was limu manauea and limu huluhulu waena and a lot of wana. We caught lobsters using nets at night. We used to catch a lot of kala. Where the stream entered the ocean, there was a lot of mud, and there were clams in the mud. We caught opae and oopu in the stream. We fished for papio and white eels. We caught two types of crabs, aama and alamihi. On the reef my dad dived for uhu and kumu, and we did torch fishing at night for mullet, uhu, and kumu. [Fred Paoa in UHCOH 1985:2:532–535]

> Limu manauea, limu lipoa, and limu wawaeiole, and big schools of manini were found at Kalia. [John Ernstberg in UHCOH 1985:1:125]

Kālia is also a place where *‘alamihi* (common black crab; *Metopograpsus thukuhar)* crabs were once plentiful, leading to a play on the word *‘ala-mihi* (path of repentance), indicating someone who is in a repentant mood (Pukui 1983:110):

Ho‘i i Kālia ka ‘ai ‘alamihi. Gone to Kālia to eat ‘alamihi crabs.

Kālia was also known for a fishing technique used to catch schools of mullet. When a school of mullet appeared, a bag net was set and the men swam out in a row, surrounded the fish, and slapped the water together and kicked their feet, thus driving the frightened fish into the opening of their bag net. The fishermen of Kālia became known as human fishnets (Pukui 1983:150):

Ka i‘a pīkoi kānaka o Kālia; The fish caught by the men of Kālia;
he kānaka ka pīkoi, men are the floaters
he kānaka ka pōhaku. men are the sinkers

Kālia is also mentioned in a story about a woman who left her husband and children on Kīpahulu, Maui, to go away with a man of O‘ahu. Her husband missed her and went to see a *kahuna* (priest) who was skilled in *hana aloha* (prayer to evoke love) sorcery. The *kahuna* told the man to find a container with a lid and then speak into it of his love for his wife. The *kahuna* then



Figure 10. Nineteenth century photo of Waikīkī and fishponds, likely taken from Kālia (Hawai‘i State Archives n.d.)

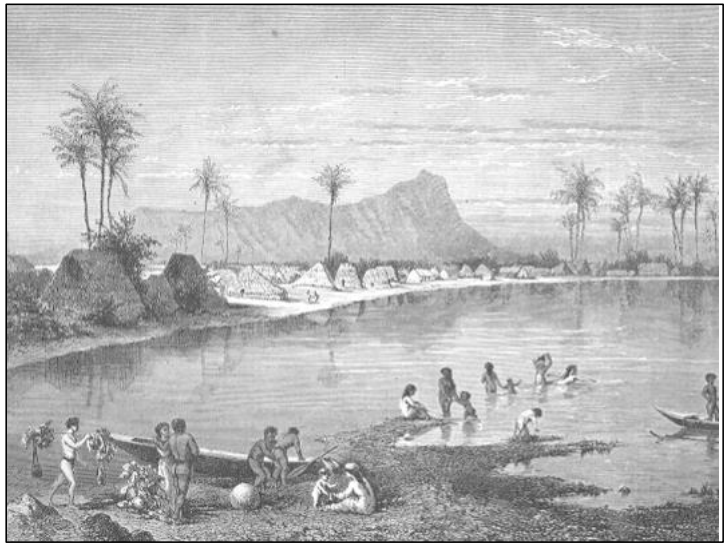


Figure 11. 1853 sketch of Waikīkī with view to Diamond Head (University of Chicago) (note close proximity of houses to the shore)

uttered an incantation into the container, closed it, and threw it into the sea. The wife was fishing one morning at Kālia, O‘ahu, and saw the container. She opened the lid, and was possessed by a great longing to return to her husband. She walked until she found a canoe to take her home:

Ka makani kā‘ili aloha o	The love-snatching wind
o Kīpahulu.	of Kīpahulu

[Pukui 1983:158]

Pi‘inaio Stream played a vital role in the geography, and almost certainly the cultural usage, of the *‘ili* of Kālia. The name of the area “Kālia” translated as “waited for” has a sense of “waiting,” “loitering,” or “hesitating.” While the nuance is uncertain, one could imagine the mouth of the Pi‘inaio Stream would be a logical place for travelers to pause. Pi‘inaio Stream once extended through the northwestern portion of the project area.

The shallow relatively protected reefs of Waikīkī, in addition to the riparian resources such as the Pi‘inaio estuary and the back dune ponds (modified into fishponds such as the Loko Pāweo and Loko Kaipuni complexes), would have made Kālia ‘Ili particularly desirable for Polynesian settlement.

Waikīkī was famous for its fishponds with one list citing 45 ponds—several of which were at Kālia (Bishop Museum 1989:8). John Papa ‘Ī‘ī (1959:49) relates an account from the early 1800s of a catch at a Kālia fishpond: “so large that a great heap of fish lay spoiling upon the bank of the pond.” It may be inferred from ‘Ī‘ī’s statement that this kind of wasteful behavior was disapproved of. ‘Ī‘ī also made mention of another large catch of fish at the Kālia ponds; this harvest, however, was given as tribute to Kina‘u, daughter of Kamehameha I (Acson 2003:18). The sheer size and volume of the Kālia fishponds would have required significant maintenance and potentially would have provided a large amount of food for distribution at chiefly discretion.

3.2.5 Kaluaokau ‘Ili

Kaluaokau ‘Ili comprises the central portion of Waikīkī Ahupua‘a. There are several possible meanings of Kaluaokau depending on pronunciation and combination of root words. Most translations of this *‘ili* suggest this place was deeply connected to the *mana* of the Waikīkī *ali‘i*, as indicated by interpretations of human sacrifice. The term may commemorate the sacrifice of Kauhi-a-Kama, as in “the pit of Kau” (Ka-lua-o-Kau), “the pit of Kauhi-a-Kama” (Ka-lua-o-Kauhi-a-Kama), or the “baking of Kauhi-a-Kama” (Kālua-o-Kauhi-a-Kama). The term may also translate as “strike lua of kau [hanging]” (Ka-lua-o-kau) in reference to a special technique of public execution and sacrifice by strangling (McKinzie and Campbell 2005:24–28). It may also translate as “the grave of Ka‘u” (Ka-lu‘a-o-ka‘u) (Thrum 1922:641). ‘Āpuakēhau Stream, literally “basket [of] dew,” flowed through this *‘ili* (see Section 3.2.1 for the *mo‘olelo* of ‘Ōlohe at ‘Āpuakēhau). The stream was also possibly named for a rain or an abundance of *ki* (ti), *hau* (beach hibiscus), and palm plants which lined the banks of ‘Āpuakēhau Stream (McKinzie and Campbell 2005:17; Pukui et al. 1974).

3.2.6 Helumoa ‘Ili

Helumoa ‘Ili, located in the central, *makai* section of Waikīkī, translates as “chicken scratch,” a reference to *mo‘olelo* about the bodies of sacrificial victims being pecked over for maggots.

Numerous chiefly residences were established at Helumoa, now the site of the Royal Hawaiian Hotel, and Ulukou, now the site of the Moana Hotel (Hibbard and Franzen 1986:2). ‘Āpuakēhau Stream emptied into the ocean between these two centers. Kawehewehe, sometimes synonymous with the mouth of ‘Āpuakēhau Stream, and also the name of the reef entrance and channel at what is known today as Grey’s Beach (just east of the contemporary Halekūlani Hotel), translates as “the removal,” which appears to refer to the water’s famous healing powers for removing sickness and forgiving of sins (Pukui et al. 1974:99). A famous surfing spot called Kalehuawehe (see Section 3.1.4 for the *mo‘olelo* of The Shark God Ka‘ehu) was located at the mouth of ‘Āpuakēhau Stream (Hibbard and Franzen 1986:2).

While many other place names in Waikīkī have been lost to antiquity, a song composed by Kawelo during the reign of Kākuhihewa provides a glimpse into other place names of Waikīkī and the emotions they once evoked. After Kawelo surfed and participated in wrestling matches at the coconut grove of Helumoa, he sang the following love song for Kou, his sweetheart from Waikīkī, upon his departure to his homeland of Kaua‘i:

Aloha Kou e, Aloha Kou,	Farewell to thee, farewell Kou,
Ke aloha mai nei Kou ia‘u	The love of Kou is within me,
Ka hoa hele i ka makani,	My companion of the windy days
I ka ‘āpa‘apa‘a anu o Ahulu nei.	And the cold of Ahulu.
E ualo mai ana ia‘u nā niu o Pai,	The coconut trees of Pai are calling me back,
E ‘ena‘ena mai ana i ku‘u maka,	They appear as raging fire to my eyes,
Ke a‘ā o Kuamānu‘unu‘u,	Like the volcanic rocks at Kuamānu‘unu‘u
‘I‘iau e ki‘i, e kui, a lei—e	I am tempted to get them, to string them, and to wear them,
Nā‘ākulikuli papa o Huia nei la,	The ‘ākulikuli blossoms there at Huia
E ualo mai ana ia‘u—e	For they are calling me back there

[Hibbard and Franzen 1986:7]

By the end of the fourteenth century, Waikīkī had become “the ruling seat of the chiefs of O‘ahu,” their power centered at Helumoa. The area was further cemented as a royal residence by the fifteenth *ali‘i ‘aimoku* (ruling chief) Kākuhihewa who, while competing at *makahiki* (new year) games at his court in Waikīkī, was challenged by Ka‘auhelemoa, the supernatural rooster or *moa* from Ka‘au Crater in Pālolo:

> The phantom moa landed at Kākuhihewa’s feet and scratched at the earth and then disappeared. Thinking it was an omen, Kākuhihewa ordered a niu tree to be planted at that spot which was named Helumoa or chicken scratch in honor of this event. This one tree grew into an estimated 10,000 coconut trees. [Kamehameha Schools 2016]

The preeminence of Waikīkī continued into the eighteenth century, evidenced by Kamehameha’s decision to reside there after winning control of O‘ahu by defeating the island’s

chief, Kalanikūpule. The nineteenth century Hawaiian historian John Papa ‘Ī‘ī (1959), himself a member of the *ali‘i*, described the king’s Waikīkī residence:

> Kamehameha's houses were at Pua‘ali‘ili‘i, *makai* of the old road, and extended as far as the west side of the sands of ‘Āpuakehau. Within it was Helumoa where Ka‘ahumanu *mā* went to while away the time. The king built a stone house there, enclosed by a fence. [‘Ī‘ī 1959:17]

‘Ī‘ī further noted that the “place had long been a residence of chiefs. It is said that it had been Kekuapoi’s home, through her husband Kahahana, since the time of Kahekili.” Helumoa remained in royal possession well beyond the nineteenth century with the later inheritance of the land by Kamehameha I’s great-grandaughter, Princess Bernice Pauahi Bishop.

3.2.7 Kapua ‘Ili

Kapua ‘Ili, located in the eastern section of Waikīkī, was an ancient surfing area, now filled in and part of Kapi‘olani Park (Finney and Housten 1966:28). In 1809, Kamehameha put his nephew, Kanihonui, to death for committing adultery with Ka‘ahumanu, and placed his remains at Papa‘ena‘ena Heiau. As Ka‘ahumanu’s “wrath was aroused,” she began to make plans to take the kingdom from Kamehameha by force when she pronounced a surfing holiday at Kapua, since “the surf was rolling fine then” (‘Ī‘ī 1959:51). Kapua was also a site where “bone-breaking wrestlers” engaged in their sport (Kamakau 1992:72).

3.2.8 *Heiau*

Thomas G. Thrum reports that eight *heiau* were once located in Waikīkī, consisting of Papa‘ena‘ena Heiau, Kapua Heiau, Kūpalaha Heiau, Helumoa Heiau, Makahuna Heiau, Kamauakapu Heiau, Pahu-a-Maui Heiau, and Kulanihakoi Heiau (Thrum 1905:44–45). Samuel Kamakau notes another *heiau* of Waikīkī called Halekumukaaha Heiau (Kamakau n.d. in McAllister 1933:78), and early historic maps by C.J. Lyons (Registered Maps [RM] 726 and 727) indicate the location of another *heiau* called Ōpūnahā Heiau. Several of the *heiau* were of *po‘okanaka* (sacrificial) classification, used ceremoniously for human sacrifices (Stokes 1991:24). In addition, four large *pōhaku*, commonly called the Wizard Stones of Kapeimāhū, also constituted a religious site within Waikīkī (Thrum 1906:139–141).

3.2.8.1 Papa‘ena‘ena Heiau

Papa‘ena‘ena Heiau was once located at the base of Lē‘ahi (Diamond Head) (McAllister Site 58, McAllister 1933:71–74). Papa‘ena‘ena Heiau, of *po‘okanaka* class, was a quadrangular paved terrace approximately 130 by 70 ft with walls on three sides from 6 to 8 ft in height and 8 ft thick at the base, and open on the western side facing the village of Waikīkī (McAllister 1933:74). Papa‘ena‘ena Heiau may have been built by the Maui ruler Kahekili to honor his victory over O‘ahu in 1780 and to avenge his ancestor, Kauhi-a-Kama, whose remains were desecrated at ‘Āpuakēhau Heiau in the sixteenth century (Thrum 1926:109). Kamehameha, who took O‘ahu from Kahekili’s successor, Kalanikūpule, in 1795, commanded sacrifices at Papa‘ena‘ena Heiau and impaled the bodies of Kiana, *mō‘ī* (king, sovereign) of O‘ahu, and other slain chieftains upon its walls (Jarves 1844:59–60 in McAllister 1933:73).

John Papa ‘Ī‘ī (1959:33, 35) described the physical layout and customs of Papa‘ena‘ena Heiau when Kamehameha became ill in late 1803 or early 1804, and Paul Rockwood drew an image of such a *luakini* (sacrificial, to include human sacrifices) class *heiau* as described by ‘Ī‘ī.

> The house in which they dwelt was called the Hale Pahu, for that was where the drums of the gods were kept. These drums, which were sounded every morning at dawn, were kept in the gods’ houses by their keepers, who did the drumming. It was also said that the drums were sounded in the Hale Pahu when the king did not utter the ‘amama [finished] prayer.
>
> The Hale Pahu was closed from top to bottom on the side and back walls, whereas the front had only posts, like a lanai. It faced the ‘anu‘u tower and the row of idols in front of the ‘anu‘u. Between them was the lele altar. Three of the houses were thatched with leaves of the loulu palm (lau lauli‘i). The largest house, called the Hale Mana, was long, like a halau [long house]. Its front and door faced the entrance of this luakini heiau. The third house was the Hale Umu, or Oven House, which stood on the left side of the Hale Mana, extending forward of it a little, with front and door directly toward the back of the Hale Pahu. The fourth house, called the Hale Waiea, was a small one between the Hale Umu and the Hale Pahu. It was twice the length of the distance from fingertip to elbow in length, its height, and breadth being half that measure. Two images stood before it on either side of the opening, and the king and kahuna conducted their ‘aha (prayer) services at the right side of the opening, in the dark of the night before the birds began to twitter. [‘Ī‘ī 1959:33, 35]

Kamehameha was said to have visited Papa‘ena‘ena Heiau before setting off to battle for Ni‘ihau and Kaua‘i in 1804. Five years later, Kanihonui’s death at Papa‘ena‘ena Heiau would have been one of the last human sacrifices in the kingdom. Queen Emma, the widow of Alexander Liholiho (Kamehameha IV), had Papa‘ena‘ena Heiau dismantled, and she used the rocks to build a fence to surround her Waikīkī estate in Kaluaokau (Kanahele 1995:136).

In 1919, Walter F. Dillingham purchased the area once occupied by Papa‘ena‘ena Heiau from the James Campbell Estate and built a palatial home (Hibbard and Franzen 1986:40), which later became the site of the Hawai‘i School for Girls at La Pietra (Becket and Singer 1999:x).

3.2.8.2 Kapua Heiau

Kapua Heiau was also mentioned by Thrum as being *po‘okanaka* class and described as follows:

> Near Kapiolani Park, opposite Camp McKinley. Heiau pookanaka. Fragments of its walls torn down in 1860, show it to have been about 240 feet square; said to be the place of sacrifice of Kaolohaka, a chief from Hawaii, on suspicion of being a spy [Thrum 1907:44].

3.2.8.3 Kūpalaha Heiau

The classification of Kūpalaha Heiau is unknown according to Thrum but was closely associated with Papa‘ena‘ena Heiau. The location of Kūpalaha Heiau was at Kapi‘olani Park in Waikīkī near the Cunha cottages (Thrum 1907:44). According to the University of Hawai‘i’s

Center for Oral History's (UHCOH) *Waikīkī, 1900–1985: Oral Histories*, the Cunha Cottages were located "at the corner of Lemon Road and Kapahulu Avenue" (UHCOH 1985:924).

Kākuhihewa, *mōʻī* of Oʻahu ca. 1540-1634, attempted to sacrifice a man from Honolulu named Kapoʻi at Kūpalaha Heiau for consecrating a *heiau* called Manuʻa on a day that the *mōʻī* had made *kapu* (taboo). Kākuhihewa's warriors were then attacked by owls from Molokaʻi, Lanaʻi, Maui, Hawaiʻi, Oʻahu, Kauaʻi, and Niʻihau at the order of Kapoʻi's *ʻaumakua*, which was an owl or *pueo*. The owls defeated Kākuhihewa's warriors in the *moʻolelo* known as the "Battle of the Owls." Kākuhihewa acknowledged that Kapoʻi's *akua* or god was a powerful one and from that time, the owl has been recognized as one of the many deities venerated by the Hawaiian people (Thrum 1905:200–202). The failed attempt to sacrifice Kapoʻi at Kūpalaha Heiau may indicate this *heiau* was of *poʻokanaka* class.

3.2.8.4 Helumoa Heiau (ʻĀpuakēhau Heiau)

Helumoa Heiau, also known as ʻĀpuakēhau Heiau, was once located near the *muliwai* of ʻĀpuakēhau Stream in Waikīkī. According to Thrum, portions the Royal Hawaiian Hotel are built on the former site of Helumoa Heiau. Thrum continued that the Royal Hawaiian Hotel was also built on the site of a former athletic field of the *aliʻi*. When the excavations for the hotel were made, many *ʻulumaika* (game stones) were found (Thrum 1907:79). Thrum described Helumoa Heiau as, "Heiau pookanaka, the place of sacrifice of Kauhi-a-Kama, the defeated moi [*mōʻī*] of Maui, in his raid on Oahu about 1610, in the reign of Kaihikapu" (Thrum 1907:44).

Poʻokanaka classified *heiau*, as mentioned by Thrum above, are ceremoniously used as sacrificial *heiau* or *luakini* (temple where human sacrifices were offered) (Stokes 1991:24). Fornander continues—

> Kauhiakama, the son of Kamalalawalu was carried prisoner from Maui by the Oahu chiefs and burnt at Apuakehau, in Waikiki, and his skull was used as an ipu honowa (excrement receptacle), hence the vindictiveness of Kahekili to the Oahu chiefs [Fornander 1919:321].

Primarily a war temple, this sacrificial *heiau* was where Kaʻopulupulu—the last Oʻahu-born *kahuna nui* (high priest and councilor to a chief) of Oʻahu—was laid after being slain in Waiʻanae by Kahāhana. Eventually, Kahāhana, himself was also sacrificed at Helumoa Heiau by Kahekili's invading army from Maui (Thrum 1904:112–113).

3.2.9 Nā Pōhaku ʻOla Kapaemāhū a Kapuni

Another religious site in Waikīkī is Nā Pōhaku ʻOla Kapaemāhū a Kapuni, commonly referred to as the Wizard Stones of Kapaemāhū. These stones were unearthed in the late 1800s on the Waikīkī premises of the Cleghorn family, Governor A. Cleghorn, his wife Princess Likelike, and their daughter Princess Kaʻiulani. According to a *moʻolelo* gathered by Thrum (1906:139–141), four soothsayers from the court of a Tahiti king came to Hawaiʻi and helped heal many people. Four large stones were gathered from the vicinity of a "bell rock" in Kaimukī and erected in Waikīkī to commemorate them, two at their habitation and two at their bathing place in the sea. The chief of the wizards, Kapaemāhū, named his stone after himself, and a virtuous young chiefess was sacrificed and placed beneath the stone. Today they are located at Kūhiō Beach Park (Thrum 1906:139–141) (Figure 12).



Figure 12. Photograph of the healing wizard stones of Kapaemahu

The Honorable A.S. Cleghorn unearthed an 8-ton stone at his residence close to the Moana Hotel in 1905. Another stone weighing 10 tons was uncovered by Mr. Lutted, and two more were excavated in a straight line with the others. Underneath the 10-ton stone Mr. Cleghorn uncovered a female jaw bone and some crude images, which he later cemented onto the stone. In 1941, the Waikiki Bowling Alley was constructed with the stones serving as part of the foundation, but they were then uncovered in 1958 when the building was razed. In 1963, the stones were located together on the beach, and in 1980 they were relocated to their present site near the police substation. The location of Mr. Cleghorn's cement casings indicated the stones had been positioned incorrectly; however, a decision was reached to leave them as they had been placed (Paglinawan 1997:5–6).

3.2.10 Healing Waters of Kawehewehe

Kawehewehe takes its meaning from the root word, *wehe*, which can be translated as "to remove" (Pukui et al. 1974:383). Thus, as the name implies, Kawehewehe was a traditional place where people went to be cured of all types of physical and spiritual illnesses. Two healing areas share the name Kawehewehe, one being a healing pond and the other a beach. Kawehewehe pond is located in the vicinity of Saratoga Road. As a treatment for illness and defilement, the sick were brought here to bathe in the healing waters of the ocean. As part of the healing ritual, the ill might wear a *lei* (garland) made from the *limu kala* (seaweed) and leave it in the water as a request that his sins be forgiven; hence the origin of the name *kala* ("the removal," Pukui et al. 1974:99). By ducking under the water, the ill person releases the *lei* from around his neck, letting the *lei limu kala* float out to sea. Upon turning around to return to shore, the custom is to never look back, symbolizing the *'oki* (to sever or end) and putting an end to the illness; as well as forgiveness (*kala*) and the leaving of anything negative behind. It is uncertain if the tradition of Kawehewehe as a healing place originated hundreds of years ago in Hawaiian history or whether it began after the introduction of foreign diseases and epidemics that decimated thousands of Hawaiians.

3.2.11 Trails

In a section of *Fragments of Hawaiian History*, called "Places and Persons on Oahu," John Papa 'Ī'ī describes the "Honolulu trails of about 1810." In particular, 'Ī'ī discusses the trails of lower Waikiki, Kāmo'ili'ili and Mānoa (Figure 13):

> A trail led out of the town at the south side of the coconut grove of Honuakaha and went on to Kalia. From Kalia it ran eastward along the borders of the fish ponds and met the trail from lower Waikiki. At Kawaiahao a trail passed in front of the stone house of Kaina, late father of Kikaha. The trail went above Kalanipuu's place, along the stream running down from Poopoo to the sea, close by Kaaihee in Makiki, to Puu O Manoa, then below Puupueo, where a trail branched off to go to upper Ka'aipu and Kahoiwai, and another to go below Kaahulue, to Kapulena and Kolowalu. The trail from Kawaiahao which led to lower Waikiki went along Kaananiau, into the coconut grove at Pawaa, the coconut grove of Kuakuaka, then down to Piinaio; along the upper side of Kahanaumaikai's coconut grove, along the border of Kaihikapu pond, into Kawehewehe; then through the center of Helumoa of Puaaliilii, down to the mouth of the Apuakehau stream; along the sandy beach of Ulukou to Kapuni, where the surfs roll in; thence to the stream of Kuekaunahi; to Waiaula and to Paliiki, Kamanawa's house site. The latter was named for the

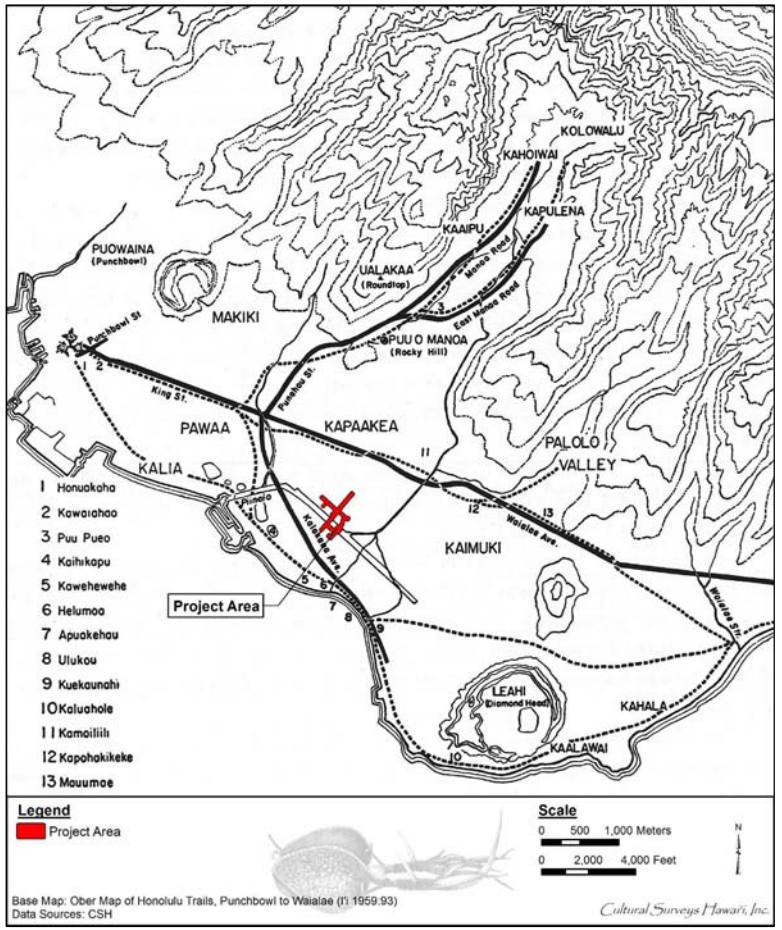


Figure 13. Map depicting project area in red and trails from Punchbowl Street to Waialae as described by 'Ī'ī (1959:93)

> Paliiki in Punahoa, Hilo. Perhaps that was where Kamanawa lived when the king resided in Hilo during the battle called Puana, prior to the building of the great *peleleu* fleet.
>
> From Paliiki the trail ran up to Kalahu, above Leahi, and on to the place where the Waialae stream reached the sand. The trail that ran through Kaluahole went to Kaalawai, up, over, and down into Kahala, to meet the other trail at the place where the stream reached the sand. There they met the mauka trail that came from Ululani's place in Pawaa to Kapaakea, then up to Kamoiliili, and to Kapohakikeke, where it left the trail that went up to Palolo. [Ī‘ī 1983:93–94]

3.3 *‘Ōlelo No‘eau* (Proverbs)

Hawaiian knowledge was shared by way of oral histories. Indeed, one’s *leo* (voice) is oftentimes presented as *ho‘okupu* (“to cause growth,” a gift given to convey appreciation, to strengthen bonds); the high valuation of the spoken word underscores the importance of the oral tradition (in this case, Hawaiian sayings or expressions), and its ability to impart traditional Hawaiian “aesthetic, historic, and educational values” (Pukui 1983:vii). Thus, in many ways these expressions may be understood as inspiring growth within reader or between speaker and listener:

> They reveal with each new reading ever deeper layers of meaning, giving understanding not only of Hawai‘i and its people but of all humanity. Since the sayings carry the immediacy of the spoken word, considered to be the highest form of cultural expression in old Hawai‘i, they bring us closer to the everyday thoughts and lives of the Hawaiians who created them. Taken together, the sayings offer a basis for an understanding of the essence and origins of traditional Hawaiian values. The sayings may be categorized, in Western terms, as proverbs, aphorisms, didactic adages, jokes, riddles, epithets, lines from chants, etc., and they present a variety of literary techniques such as metaphor, analogy, allegory, personification, irony, pun, and repetition. It is worth noting, however, that the sayings were spoken, and that their meanings and purposes should not be assessed by the Western concepts of literary types and techniques. [Pukui 1983:vii]

Simply, *‘ōlelo no‘eau* may be understood as proverbs. The Webster dictionary notes it as “a phrase which is often repeated; especially, a sentence which briefly and forcibly expresses some practical truth, or the result of experience and observation.” It is a pithy or short form of folk wisdom. Pukui equates proverbs as a treasury of Hawaiian expressions (Pukui 1995:xii). Oftentimes within these Hawaiian expressions or proverbs are references to places. This section draws from the collection of author and historian Mary Kawena Pukui and her knowledge of Hawaiian proverbs describing *‘āina* (land), chiefs, plants, and places. The following proverbs concerning Waikīkī come from Mary Kawena Pukui’s *‘Ōlelo No‘eau* (Pukui 1983).

3.3.1 *‘Ōlelo No‘eau* #2255

> *Na līpoa ‘ala o Kawehewehe.*
>
> The fragrant līpoa of Kawehewehe.

> The līpoa seaweed of Waikīkī, especially at Kawehewehe, was so fragrant that one could smell it while standing on the shore. Often mentions in songs about Waikīkī [Pukui 1983:246]

3.3.2 *Ōlelo No‘eau* #110

> *Alia e ‘oki ka ‘āina o*
>
> *Kahewahewa, he ua.*
>
> Wait to cut the land of Kahewahewa, for it is raining.
>
> Let us not rush. Said by Kaweloleimakua as he wrestled with an opponent at
>
> Waikīkī. [Pukui 1983:14]

3.3.3 *Ōlelo No‘eau* #1321

> *Kāhunahuna pa‘akai o Kālia*
>
> Fine-grained salt of Kālia.
>
> A derogatory expression for the dried, viscid matter in the corners of the eyes of an unwashed face. Kālia was a place for gathering salt, although any place name might be used. [Pukui 1983:144]

3.3.4 *‘Ōlelo No‘eau* #285

> *E ho‘i ka u‘i o Mānoa, ua ahiahi.*
>
> Let the youth of Mānoa go home, for it is evening.
>
> Refers to the youth of Mānoa who used to ride the surf at Kalehuwehe in Waikīkī. The surfboards were shred among several people who would take turns using them. Those who finished first often suggested going home early, even though it might not be evening, to avoid carrying the boards to the hālau [long house] where they were stored. Later the expression was used for anyone who went off to avoid work. [Pukui 1983:35–36]

3.3.5 *‘Ōlelo No‘eau* #1378

The following *‘ōlelo no‘eau* describes the fishing techniques found in the Kālia area on O‘ahu Island.

> *Ka i‘a pīkoi kānaka o Kālia; he kānaka ka pīkoi, he kānaka ka pōhuku.*
>
> The fish caught by the men of Kālia; men are the floaters, men are the sinkers.
>
> In ancient days, when a school of mullet appeared at Kālia, O‘ahu, a bag net was set and the men swan out in a row and surrounded the fish. Then the men would slap the water together and kick their feet, driving the frightened fish into the opening of their bag net. Thus the fishermen of Kālia became known as human fishnets [Pukui 1983:151].

3.3.6 *‘Ōlelo No‘eau* #1493

> *Ka nalu ha‘i o Kalehuawehe.*

The rolling surf of Kalehuawehe.

Ka-Lehua-wehe (take-off-the-lehua) was Waikīkī's most famous surf. It was so named when a legendary hero took off his lei of lehua [the flower of the ‘ōhi‘a tree] blossoms and gave it to the wife of the ruling chief, with whom he was surfing. [Pukui 1983:161–162]

3.3.7 *‘Ōlelo No‘eau* #1734

The following *‘ōlelo no‘eau* describes the pleasant ocean reverberations characteristic of shallow reef shorelines.

Ke kai wawalo leo le‘a o Kālia.

The pleasing, echoing sea of Kālia.

Refers to the sea of Kālia, Honolulu, now known as Ala Moana. [Pukui 1983:186]

3.3.8 *‘Ōlelo No‘eau* #1772

Ke one ‘ai ali‘i o Kakuhihewa.

The chief-destroying sands of Kakuhihewa.

The island of O‘ahu. When the priest Ka‘opulupulu was put to death by the chief Kahāhana for warning him against cruelty to his subjects, he uttered a prophecy. He predicted that where his own corpse would lie in a heiau at Waikīkī, there would lie the chief's corpse as well. Furthermore, he said, the land would someday go to the sea—that is, to a people from across the sea. This was felt to be a curse. When Kamehameha III was persuaded by a missionary friend to move the capital from Lahaina to O‘ahu, a kahuna, remembering the curse, warned him not to, lest the monarchy perish. The warning was ignored, and before the century was passed, the Kingdom of Hawai‘i was no more. [Pukui 1983:190]

3.4 *Oli* (Chant)

3.4.1 Chant of Papa‘ena‘ena

In Waikīkī when the waves were running, the *kāhuna* (priests who were in charge of all rites pertaining to surfing) signaled to the people by flying a kite. An ancient chant tells of Papa‘ena‘ena (see Section 3.2.8.1 Papa‘ena‘ena Heiau):

There at Kalahuewehe is the big surf created by Papa‘ena‘ena.

Arise, of ye surf of Kalahuewehe, arise!

The *kahuna* of Papa‘ena‘ena flies his moon kite

To proclaim the suitability of the sea for surfing.

The eater lookout on younder highland

Anxiously scans the skies for this signal,

And relays the good news by runners;

Farmers, woodsmen, bird catchers all,

Leave their tasks and fetching their surf boards

Hurry to the beach at Waikiki.

Soon the sea is filled with natives

Sporting in the billowy surf;

Trick riding, zigging and zagging, amidst the foam,

Shouting words of defiance against the angry surf

To topple the rider if it can

[Kanahele 1995:56–57]

3.5 *Mele* (Song)

A number of late nineteenth and twentieth century *mele* concern or mention Waikīkī; these *mele* are presented below.

3.5.1 O‘ahu

O‘ahu is a traditional *mele* describing O‘ahu as the land of love; it highlights the areas of Mānoa, Waikīkī, Nu‘uanu, and Makiki. Raiatea Helm recently rerecorded this *mele* on her 2016 album *He Leo Huali*:

Mānoa he u‘i nō i ka‘u ‘ike	Mānoa is indeed a beauty for my sight
I ka pi‘o mai a ke ānuenue	At the arching of the rainbow
Waikīkī i ke kai malamalama	Waikīkī in the glimmering sea
He wai ho‘oheno a ka pu‘uwai	Cherished waters of my heart
Nu‘uanu i ka makani lawe mālie	Nu‘uanu in the caressing wind
I ke ‘ala o nēia pua o ka ‘awapuhi	In the fragrance of this blossom of ginger
Makiki ka home o nā manu	Makiki, the home of the birds
A beauty, a breath in the heavens,	
when they soar into the sky	
Ha‘ina ‘ia mai ana ka puana	Tell the refrain
He u‘i ke ea mai i ka lani	O‘ahu, the land of love
O‘ahu ka ‘āina o ke aloha	

3.5.2 Ku‘u Pua i Paoakalani (My Flower at Paoakalani)

This *mele* was composed by Queen Lili‘uokalani during the eight months she was imprisoned at ‘Iolani Palace. The queen was imprisoned with one of her loyal supporters, Mrs. Evelyn Townsend Wilson. Her son would often bring the queen flowers from one of her O‘ahu estates; these flowers would be wrapped in newspaper so the queen would have access to the news

occurring outside her palace prison. "One day, she recognized a type of flower that grew at her home in Waikīkī, Paoakalani, and composed this song—translated as 'My Flower at Paoakalani'—as a tribute to its beauty" (Bolante and Keany 2007):

E ka gentle breeze *a pa mai nei*	O gentle breeze that waft to me
Ho'ohāli'ali'a mai ana ia'u	Sweet, cherished memories of you
E ku'u sweet never fading flower	Of my sweet never fading flower
I pua i ka uka o Paoakalani	That blooms in the fields of Paoakalani
Hui: 'Ike mau i ka nani o nā pua	Chorus: I've often seen those beauteous flowers
O ka uka o Uluhaimalama	That grew at Uluhaimalama
'A'ole na'e ho'i e like	But none of those could be compared
Me ku'u pua i ka la'i o	To my flower that blooms in the fields
Paoakalani	of Paoakalani
Lahilahi kona ma hi'ona	Her face is fair to behold
With softest eyes as black as jet	
Pink cheeks so delicate of hue	
I ulu i ka uka o Paoakalani	That grew in the fields of Paoakalani
Nane 'ia mai ana ku'u aloha	Now name to me the one I love
E ka gentle breeze *e* waft mai nei	Gentle breezes passing by
O come to me *k'au mea e li'a nei*	And bring to me that blossom fair
I ulu ika uka o Paoakalani	That blooms in the fields of Paoakalani

3.5.3 Waikīkī Hula

Waikīkī Hula is a traditional *mele.* This song "was written for Pualeilani, the Waikīkī home of Prince Jonah Kuhio Kalanianaole. It was given to Helen Ayat by her mother, a lady-in-waiting to Princess Kahanu, wife of Prince Kuhio" (Huapala n.d.):

He aloha 'ia no a'o Waikīkī, eā	Beloved is Waikīkī
Ka nehe o ke kai hāwanawana	The rustling of the whispering sea
Pa iho ka makani lawe mālie, eā	The wind blows carrying softly
Ke 'ala onaona o ka līpoa	The sweet fragrance of seaweed
Kaulana kou inoa i nā malihini, eā	Your name is famous to visitors,

Ka'apuni kou nani puni ka honua	All your beauty known around the world
Huli aku nānā ia Kaimana Hila, eā	Turn and look at Diamond Head
'Ike i ka nani a'o Honolulu	See the beauty of Honolulu
Ha'ina 'ia mai ana ka puana, eā	The story is told
He aloha 'ia no a'o Waikīkī	Beloved is Waikīkī

3.5.4 Waikiki

In 1938, Andrew Kealoha Cummings, "a homesick local boy," composed this famous song while touring in Michigan (Bolante and Keany 2007). The song, originally performed by Cummings, has been described by George Kanahele as a "rare instance of a near perfect fit of song and singer" (Bolante and Keany 2007):

There's a feeling deep in my heart
Stabbing at me just like a dart
It's a feeling heavenly

I see memories out of the past
Memories that always will last
Of the days that used to be
(Of a place beside the sea)

Waikiki
At night when the shadows are falling
I hear the rolling surf calling
Calling and calling to me

Waikiki
Tis for you that my heart is yearning
My thoughts are always returning
Out there to you across the sea

Chorus: Your tropic nights and your wonderful charms
Are ever in my memory
And I recall when I held in my arms
An angel sweet and heavenly

Waikiki
My whole life is empty without you
I miss that magic about you
Magic beside the sea
Magic of Waikiki

Section 4 Traditional and Historical Accounts of Waikīkī

The current project area belongs to the *ahupua‘a* of Waikīkī. Waikīkī Ahupua‘a at one time spanned the area from Kou (an older name for Honolulu) in the west to Maunalua in the east. Like other *ahupua‘a* of southeastern O‘ahu, Waikīkī Ahupua‘a also traditionally extended from the Ko‘olau mountain range on the *mauka* side all the way to the shoreline on the *makai* side (Kanahele 1995:5).

During the growth of the Honolulu and Waikīkī settlements in the late pre-Contact (pre-1778) and early post-Contact periods, the seaward sections of southeastern O‘ahu *ahupua‘a*—Waikīkī Ahupua‘a included—became effectively “cut off” from the sea along what would become the east-west King Street/Wai‘alae Avenue alignment. The boundaries of Waikīkī Ahupua‘a shrank to Kalākaua Avenue in the west, Diamond Head in the east, and the sea coast to the south. Much of the available traditional and historical background literature from the late pre-Contact through early post-Contact era refers to this more limited *ahupua‘a* of Waikīkī.

4.1 Pre-Contact to Early 1800s

By the time of the arrival of westerners in the Hawaiian Islands during the late eighteenth century, Waikīkī had long been a center of population and political power on O‘ahu. Chiefly residences, however, were only one element of a complex of features that characterized Waikīkī during pre-Contact (before 1778). Beginning in the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. This field system—an impressive engineering design traditionally attributed to the chief Kalamakua—took advantage of streams descending from Makiki, Mānoa, and Pālolo valleys that also provided ample fresh water for the Hawaiians living in the *ahupua‘a*. Water was also available from springs in nearby Mō‘ili‘ili and Punahou. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. A sizeable population developed amidst this Hawaiian-engineered abundance. Captain George Vancouver (1798), arriving at “Whyteete” in 1792, captured something of this profusion in his journals:

> On shores, the villages appeared numerous, large, and in good repair; and the surrounding country pleasingly interspersed with deep, though not extensive valleys; which, with the plains near the sea-side, presented a high degree of cultivation and fertility.
>
> [Our] guides led us to the northward through the village, to an exceedingly well-made causeway, about twelve feet broad, with a ditch on each side.
>
> This opened our view to a spacious plain, which, in the immediate vicinity of the village, had the appearance of the open common fields in England; but, on advancing, the major part appeared to be divided into fields of irregular shape and figure, which were separated from each other by low stone walls, and were in a very high state of cultivation. These several portions of land were planted with the eddo or taro root, in different stages of inundation; none being perfectly dry, and some from three to six or seven inches under water. The causeway led us near a mile from the beach, at the end of which was the water we were in quest of. It was a rivulet five or six feet wide, and about two or three feet deep, well banked up, and

> nearly motionless; some small rills only, finding a passage through the dams that checked the sluggish stream, by which a constant supply was afforded to the taro plantations.
>
> [We] found the plain in a high state of cultivation, mostly under immediate crops of taro; and abounding with a variety of wild fowl, chiefly of the duck kind . . . The sides of the hills, which were at some distance, seemed rocky and barren; the intermediate vallies, which were all inhabited, produced some large trees, and made a pleasing appearance. The plain, however, if we may judge from the labour bestowed on their cultivation, seemed to afford the principal proportion of the different vegetable productions on which the inhabitants depend for their subsistence. [Vancouver 1798:161–164]

Further details of the exuberant life that must have characterized Hawaiian use of the lands including the *ahupua‘a* of Waikīkī are given by Archibald Menzies (1920), a naturalist accompanying Vancouver’s expedition:

> The verge of the shore was planted with a large grove of cocoanut palms, affording a delightful shade to the scattered habitations of the natives. Some of those near the beach were raised a few feet from the ground upon a kind of stage, so as to admit the surf to wash underneath them. We pursued a pleasing path back to the plantation, which was nearly level and very extensive, and laid out with great neatness into little fields planted with taro, yams, sweet potatoes and the cloth plant. These, in many cases, were divided by little banks on which grew the sugar cane and a species of Draecena [ti or *kī*] without the aid of much cultivation, and the whole was watered in a most ingenious manner by dividing the general stream into little aqueducts leading in various directions so as to be able to supply the most distant fields at pleasure, and the soil seemed to repay the labour and industry of these people by the luxuriancy of its productions. Here and there we met with ponds of considerable size, and besides being well stocked with fish, they swarmed with water fowl of various kinds such as ducks, coots, water hens, bitterns, plovers and curlews. [Menzies 1920:23–24]

However, the traditional Hawaiian focus on Waikīkī as a center of chiefly and agricultural activities on southeastern O‘ahu was soon to change—disrupted by the same Western Contact that produced the first documentation (including the records cited above) of that traditional life. The *ahupua‘a* of Honolulu—with the only sheltered harbor on O‘ahu—became the center for trade with visiting foreign vessels, drawing increasing numbers of Hawaiians away from their traditional environments. Kamehameha himself moved his residence from Waikīkī to the coast near Honolulu harbor, likely in order to maintain his control of the lucrative trade in sandalwood that had developed. By 1828, the missionary Levi Chamberlain (1957:26), describing a journey into Waikīkī, noted the following:

> Our path led us along the borders of extensive plats of marshy ground, having raised banks on one or more sides, and which were once filled with water, and replenished abundantly with esculent fish; but now overgrown with tall rushes waving in the wind. The land all around for several miles has the appearance of having once been under cultivation. I entered into conversation with the natives respecting this

> present neglected state. They ascribed it to the decrease of population. [Chamberlain 1957:26]

Tragically, the depopulation of Waikīkī was not simply a result of the attractions of Honolulu (where, by the 1820s, the population was estimated at 6,000 to 7,000) but also of the western diseases that had devastating effects upon the Hawaiian population.

4.1.1 Aquaculture

Fishponds were one of the most important traditional resources for the Hawaiian community in Waikīkī. Historic maps and images depict the locations of numerous *loko i‘a* (fishponds) in Waikīkī and historic documents describe “several hundred” and “innumerable” artificial freshwater fishponds extending a mile inland from the shore (Bloxam 1925:35–36 in McAllister 1933:76). Two studies by the U.S. Commission of Fish and Fisheries (Bowers 1902:429; Cobb 1902 in McAllister 1933:76) listed extant fishponds in Kālia in 1901, including Ka‘ihikapu (“the taboo sacredness”), Kūwili (“stand swirling”), Kaipuni (1 and 2), Paweo (1 and 2), Kapu‘uiki, Kapaakea, Maalahia, Opu, and Opukaala, as well as several fishponds with undocumented names. In addition, historic maps provide the locations of several other fishponds: Kaohai, Oo, Halemauuola, Moo, Kuilei (“lei stringing”), and Kaheana.

The fame of Kālia’s fishponds is attested to in a *mo‘olelo* recounted by John Papa ‘Ī‘ī (in Wyban 1992) that deals with prohibitions against wasting food:

> Once Kinopu gave a tribute of fish to Kamehameha’s son Kinau, at Moehonua’s fishpond in Kalia. While Kinau and his wife Kahukuhaakoi (Wahine-pio) were going to Waikiki from Honolulu, the sea came into the pond and fishes of every kind entered the sluice gate. Kinopu ordered the keepers of the pond to lower fish nets and the result was a catch so large that a great heap of fish lay spoiling upon the bank of a pond.
>
> The news of the huge catch reached Kamehameha, who was then with Kalanimoku, war leader and officer of the king’s guard. The king said nothing at the time, but sat with bowed head and downcast eyes, apparently disapproving of such reckless waste. [Wyban 1992:87]

4.1.2 Agriculture and Subsistence

For spiritual and dietary reasons, *kalo* was a sacred staple in the Hawaiian diet. According to Hawaiian mythology, man was born from the taro plant. According to the *Kumulipo* (“origin, genesis”), Hāloa, “he of the long breath,” is the second son of Wākea (Father Sky) and Papa (Mother Earth). Wākea and Papa’s first born, Hāloa-naka was born premature and died shortly after his birth (Kanahele 1995:17). After burying Hāloa-naka, a *kalo* plant sprouted at his grave. Shortly after, a second son (Hāloa) was born. A human child, Hāloa symbolizes *kalo* and man. *Kalo* is a metaphor for life, Kanahele explains as follows:

> In the mythologies of many cultures, plants have been used to symbolize human spiritual growth. Hawaiians made taro a metaphor for life because, like the taro plant, it needs to be rooted in good soil and to be constantly nourished with the waters of Kāne. As the stalk grows taller with its leaves reaching toward the light of the sun, symbolized by Wākea, so Hawaiians grow aspiring to be closer to their

> heavenly spirit. Just as every young shoot can become a full-grown plant, so can they become gods as descendants of Hāloa. As every plant must die, however, they too must die. And from the remains a new plant lives again. In this continuity of life, both plant and man repeat the mystery of the unending cycle. [Kanahele 1995:18]

The Waikīkī marshland was an ideal place for *kalo* cultivation, providing an abundance of water and sunlight (Figure 14). *Kalo* grown in sunnier conditions matured noticeably faster, thus Waikīkī was established as a key area for cultivation (Kanahele 1995:22). *'Uala* (sweet potato; *Ipomoea batatas*) and the prized *ipu* (gourd) were also abundant in the lower Waikīkī marshlands (Kanahele 1995:35).

In his masters thesis discussing Waikīkī and the reclamation of the Waikīkī marshalnds, Barry Seichi Nakamura determines that wealth and power succeeded in driving people away from Waikīkī.

> To the uninitiated, it would probably come as a surprise to learn that Waikiki, as recently as the 1920's, was one of the important areas of Hawai'i for the cultivation of agriculture and aquaculture. As early as in the 15th century, the Native Hawaiian people engineered and developed at Waikiki extensive taro pondfields and fishponds and an irrigation system which decentralized the water resources of the mountain streams which flowed into the Waikiki hinterland. [Nakamura-1979:v–vi]

The settlers of Waikīkī had to travel *mauka* to the foothills of Mānoa and the valley of Pālolo to gather grasses, vines, and other fauna. *Pili* (*Heteropogon contortus*) grass could be found in the drier areas of Mānoa as well as in Kapahulu and Kaimukī (Kanahele 1995:24). *Pili* grass was used primarily to thatch homes. Along the Waikīkī stream banks, *hau* (beach hibiscus; *Hibiscus tiliaceus*) flourished. The *hau* tree's wood proved excellent for outrigger canoe frames and kite supports; the bark was used for ropes, nets, and *kapa* (cloth); while the flowers were used for medicine (Kanahele 1995:25). *Kukui* (candlenut; *Aleurites moluccana*) trees could be found midway in Mānoa Valley (Kanahele 1995:26). The kernels were used to make *'inamona* (relish) and the oily nut could also be used for stone lamps. The flowers, leaves, branches, and bark were used for medicinal purposes, curing a range of ailments from sore throats to bouts of constipation (Kanahele 1995:26). *'Ōhia 'ai* (mountain apple; *Eugenia malaccensis*) could also be found midway in the *ahupua'a*, toward Mānoa Valley (Kanahele 1995:26).

4.2 Mid-to Late 1800s and the Māhele

The depopulation of Waikīkī, however, was not total and the *ahupua'a* continued to sustain Hawaiians living traditionally into the mid-nineteenth century. Many of these families continued to carry out traditional aquacultural and agricultural practices (Figure 14). Land Commission Award records associated with the mid-nineteenth century Māhele document awardees continuing to maintain fishponds and irrigated and dryland agricultural plots though on a greatly reduced scale than had been possible previously with adequate manpower.

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown and the *ali'i*



Figure 14. Aerial photograph of Waikīkī with overlay of areas historically known to be *lo'i kalo* (green), streams (blue), and fish ponds (teal) (Google Earth 2012; image courtesy of Mr. Peter Young 2013)

received their land titles. The *maka'āinana* began to receive their *kuleana* awards (individual land parcels) in 1850. Although many Hawaiians did not submit or follow through or were not granted the claims for their lands, the distribution of LCAs can provide insight into patterns of residence and agriculture. Many of these patterns of residence and agriculture probably had existed for centuries past. By examining the patterns of *kuleana* (commoner) LCA parcels in the vicinity of the survey area, insight can be gained to the likely intensity and nature of Hawaiian activity in the area (Chinen 1958:8–12).

An 1881 Hawaiian Government survey map by S.E. Bishop—with locations of LCA parcels indicated—provides a detailed record of the physical landscape of Waikīkī before the transformations of the twentieth century (Figure 15). When the map was copied in 1922, additional material from subsequent government surveys was added, including locations of road corridors not present in 1881 (Figure 16). The maps reveal an extensive complex of irrigated fields, streams and irrigation watercourses, and ponds stretching inland from the Waikīkī shoreline to the plains of Mō'ili'ili. Land Commission Award records for the awards shown on the map document house lots near the shore with associated taro *lo'i* located inland and house lots adjacent to inland taro *lo'i.* The records also indicate habitation and agricultural pursuits by the Native Hawaiian population continuing into the mid-nineteenth century.

A review of an 1881 Hawaiian Government survey map by S.E. Bishop indicates seven LCAs within the project area (see Figure 15, Figure 17, and Table 1). The majority of the parcels are located in the *'ili* of Kālia, with one parcel located in Kuilei.

LCA documentation indicates LCA 154:4 was awarded to W. Sumner and includes what is labelled as Loko Kuilei on historic maps of the area, and describes a *kalo* patch *makai* in marsh. A description given by Lahilahi follows:

> Lahilahi, sworn, I know this land called Kuilei. It consists of kalo land principally, and some kula. I was born near it, and have lived there all my life. I cannot give the exact number of kalo patches. It consists of 4 distinct pieces, and one of sea, called Ele, beyond Diamond Hill. I went with Kalanikahua (surveyor) when he surveyed it, and the bounds given in these surveys are correct, which I can point out at any time. There are several tenants living on this land and having rights therein.
>
> Mr. Sumner got this land in time of Kamehameha 2 in 1822 or 1823, and he and his heirs have held them ever since in peace and quietness. I am headman of this land.
>
> Mr. Sumner on part of the heirs, said he did not wish to disturbe [*sic*] the right of the tenants there, he fully recognized their rights. [Foreign Testimony 1846-1853:2:509–510]

LCA 154:4 is the only parcel in the project area that is not in the *'ili* of Kalia. It is labelled as belonging to the *'ili* of Kuilei, a *lele*. A *lele* is described as a separate piece of an *'ili*, a discontinuous portion (United States Congress 1894:1697). It is ambiguous in the above statement by Lahilahi, but it seems there were residents on this land.

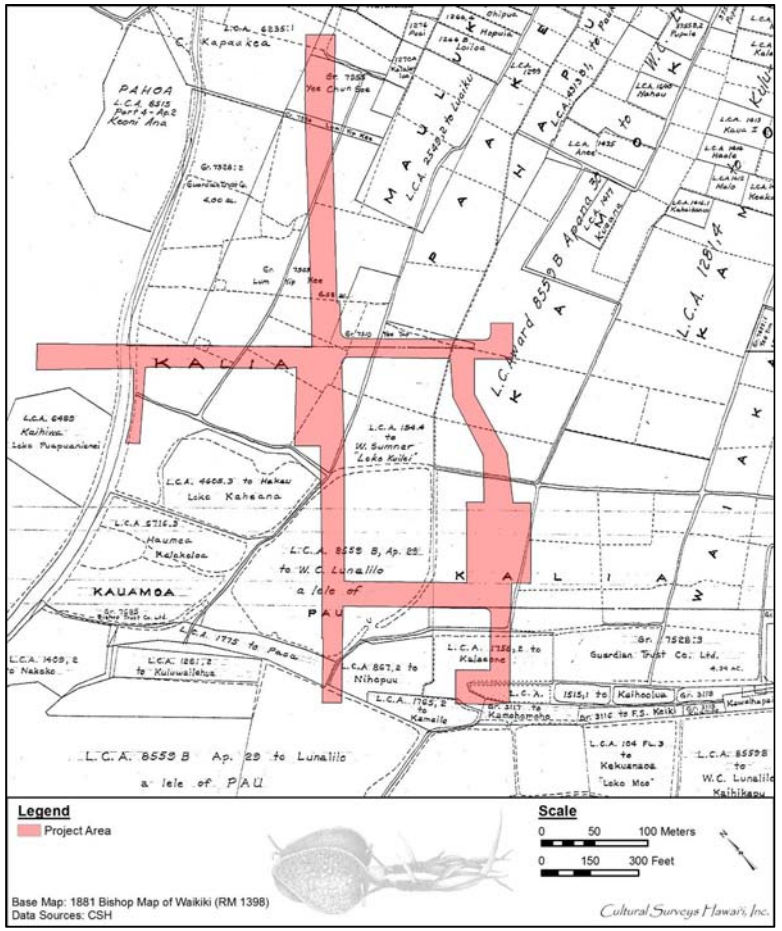


Figure 15. Portion of an 1881 Hawaiian Government survey map by S.E. Bishop showing the location of land claims within the project area

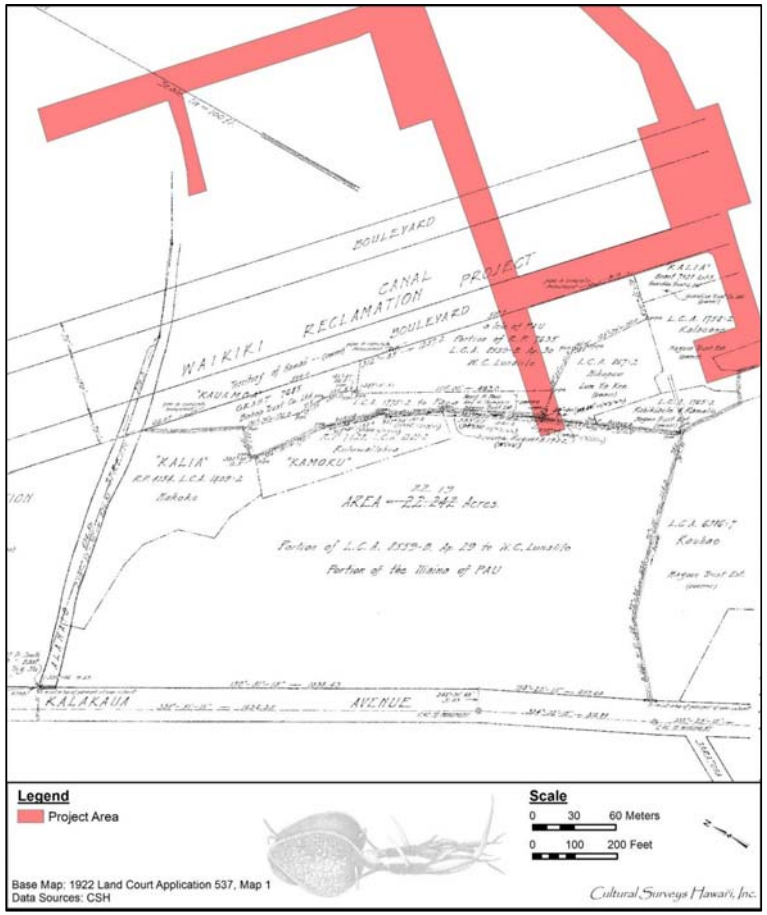


Figure 16. Portion of a 1922 LCA 537, Map 1 showing the locations of LCAs in the Waikīkī Kai portion of the project area, with more detail than the 1881 S.E. Bishop map (Hawai'i Land Survey Division)

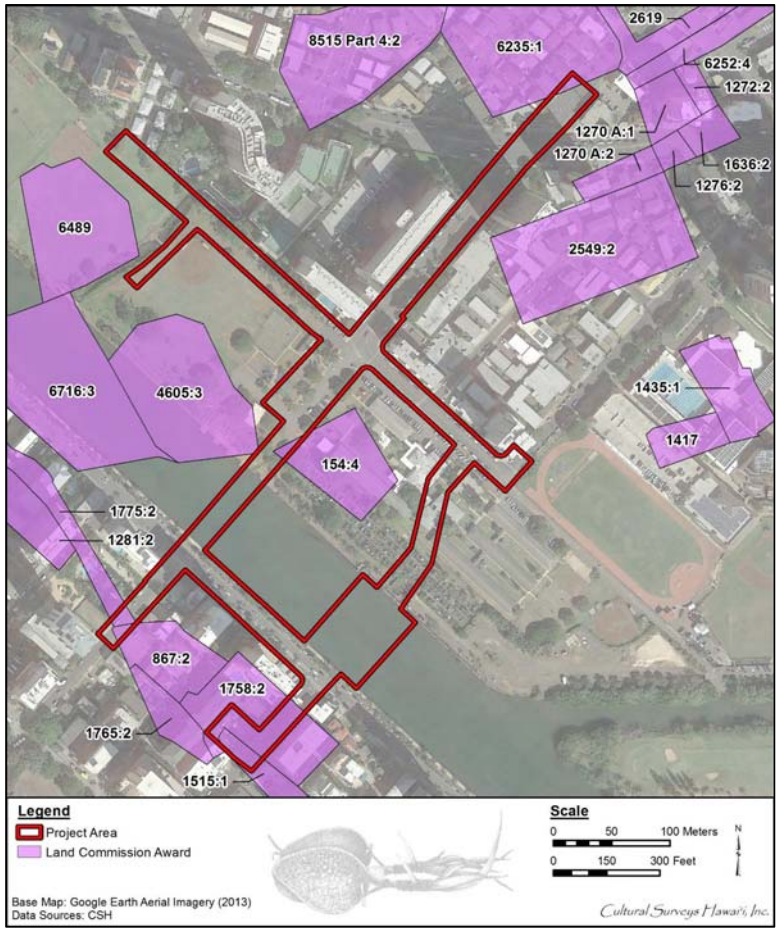


Figure 17. Aerial photograph showing the locations of Kuleana LCAs (Google Earth 2013) within the project area.

Table 1. Land Claims Located within the Project Area

Land Claim #	Claimant	*‘Ili*	Land Use
154:4	W. Sumner	Kuilei	*Kalo* patch *makai* in marsh
867:2	Nihopuu	Kālia	Enclosure with house lot, four *lo‘i* and *‘auwai*
1515:1	Kaihuolua	Kālia	Three *lo‘i*
1758:2	Kalaeone	Kālia	*Lo‘i*, *paukū* (small land section) stream
1765:2	Kahikiaele and Kamalie	Kālia	*Lo‘i*
1775:2	Paoa	Kālia	*Paukū* ditch of stream taro
6235:1	C. Kapaakea	Kālia	*Lo‘i*

LCA 867:2 was awarded to Nihopuu and includes an enclosure with a house lot, four *lo‘i* and a portion of *‘auwai*. Nihopuu indicates he lives in a separate parcel by the ocean (outside the project area). Kamainui describes the house lot and taro lands:

> I have seen Nihopuu’s house lot and taro land at Waikiki and here are the boundaries of the house lot:
>
> [Apana 1, outside of project area]:
>
> Toward the mountain and on the Honolulu side, Kaeina’s lots
>
> The sea is in the direction of the sea and
>
> Kahikaele’s house lot, Waikiki.
>
> This place has a wooden fence with one house on it and he is living there. This had been an idle land during Kaahumanu's reign and since that time Nihopuu has lived there to the present in absolute peace.
>
> [*‘Āpana* (parcel) 2, within project area]
>
> The boundaries of the taro land are:
>
> Kuluwailehua’s land, toward the mountain
>
> My land, Waikiki
>
> Peleuli’s land, toward the sea and
>
> Makuahine’s land is on the Honolulu side.
>
> This place has an enclosure and the house within is for Nihopuu. These are four patches with a section of the creek. Nihopuu had received this from Peleuli and he occupied this for the same length of time as he had the house lot
>
> [Native Testimony 1846-1852:3:10]

The LCA documents indicate there was a house lot located within *‘Āpana* (portion) 2. At the time of documentation, Nihopuu was residing in a house lot at *‘Āpana* 1, at the ocean’s edge.

Although this would seem to indicate there was no one living at the house lot in *‘Āpana* 2, it is likely Nihopuu was staying there part-time, someone else was living there, or, at the very least, in years prior it served as a permanent habitation when the population of Waikīkī was much higher. Although this is the only documented habitation site within the project area, there are numerous sources for habitation sites around these inland agricultural plots.

LCA 1515:1 was awarded to Kaiholua and includes three *kalo* patches located in and around the project area. Kaiholua also has an enclosed house lot located by the beach. This parcel is described by Meanui:

> Meanui, sworn, says she knows the land of claimant at Kalia, Waikiki, Oahu. It consists of 3 kalo patches and a house lot.
>
> The kalo patches are bounded:
>
> On the Mauka side by Government land
>
> Waialae side by the stream
>
> Makai, the same
>
> Honolulu side by Kamalie’s land.
>
> Claimant has a house lot on the sea beach. It is enclosed.
>
> He has held the land and house lot in peace since the days of Kaahumanu.
>
> [Foreign Testimony1846-1853:3:470]

LCA 1758:2 was awarded to Kalaeone and includes a *lo‘i* and *paukū* stream that was being worked. The parcel is described by Kahonu as “1 taro patch and *paukū* stream” bounded, “Mauka and Waialae, konohiki’s land. Makai, Waalani’s land, Kamailie’s land. Honolulu, Nihopuu’s land” (Native Testimony 1846-1852:3:506). A *paukū* is a narrow strip of land smaller than a *mo‘o* (Pukui and Elbert 1986:320). The house site of Kalaeone is located on a separate parcel.

LCA 1765:2 was awarded to Kahikiaele and Kamalie and includes a *lo‘i*. The parcel is described by Kahonu:

> 1. House-lot with his personal house and 2 houses for others who live under him; this has not been completely enclosed.
>
> Mauka, M. Kekuanaoa’s fish pond
>
> Waialae, Kamalo
>
> Makai, the sea
>
> Honolulu, Nihopuu.
>
> 2. 1 taro patch:
>
> Mauka, Nihopuu
>
> Waialae, Kawahakai
>
> Makai, Kahaawepala

> Honolulu, Makuahine.
>
> Kekuanaoa had given them their land at the time of Kaahumanu I and they have continued living there without objections.
>
> [Native Testimony 1846-1852:3:505]

The *‘Āpana* 1 house lot of Kahikiaele is located next to the *‘Āpana* 1 house lots of Nihopuu and Kaiholua along the shore in present day Fort DeRussy. It is interesting to note that they all have neighboring house lots by the sea and neighboring taro patches further inland.

LCA 1775:2 was awarded to Paoa (also called Pawa) and includes a *paukū* ditch and stream taro located in Kalia. Describing this parcel, on 16 December 1847 Paoa testified as follows:

> . . . I hereby state my claim for a section of irrigation ditch. I do not know its length— perhaps it is two fathoms more or less. The length of my interest at this place is from the time of Ka‘ahumanu I, which was when my people acquired this place . . . [Native Register 1846-1848:3:250]

Paoa also claimed—and was awarded—a separate house lot at the shore. The “irrigation ditch” parcel is further described by a witness, Kalaeone, testifying on Paoa’s behalf, as “a paukū ditch of stream taro” bounded “*Mauka* [by] Government land; *Waialae* [by] Nihopuu’s land; *Makai* [by] Kuluwailehua’s land, Keino’s land; *‘Ewa* [by] Nakoko’s land” (Native Testimony 1846-1852:3:509). The names of the adjacent awardees correspond to those shown on the 1881 map. Kalaeone also describes the history of Paoa’s tenure on his house lot and “*Paukū* ditch of stream taro”:

> Land to [Paoa] from his mother, Makuahine. Makuahine had received it from Naliikipi after the death of Kinau in 1839, because Makuahine is Naliikipi’s sister. Makuahine had bequested it permanently to [Paoa], their son. Makuahine, [Paoa’s] parent has died and [Paoa] has been living there to the present time peacefully [Native Testimony 1846-1852:3:509]

The LCA documents indicate Paoa’s parcel within the present project area comprised an actively worked taro cultivation feature that had been in his family for two generations. It is highly likely the *paukū* had been fully developed and operational at the time of the Paoa family’s acquisition earlier in the nineteenth century.

LCA 6235:1 was awarded to Kapaakea and includes only a general description of *lo‘i*. This parcel is located at the extreme northeast portion of the project area, in the vicinity of present day University Avenue and Kapiolani Boulevard. This parcel is the only one located in the project area that can definitively be ascribed to Waikīkī Waena. The rest of the LCA parcels are located in the vicinity of the Ala Wai Canal and so can be ascribed to Waikīkī Waena or, most likely, Waikīkī Kai, because the exact boundary has never been fully described.

LCA 8559B:29, located in Pau, and 8559B:30, located in Kamoku, were awarded to W.C. Lunalilo. These large tracts of land are located in the project area although Māhele award documents do not reveal specific activities or land usage for these particular properties during the mid-nineteenth century.

After reviewing the LCA information for the project area, the documentation suggests this entire Waikīkī Kai portion of the project area was interlaced with streams, *loko* and *‘auwai* and utilized for the purpose of watering individual taro patches. These practices are seen to be a continuance of traditional Hawaiian farming techniques known from ancient times. All of the *kuleana* claimants have residences in the vicinity. The single house lot documented in the project area belongs to Nihopuu, but he has been residing in a different house lot close to the ocean.

In contrast to this traditional Hawaiian lifestyle—still apparent from LCA documentation and the 1881 S.E. Bishop map (see Figure 15)—in the Waikīkī Kai portion of the project area, the Waikīkī Waena portion of the project area (in the vicinity of University Avenue and Hihiwai Street) hints at the changes starting to occur. These hints are manifest in Land Grants awarded to Chinese farmers, suggesting a shift in agriculture. This will be further elaborated below as a general discussion on the trend for converting former taro lands to rice lands.

As the nineteenth century progressed, Waikīkī Kai was becoming a popular site among foreigners, mostly American, who had settled on O‘ahu. An 1865 article in the *Pacific Commercial Advertiser* mentioned a small community that had developed along the beach. The area continued to be popular with the *ali‘i* and several notables had residences there. A visitor to O‘ahu in 1873 described Waikīkī as “a hamlet of plain cottages, whither the people of Honolulu go to revel in bathing clothes, mosquitoes, and solitude, at odd times of the year” (Bliss 1873:195–196).

Other developments during the second half of the nineteenth century, a prelude to the dramatically altered landscape of Waikīkī during the twentieth century, included the improvement of the road connecting Waikīkī to Honolulu (Waikīkī Road, the route of the present Kalākaua Avenue), the building of a tram line between the two areas, and the opening of Kapi‘olani Park on 11 June 1877. Traditional land uses in Waikīkī were abandoned or modified.

4.2.1 Rice Cultivation

By the end of the nineteenth century, most of the fishponds that had previously proliferated had been neglected and allowed to deteriorate. The remaining taro fields were planted in rice to supply the growing numbers of immigrant laborers imported from China and Japan, and for shipment to the west coast of the United States (Coulter and Chun 1937).

As the sugar industry throughout the Hawaiian Kingdom expanded in the second half of the nineteenth century, the need for increased numbers of field laborers prompted passage of contract labor laws. In 1852, the first Chinese contract laborers arrived in the Islands. Contracts were for five years and pay was $3 a month plus room and board. Upon completion of their contracts, a number of the immigrants remained in the Islands, many becoming merchants or rice farmers. As was happening in other locales in the 1880s, groups of Chinese began leasing and buying (from the Hawaiians of Waikīkī) former taro lands for conversion to rice farming. The taro lands’ availability throughout the Islands in the late 1800s reflected the declining demand for taro as the Native Hawaiian population diminished (Coulter and Chun 1937).

The Hawaiian Islands were well positioned for rice cultivation. A market for rice in California had developed as increasing numbers of Chinese laborers immigrated there since the mid-nineteenth century. Similarly, as Chinese immigration to the Islands also accelerated, a domestic market opened.

> The primary market for both husked rice and paddy raised in all parts of the Hawaiian Islands was in Honolulu. The number of Chinese in the islands created a large home demand.
>
> In 1880 the home market was made more secure by an increase in the duty on rice imported into Hawai‘i to 1½ cents on paddy and 2½ cents on hulled rice. It resulted in further checking the importation of foreign rice and giving an immense impetus to the home product. [Coulter and Chun 1937:130]

By 1892, Waikīkī had 542 acres planted in rice, representing almost 12% of the total 4,659 acres planted in rice on O‘ahu (Figure 18 and Figure 19). Most of the former taro *lo‘i* converted to rice fields were *mauka* of the present Ala Wai Boulevard, understood to be Waikīkī Waena.

A review of an 1881 Hawaiian Government survey map by S.E. Bishop indicates land grants were awarded to people with Chinese names in the Waikīkī Waena portion of the project area, with a much more sparse dispersion of Hawaiian names as compared to the Waikīkī Kai portion (see Figure 15). There is no specific note in the land grant information as to how the land was utilized due to incomplete documentation. A review of an 1893 map of Honolulu by Wall shows that most of the project area is located within rice fields (see Figure 19). Within the 12 years that the maps were drawn (1881-1893) it is apparent there was a major shift away from traditional Hawaiian agriculture toward rice cultivation.

4.2.2 Banana Cultivation

According to historic maps and photographs, the Waikīkī Kai portion of the current project area appears to be located within former banana fields, cultivated post-Contact (after 1778) in the Waikīkī wetlands until the 1920s Waikīkī land reclamation (Figure 20, Figure 21, and Figure 22). Bananas were likely first brought to the Hawaiian Islands by Polynesians. They fared well on long distance journeys, both in root form and ripened, likely due to their hardy corm-like bulb and its leathery peel (Pope 1926:8). By the time Captain Cook and his men made contact with Hawaiians in 1778, many different varieties of bananas were already being cultivated locally (Pope 1926:2). Multinational strains of bananas were introduced to Hawai‘i as early as the 1850s. Today, multinational strains of the fruit are so popularly grown in the Hawaiian Islands that only about 20 of the estimated 70 early Hawaiian varieties remain and these are often limited to remote valleys (Wagner et al. 1990:1465).

The Chinese banana, also known as the Dwarf or Cavendish banana, was introduced in 1855 and quickly became the most popular tropical fruit to be grown on a commercial scale because of its sweet taste, rapid growth, and resistance to insects like fruit flies (Higgins 1904:16). In addition to being the most widespread commercially grown banana in the Hawaiian Islands, the Chinese banana yields crops within one year of being planted at sea level, giving farmers the extra incentive to grow in lowlands. Banana farms flourished in areas like Waikīkī, which had been cultivated for centuries with taro *lo‘i,* and later on with rice. Von Tempski (1940) provides a first-hand observation of the marshy landscape and the banana fields of Waikīkī ca.1910:

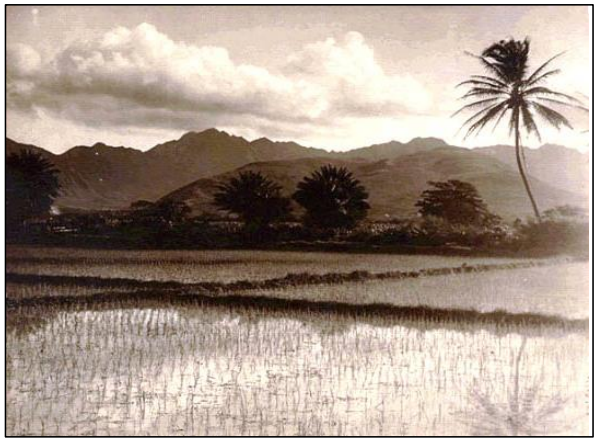


Figure 18. Photo of rice fields in Waikīkī in the 1890s; *mauka* is Mānoa Valley (Hawaiian Historical Society)

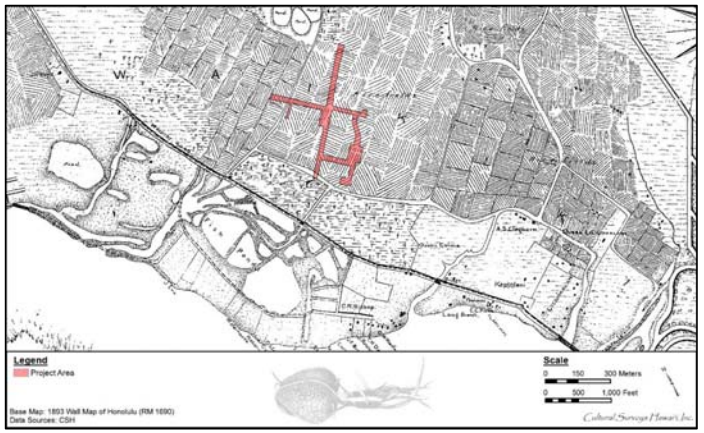


Figure 19. Portion of an 1893 Wall map of Honolulu, showing distribution of rice fields in and around the current project area

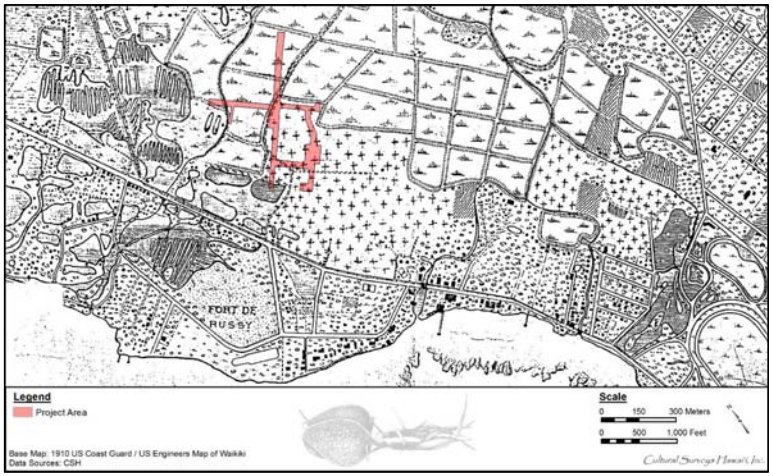


Figure 20. Portion of 1910 U.S. Engineers map of Waikīkī showing the project area; note the in-filling of the fishponds within the southern portion of Fort DeRussy



Figure 21. A 1910 photograph of the banana fields at Olohana Street, located approximately one block west of the current project area, showing the irrigation and drainage systems required for lowland banana cultivation (photo by Ray Jerome Baker; adapted from LeSuer et al. 2000)

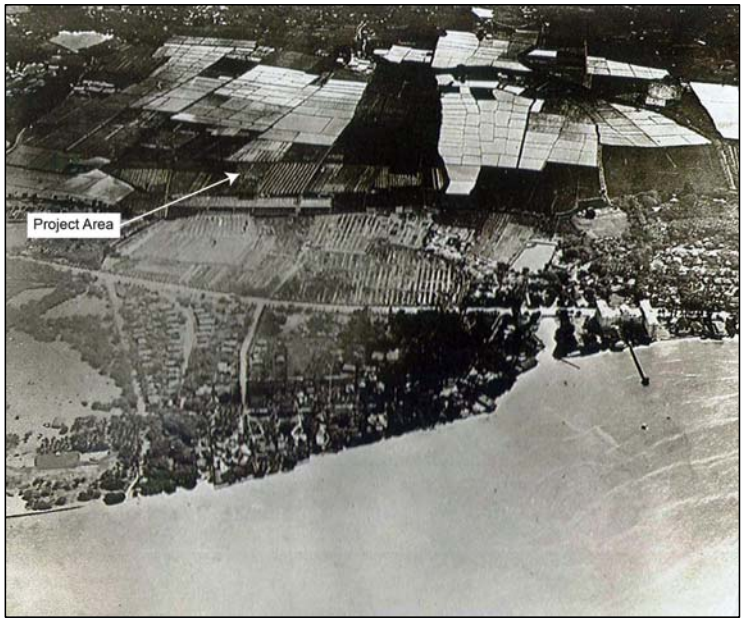


Figure 22. A 1920 aerial photograph of Kālia to Ala Moana showing the project area located within the Waikīkī wetlands; note the banana crop fields in the foreground and the rice fields in the background (from Grant 1996)

> After driving through the business section of town we began passing lovely homes set back in gracious gardens. Gradually the houses became farther apart, and finally the road started across a marshy tract of ground paralleled by a solitary street-car track. On either side of the dike were vivid green rice paddies and taro patches. Thin-legged Chinamen in coolie hats were wading around, tending the crops. Each paddy was surrounded by raised ground planted with stocky banana trees bending under huge bunches of fruit. Shanties on high poles showed here and there and imposing fleets of ducks paddled through the reed ponds quacking, shaking their tails and up-ending to dive for minnows and frogs. [von Tempski 1940:8–586]

The banana plant is notoriously thirsty; it is estimated that for every one pound of fruit yielded from a banana plant, it takes over 600 pounds of water to grow (Pope 1926:14). Therefore, irrigation and drainage systems had to be implemented as rows “laid out in ditches 1½ to 2 feet deep with high ridges between . . . The ditches are made by running a plow several times through each row, after which the loosened soil is thrown to the sides” (Pope 1926:13). Banana fields required very “deep and thorough” plowing, and after between 4-8 years of cultivation it was required that the field be replowed to maintain its productivity (see Figure 21) (Pope 1926:13, 19). This process would obliterate the previous year’s rows, suggesting the natural land surface within the project area had undergone extensive and repeated restructuring. The aerial photograph depicted in Figure 22 shows the Waikīkī area in the 1920s prior to the land reclamation, with ditches associated with banana cultivation visible.

Due to its extensive irrigation, banana farming and duck ponds reportedly went hand in hand, one helping to sustain the other. A 1901 article titled “Chinese Duck Ranch” in *Paradise of the Pacific* (cited in Feeser 2006) describes the duck ponds:

> . . . it is typical of countless such enterprises across O‘ahu . . . the duck rancher carefully monitors every stage of his birds’ growth and guards his flock from predators such as mongoose. He also states that the rancher gets two uses from his irrigation ditches, which he freshens regularly: he employs them not only for ponds, but also for growing bananas. [Feeser 2006:30]

Chinese banana strains were considered the most commonly cultivated. It is likely the bananas cultivated within the current project area were of a strain originating from China or other regions of Southeast Asia. The banana fields within the project area were eventually filled in during the Waikīkī land reclamation project, likely with material dredged from the nearby Ala Wai Canal.

4.3 1900s

Development of Waikīkī rapidly gained momentum in the twentieth century. In particular, the development of the Ala Wai Canal, Fort DeRussy military reservation, major vehicular thoroughfares (including Waikīkī Road, later renamed Kalākaua Avenue), and ultimately resort development, dramatically changed the landscape of the project area. As seen in Figure 9, Figure 19, Figure 20, Figure 23, and Figure 24, the fishponds of Kālia remained largely intact through the late 1800s and early 1900s. However, by 1928 the last of the Kālia fishponds had been filled in (Figure 25) and Pi‘inaio Stream had been filled in and replaced by Ala Moana Boulevard (see discussion below). In the 1940s and 1950s, prior to Statehood, the landscape remained much the

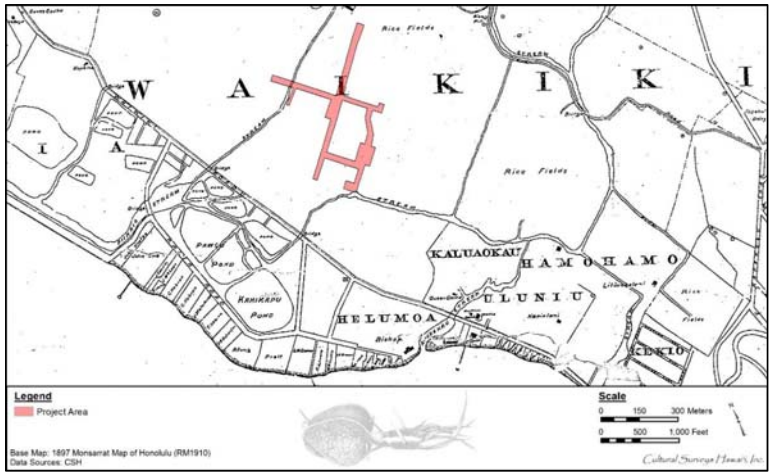


Figure 23. Portion of an 1897 map by M.D. Monsarrat, showing the project area in relation to Pi‘inaio Stream, the fishponds of Kālia, and the growing road network including Waikīkī Road (Kalākaua Avenue), Beach Road (Ala Moana Boulevard), and Kālia Road

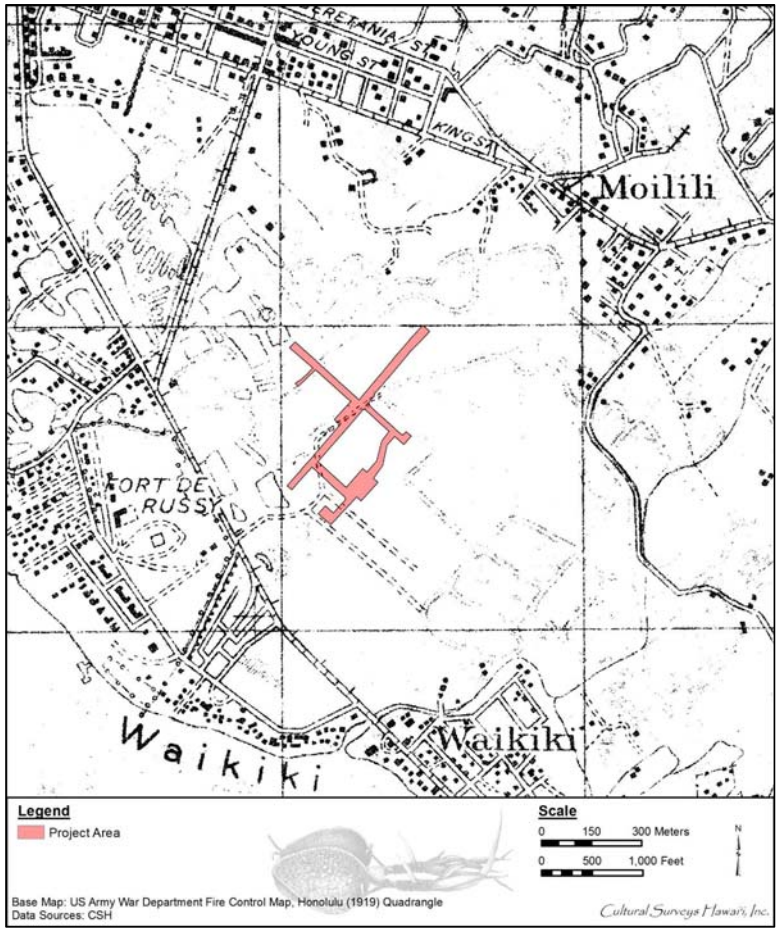


Figure 24. Portion of 1919 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area; note the remaining fishponds west of the project area

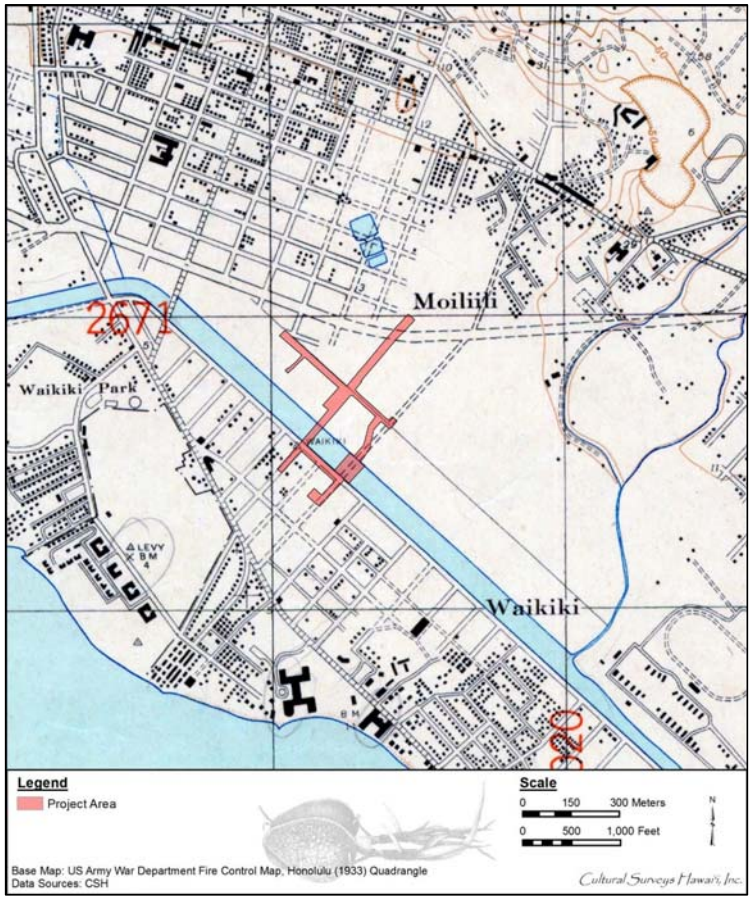


Figure 25. Portion of 1933 U.S. Army War Department Fire Control map, Honolulu quadrangle showing the project area, the complete in-filling of the Kālia wetlands, and the development of the Ala Wai Canal. Three ponds are depicted to the north of the project area that have not been filled at this time

same (Figure 26 and Figure 27). A 1978 aerial photograph of the project area shows the dramatic alteration of the landscape of Kālia over the course of less than a century (Figure 28).

4.3.1 Ala Wai Canal

It was during the 1920s that the lands including the present project area were transformed when construction of the Ala Wai Drainage Canal—begun in 1921 and completed eight years later—resulted in the draining and filling in of the remaining ponds and irrigated fields of Waikīkī, including those in Mō‘ili‘ili (see Figure 24, Figure 25, Figure 29, and Figure 30). The canal was one element of a plan to urbanize Waikīkī and the surrounding districts, first conceived in 1906:

> The [Honolulu city] planning commission began by submitting street layout plans for a Waikīkī reclamation district. In January 1922 a Waikīkī improvement commission resubmitted these plans to the board of supervisors, which, in turn, approved them a year later. From this grew a wider plan that eventually reached the Kapahulu, Mō‘ili‘ili, and McCully districts, as well as lower Makiki and Mānoa . . . The standard plan for new neighborhoods, with allowances for local terrain, was to be that of a grid, with 80-foot-wide streets crossing 70-foot-wide avenues at right angles so as to leave blocks of house lots about 260 by 620 feet. Allowing for a 10-foot-wide sidewalk and a 10-foot right-of-way [alley] down the center of each block, there would be twenty house lots, each about 60 by 120 feet, in each block. [Johnson 1991:311]

The final result was a “canal three miles long, with an average depth of twenty-five feet and a breadth of two hundred fifty feet” (*Honolulu Star-Bulletin*, 17 October 1928). Several claims were made against the dredging company, including compensation for destroyed crops and livestock, by farmers living in Waikīkī. For instance, a Chinese tenant farmer named Chang Fow, who was leasing lands in Waikīkī from the Bishop Trust Company, wrote a letter of complaint indicating the salt water that leached into his lands as a result of the dredging had devastated his fishponds and stocks of ducks and chickens (letter from Chang Fow to the Bishop Trust Company, 23 May 1922 in Nakamura 1979:100–101). His claims, along with those of other residents of the area, give an impression of the continuing agricultural subsistence base in Waikīkī that lasted into the 1920s, and rapidly became a thing of the past.

Information about the actual dredging and fill process and the materials dredged up and used for fill is minimal. Statements and pictures regarding the event suggest dredging was done both offshore on the ocean bed, and in the area slated for the canal. As yet, information regarding the filling process of personal properties—with the excess dredge that became the property of the Hawaiian Dredging Company—is unclear. Numerous phases seem to have taken place.

Nakamura (1979:85) writes that the government of the Territory of Hawaii solicited bids in 1920 for the dredge and fill project planned for the environs of Waikīkī. The plan was to create hundreds of acres of urban land at the expense of wetland agriculture and aquaculture in the area. The advertisement soliciting bids for the project put forward by Lyman H. Bigelow masked the significance of the undertaking by describing the project as “Dredging a Drainage Canal and Filling and Reclaiming Certain Unsanitary Lands at Waikiki” (Nakamura 1979:85). He further

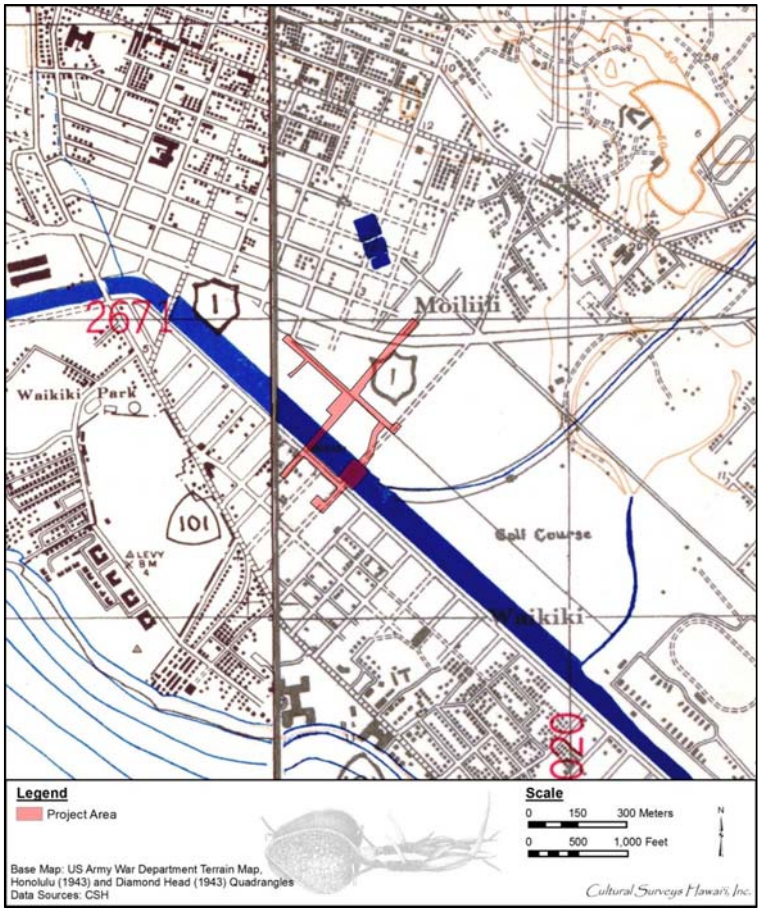


Figure 26. Portion of 1943 U.S. Army War Department topographic map, Honolulu and Diamond Head Quadrangles, showing the project area; three ponds depicted to the north of the project area have not been filled at this time

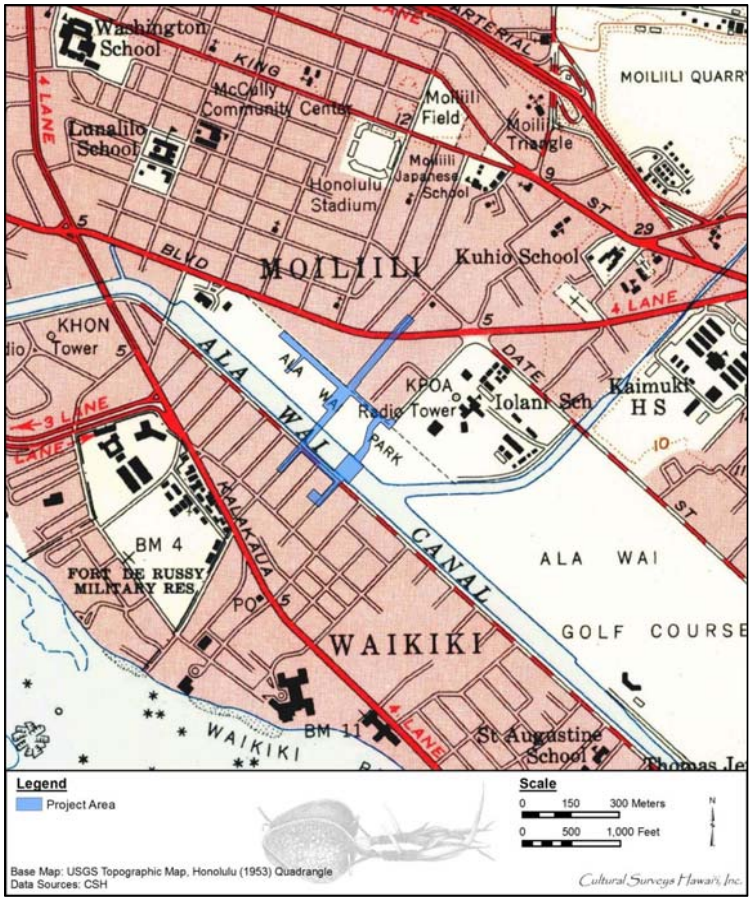


Figure 27. Portion of 1953 Honolulu USGS topographic quadrangle showing the project area and the complete in-filling of Pi‘inaio Stream which was replaced by Ala Moana Boulevard; note the three ponds to the north of the project area have been filled by this time

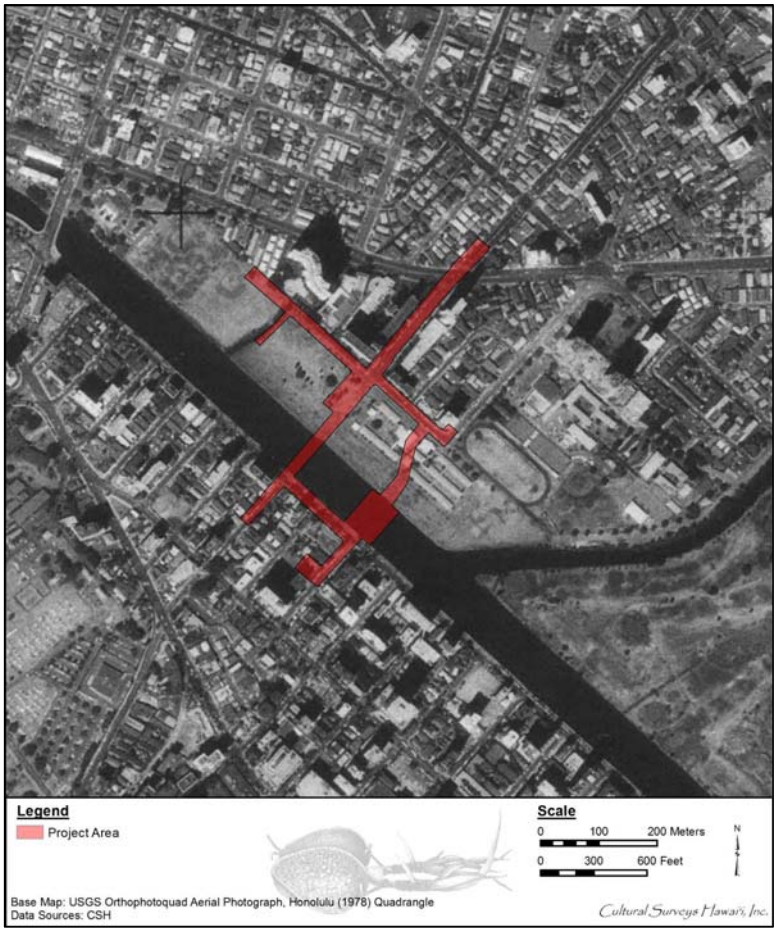


Figure 28. 1978 USGS aerial orthophotograph, Honolulu Quadrangle, showing the project area

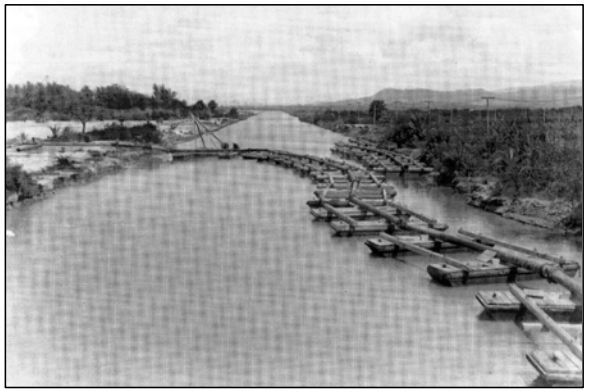


Figure 29. Creation of the Ala Wai Canal showing floating dredge line, ca. 1924 (Bishop Museum Archives)



Figure 30. 1927 aerial photo of the completed Ala Wai Canal showing the reclamation of the Kālia area within Waikīkī with coral fill (dredge and pipe in foreground) (Bishop Museum Archives)

writes that State laws required property owners to pay for the filling in of their lands, which apparently was going to be done whether they wanted it or not. A lien would be fixed against their property and if payment was not made on time, the land would be foreclosed on. Nakamura points out that the cost was so high for some of the property owners that the bank lien could extend into a 15-year mortgage (Nakamura 1979:89).

Once filling of land that the Territorial government wanted (for State buildings) was complete, any further dredged materials became the property of the dredging company—Hawaiian Dredging Company—and they in turn could sell the materials to the property owners, who in turn were forced to buy the product. The involvement of Walter F. Dillingham of the Hawaiian Dredging Company was described in *Time* magazine, “Walter Dillingham used the muck dragged up from the sea to fill in low, marshy areas around Honolulu, over the years created 5,000 acres of solid ground that now holds a full third of the city’s population” (Nakamura 1979:112).

The land surface of modern Waikīkī is situated on the result of this decade-long dredging and fill project. In Nakamura’s (1979:113) *The Story of Waikīkī and the Reclamation Project,* he writes that this “land ‘reclamation’ program changed the ecology of Waikīkī from a once viable and important agriculture and aquaculture center . . . destroyed by profit-seeking capitalist entrepreneurs . . . under the subterfuge of ‘drainage’ and ‘sanitation.’” Many of the original property owners lost their land or sustained serious damage to their property as a result of the reclamation activities and/or the costly expense for the mandatory filling in of their properties.

Waikīkī was changed forever by the Ala Wai Canal. The ancient irrigation systems were gone, the farms were gone, the streams were gone, the mosquitoes were gone, and Waikīkī was separated from the rest of Honolulu by a broad canal. On the new high-and-dry lands behind the hotels, developers laid out tracts of inexpensive homes and garden apartments. Almost overnight Waikīkī became urban (Grant 1996:54).

4.3.2 Development of Waikīkī

Newly created land tracts following the Ala Wai Canal’s construction spurred a rush to development in the 1930s. An article in the *Honolulu Star-Bulletin* in 1938 extolled the area’s progress:

> The expansion of apartment and private residence construction is no secret. Examination of building permits will show that more projects have been completed during the past year, and more are now underway in this area, than in any other section of the territory. [Newton 1939:10]

The entrance of the United States into World War II following the Japanese bombing of Pearl Harbor on 7 December 1941 put on hold plans for the development of Waikīkī as a tourist destination. Until the war’s end in 1945, the tourist trade was non-existent “since the Navy controlled travel to and from Hawai‘i and did not allow pleasure trips” (Brown 1989:141). For the duration of the war, Waikīkī was transformed into a recreation area for military personnel.

> It was not the same Waikīkī as before the war, though; barbed wire barricades now lined its sands, and there were other changes too. Fort DeRussy became a huge recreation center, with a dance hall called Maluhia that attracted thousands of men

> at a time. The Moana Hotel continued to function, but many other establishments and private homes in the area were taken over by the military. [Brown 1989:141]

4.3.3 Post-1950 Modern Land Use

The 1950 Sanborn Fire Insurance maps identify the buildings and features present on the project area at mid-century compared to the empty lots visible on the 1927 Sanborn Fire Insurance map (Figure 31, Figure 32, and Figure 33). By the mid-1950s there were more than 50 hotels and apartment buildings from the Kālia area to the Diamond Head end of Kapi‘olani Park. By the mid-1950s, the Waikīkī population was not limited to transient tourists but included 11,000 permanent residents living in 4,000 single dwellings and apartments in stucco or frame buildings. The intensification of urban dwellings and tourist infrastructure has continued to the present day.

4.3.4 ‘Iolani School Olympic Rowing Team

Rowing in Hawai‘i has a storied history; according to Dan Cisco, author of *Hawai‘i Sports*, the activity had a following amongst Hawai‘i’s royalty:

> Rowing debuted in Hawai‘i in the late 1860s. The first account of competitive rowing appeared in the December 16, 1871, issue of the Pacific Commercial Advertiser: ‘There was a race between two-oared boats, of which four were entered, Young America the winner. There was splendid rowing exhibited, and the winners became such by purely hard work.’
>
> King Kalakaua’s birthday on November 16th, 1875, also marked Hawai‘i’s first regatta with [an] extensive rowing competition. The King, a rowing buff, viewed the event from his yacht along with other members of his royal family. The Oahu celebration featured rowers who vied for top prizes ranging from $20 to $25. There were aquatic sports, including five-oared whaleboat races, canoe races, yacht races, and swimming. Capping the day were spectators who climbed greased poles extending over the water. Whoever held on the longest was the ‘winner.’ The regatta was popular over the next two decades. Government representative A. G. M. Robinson supported the event and persuaded other lawmakers to establish Regatta Day. The legal holiday was observed on the third Saturday of September.
>
> Many clubs were organized by the end of the century. The first organized group was the Myrtle Rowing Club, formed in 1883 and headed by M. D. Monsarrat. The Honolulu Rowing Association was formed during this era and helped organize competitions. In 1890 the Healani Boat Club, with president W E. Wall, and the Leilani Boat Club, headed by David Kawananakoa, were formed. Two years later the first regatta at Pearl Harbor was held, all three clubs raced at Pearl Harbor. Interest in rowing spread to Maui, and the Puunene Rowing Club was formed in 1912.
>
> In the 1920s, there were five rowing clubs in Hawai‘i. The men's clubs were Myrtle and Healani from Oahu and Hilo from the Big Island. The Oahu-based Kunalu and Honolulu were the two women's clubs. Kunalu was coached by Healani, while the

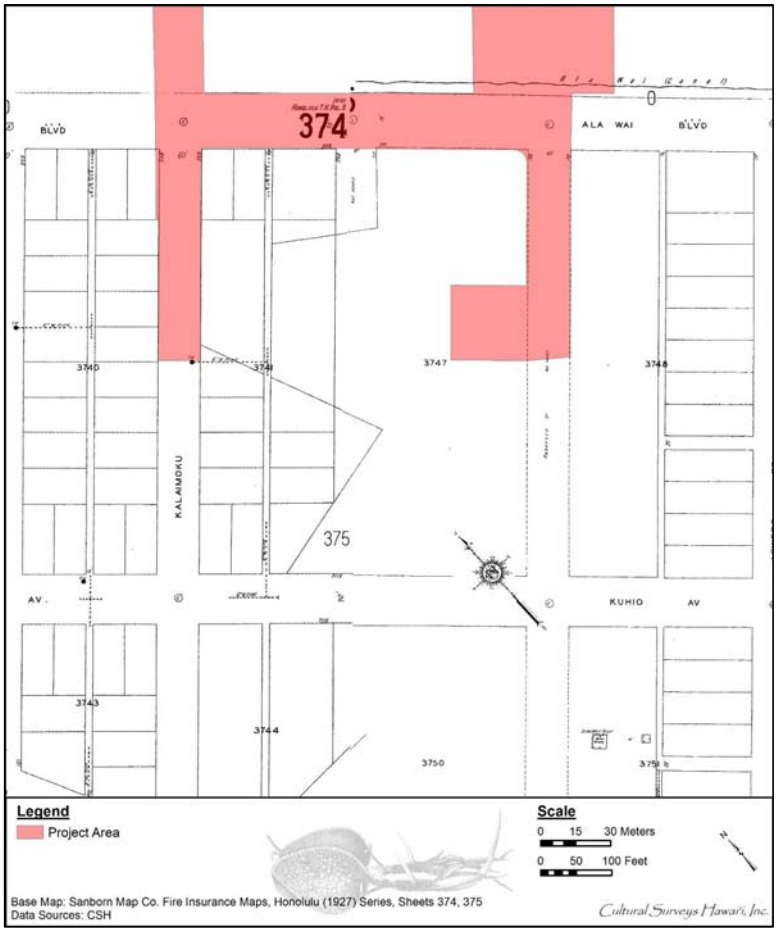


Figure 31. 1927 Sanborn Fire Insurance map showing the newly created lots in the Waikīkī Kai portion of the project area

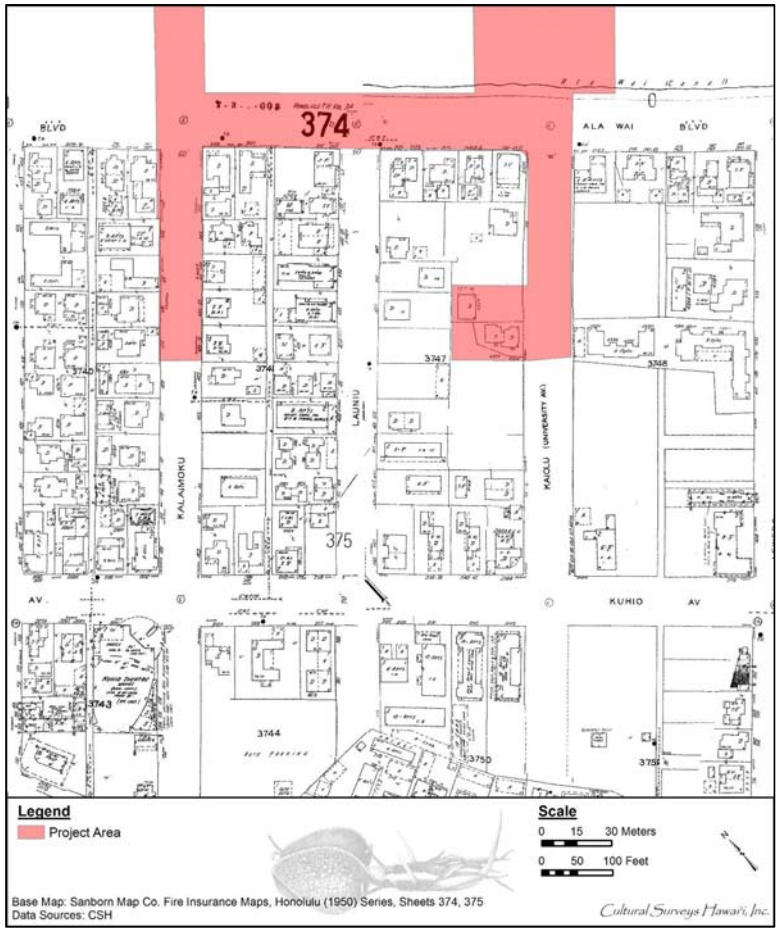


Figure 32. 1950a Sanborn Fire Insurance map showing the new apartments in the Waikīkī Kai portion of the project area

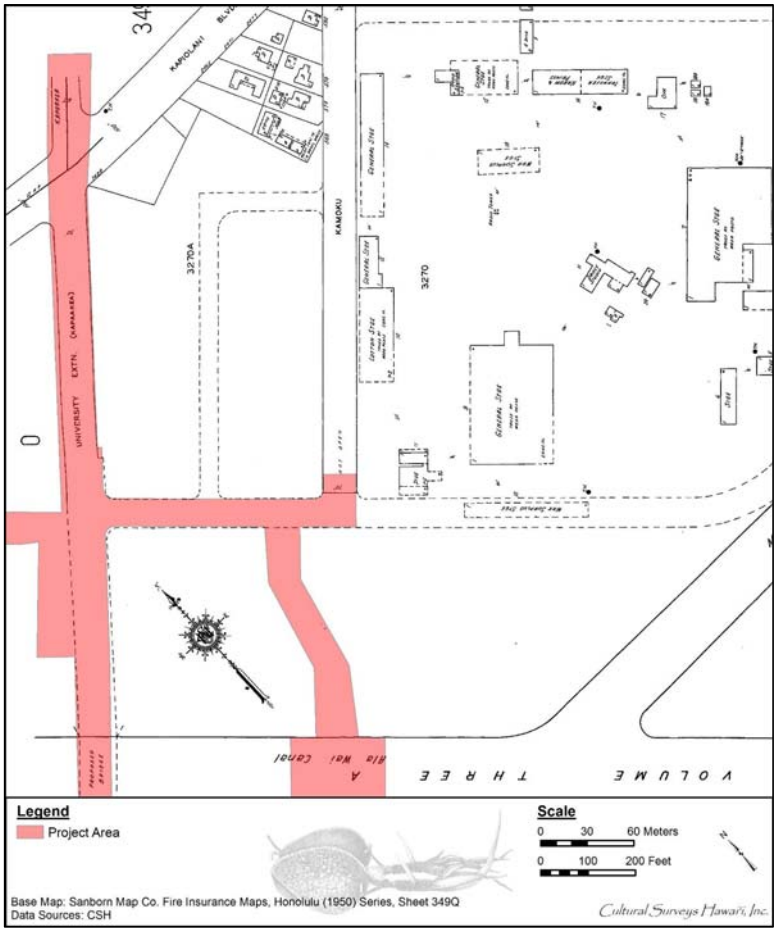


Figure 33. 1950b Sanborn Fire Insurance map showing the Waikīkī Waena portion of the project area

> Honolulu Girls were affiliated with Myrtle. There were two regattas a year, one in Hilo and the other in Honolulu.
>
> In 1957, the Interscholastic League of Honolulu added rowing to its list of sports. Five schools competed for the inaugural ILH title: Iolani, Kaimuki, Mid-Pacific, McKinley, and Punahou. [Cisco 1999:490-493]

The construction of the Ala Wai allowed for the practice of numerous recreational activities in the man-made waterway. In 1964, the Iolani School rowing crew qualified for the finals of the 1964 Olympic Trials held at the World's Fair in Queens, New York (Chong 2006:6). The Hawai'i team, racing through the water, became a common fixture of the canal. Prior to competing at the 1964 Olympic Trails, the 'Iolani Team was known to average five and a half miles daily on the canal (Chong 2006:7). As Chong notes,

> The members of Iolani's crews were fine athletic specimens, happiest when they were practicing and competing on the Ala Wai Canal. Their event was the four-oared shell with coxswain. The coxswain steers the shell or boat and is the on-the-water coach for the crew. The coxswain is also the person who gets thrown into the water after the crew wins a race. Iolani's coxswains always left the canal dripping. [Chong 2006:7–8]

David Mather, one of Iolani's crew members described the Ala Wai Canal, "the Ala Wai Canal was an absolutely beautiful course. I hated to quit practice. I could have practiced all day." (Chong 2006:13).

Section 5 Previous Archaeological Research

Archaeological studies in the vicinity of the project area are listed in Table 2 and shown in Figure 34. Multiple archaeological monitoring programs, investigations, data recovery, or inventory surveys have previously been conducted along the majority of the project area. Archaeological finds documented during these studies include human burials, pre- and post-Contact cultural layers, buried fishponds, ditches, and other remains of extensive wetland agriculture, trash pits, and construction debris. These archaeological remains have been identified and documented beneath the extensive fill layers related to land reclamation activities associated with urban development. The historic properties identified in the vicinity of the project area are shown in Figure 35.

Table 2. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
McMahon 1994	Kalakaua near Kuhio	SHPD inadvertent discovery	Inadvertent burial discovery associated with State Inventory of Historic Properties (SIHP) # -4890
Cleghorn 1996	Proposed Kalākaua Plaza	Archaeological inventory survey	No significant findings
LeSuer et al. 2000	King Kalākaua Plaza Phase II	Archaeological inventory survey	SIHP # -5796, previous land surface (wetland sediments), adversely impacted by land alteration; SIHP # -4970, *‘auwai*
Borthwick et al. 2002	71,000-sq-ft parcel (TMK: [1] 2-6-016:002)	Archaeological inventory survey	Absence of dry Jaucas sand deposits indicate burial finds unlikely in project area; identified SIHP # -6407, subsurface cultural layer
Bush et al. 2002	Kalākaua Ave (from Ala Moana Blvd to Kapahulu Ave)	Archaeological monitoring	Four human burials (SIHP #s -5860 Features U and V, -5864, and -5856 Feature C) (not shown in Figure 25) documented within the southern portion of the project area (no SIHP # assigned); an historic to modern trash pit as well as wetland sediments believed to belong to the former Loko Kaipuni complex identified within the northern portion of the project area

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
Kailihiwa and Cleghorn 2003	Portions of Lau‘ula St, Waikolu Way and Royal Hawaiian Ave	Archaeological monitoring	No significant findings
Esh and Hammatt 2004	Ala Wai Blvd	Archaeological monitoring	No significant findings
McIntosh and Cleghorn 2004	Urban Loft Development at Launiu St (TMKs: [1] 2-6-017; 068, 070, 071, 072, 073)	Archaeological inventory survey	Documented SIHP # -6680, ponded field sediments which yielded anomalous date (calibrated 2-sigma date range of 1280 to 1010 BC)
Tulchin et al. 2004	Approximately 71,000-sq ft parcel (TMKs: [1] 2-6-016:002, 004, 006, 007, 008, 012-019, 062, 064, 070, 075, 076, and 077)	Archaeological data recovery	Samples from SIHP # -6407 Feature A (subsurface cultural layer) yielded pollen and radiocarbon dating results and Hawaiian use of *kuāuna* (bank or border of a taro patch) and *paukū* features
Esh and Hammatt 2006	Kūhiō Ave from Ka‘iulani Ave to Kapahulu Ave	Archaeological monitoring	No significant findings
O’Leary et al. 2006	0.5-acre Royal Kāhili Condo	Archaeological assessment	Negative findings
Petrey et al. 2008	1944 Kalākaua (TMKs: [1] 2-6-014:004, 006, 007, 008, 010, 019, and 058)	Archaeological assessment	No significant findings
Yucha et al. 2009	Waikiki Shopping Plaza (TMKs: [1] 2-6-019:056, 061)	Archaeological inventory survey	SIHP # -5796, a culturally modified wetland ground surface located beneath early twentieth century land reclamation fill deposits
Park and Collins 2010	Ala Wai Garden project	Archaeological monitoring	No subsurface human burials or historic properties observed

Reference	Location	Type of Study	Results (SIHP # 50-80-14****)
Sroat et al. 2011	Waikīkī Shopping Plaza (TMKs: [1] 2-6-019:056, 061)	Archaeological monitoring	SIHP # -5796, a culturally modified wetland ground surface located beneath early twentieth century land reclamation fill deposits
Gosser and Collins 2014	Intersection of Kuhio Ave and Namahana St	Archaeological monitoring	No significant findings
LaChance and Hammatt 2014	TMKs: [1] 2-3-034:033, 2-3-037:001 and 002, 2-6, and 2-7-036	Archaeological monitoring	No significant findings
Lima et al. 2014	TMKs: [1] 2-6-003, 005, 016, 024, and 027	Archaeological monitoring	No significant findings
Pammer et al. 2014	Bounded by Kūhiō Ave, Lau‘ula St, and Lewers St (TMKs: [1] 2-6-018:043, 045–048)	Archaeological inventory survey	SIHP # -5796, a culturally modified wetland including a pond (Feature A) and a berm (Features B–E)
Morriss and Hammatt 2015	Along both *mauka* and *makai* sides of Ala Wai Canal	Archaeological inventory survey	SIHP # -5796, a previously identified pre-Contact to early twentieth century natural wetland deposit
Martel and Hammatt 2016	TMKs: [1] 2-6-017; 2-7-013, 014, and 036 (various parcels)	Archaeological inventory survey	SIHP # -5796, an original wetland surface, and SIHP # -9757, the Ala Wai Canal were identified as being within the current project area

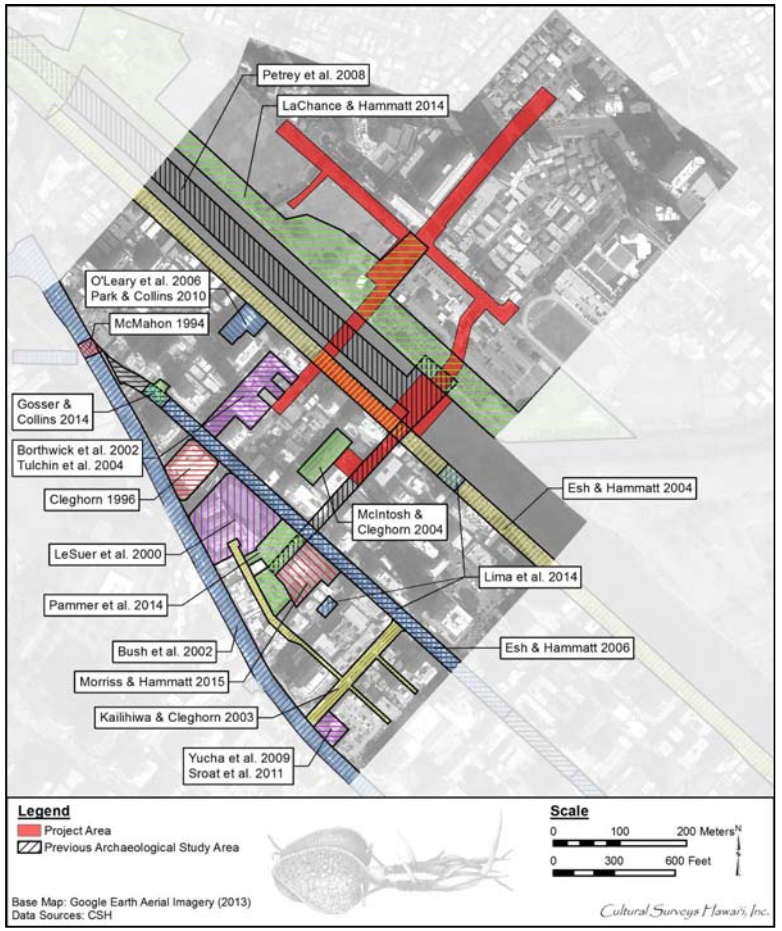


Figure 34. Previous archaeological studies in the vicinity of the current project area (Google Earth 2013)

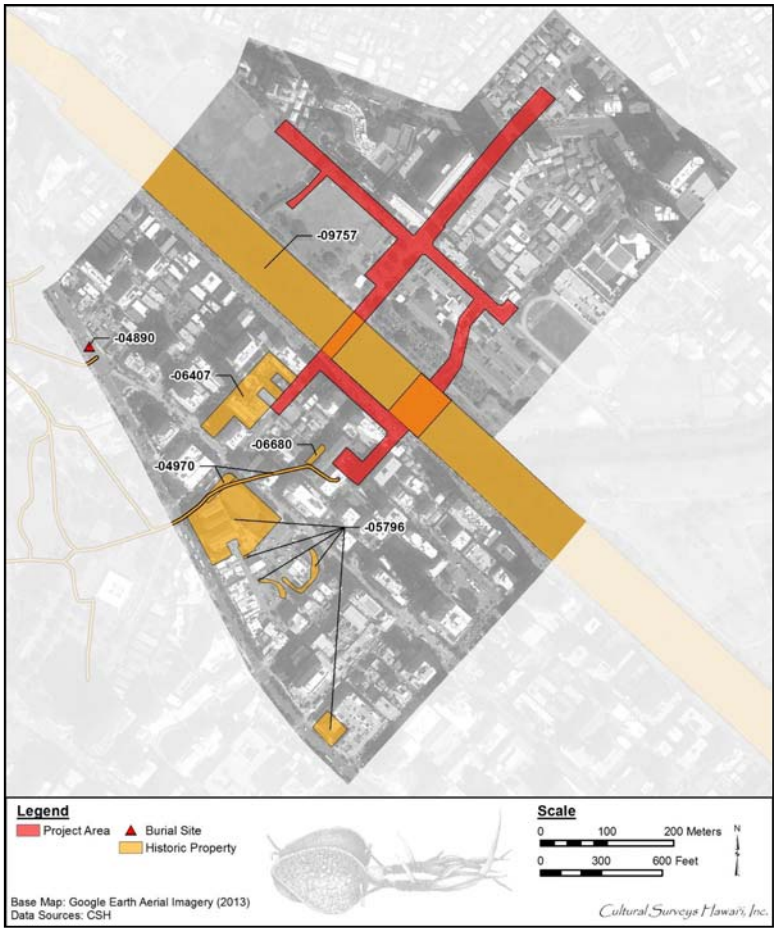


Figure 35. Previously designated archaeological sites in the vicinity of the project area (Google Earth 2013)

5.1.1 McMahon 1994

On 28 April 1994, an inadvertent burial discovery was made during excavation for a water line at the intersection of Kalākaua Avenue and Kuamo‘o Street (just *mauka* of Fort DeRussy). These remains represented a single individual (McMahon 1994).

5.1.2 Cleghorn 1996

In 1996, Pacific Legacy, Inc. conducted an archaeological inventory survey (AIS) of the block bounded by Kalākaua Avenue, Kūhiō Avenue, ‘Olohana Street, and Kālaimoku Street (Cleghorn 1996). The survey included excavation of seven backhoe trenches. The subsurface testing indicated that

> [T]his area was extremely wet and probably marshy. This type of environment was not conducive for traditional economic practices. . . . The current project area appears to have been unused because it was too wet and marshy.
>
> Several peat deposits, containing the preserved remains of organic plant materials were discovered and sampled. These deposits have the potential to add to our knowledge of the paleoenvironment of the area. [Cleghorn 1996:15]

The report concluded that no further archaeological investigations of the parcel were warranted since “no potentially significant traditional sites or deposits were found,” but cautioned of the “possibility, however remote in this instance, that human burials may be encountered during large scale excavations” (Cleghorn 1996:15).

5.1.3 LeSuer et al. 2000

Between January and February 2000, CSH conducted an AIS consisting of archival research and subsurface investigations for a parcel (TMKs: [1] 2-6-018:010, 036, 042, 052, 055, 062, 064, 073, and 074) located in Waikīkī. The project parcel is located on the ‘Ewa (northwest) end of a block bounded by Kalaimoku Street, Kalākaua Avenue, Kūhiō Avenue, and Lewers Street.

Subsurface testing located the ‘Auwai O Pau and areas of possible fishpond and agricultural cultivation praxis. No habitation areas or human burials were identified during excavation. The prehistoric to early twentieth century wetland ground surface, which runs throughout the project parcel, was assigned as SIHP # -5796. Research documents the project area from ancient times to the present and reveals the historic significance of the parcel. Further details of LeSuer et al. (2000) are included in the Section 6.1.

5.1.4 Borthwick et al. 2002

In 2002, CSH conducted an AIS of a roughly 71,000-sq-ft project area in Waikīkī, O‘ahu (TMKs: [1] 2-6-016:002, 004, 006, 007, 008, 012–019, 062, 064, 070, 075, 076, and 077) (Borthwick et al. 2002). The project area is bounded by Olohana Street, Kūhiō Avenue, Kalaimoku Street, and Ala Wai Boulevard and is adjacent to the current project area. The inventory survey was primarily a subsurface survey as the project area had been cleared of buildings prior to survey commencement. Ten backhoe trenches were excavated and documented. The investigation identified SIHP # -6407, a subsurface cultural layer(s). Radiocarbon analysis of charcoal samples yielded a calibrated date range of ca. AD 1400-1660.

5.1.5 Bush et al. 2002

Between July 1999 and October 2000, CSH completed archaeological monitoring for Phase II of the Waikīkī Anti-Crime Street Lighting Improvement project along Kalākaua Avenue from Ala Moana Boulevard to Kapahulu Avenue (Bush et al. 2002). Wetland sediments believed to be associated with the Loko Kaipuni complex were documented between Ala Moana Boulevard and Kuamo‘o Street. In addition, a historic to modern trash pit was identified at the intersection of Ala Moana Boulevard and Kalākaua Avenue. In the central and southern portions of the project area, monitoring results documented intermittent wetland sediments associated with Waikīkī fishponds and *muliwai* (stream), several historic to modern era trash pits, one *imu* (fire pit) with an in situ pig skeleton, and four human burials (SIHP #s -5860 Features U and V, -5864, and -5856 Feature C, not shown on Figure 35).

5.1.6 Kailihiwa and Cleghorn 2003

In 2003, Pacific Legacy, Inc., under contract to the Honolulu Board of Water Supply, conducted archaeological monitoring services for the Waikīkī Water System Improvements project (Kailihiwa and Cleghorn 2003). No archaeological sites or features were recorded in the area and no human remains were encountered.

5.1.7 Tulchin et al. 2004

In August 2003, CSH performed data recovery in a project area that had formerly undergone subsurface testing as part of the inventory survey documented by Borthwick et al. (2002). Subsurface testing for the data recovery work was specifically focused on recovering stratigraphically informative samples from the previously identified *paukū/kuāuna* feature (SIHP # -6407 Feature A) in order to develop a better determination of the date and environment in which the *paukū/kuāuna* feature was constructed and maintained (Tulchin et al. 2004).

5.1.8 McIntosh and Cleghorn 2004

In 2004, Pacific Legacy, Inc. conducted an AIS for the proposed development on a 0.687-acre parcel (29,907 sq ft) at Launiu Street. Evidence of pond field agriculture in the form of gleyed silts and fine sands was found in the central western portion of the project area (McIntosh and Cleghorn 2004). Archaeological investigations resulted in identification of a single archaeological resource (SIHP # -6680), a buried *lo‘i* or pond field

5.1.9 Esh and Hammatt 2004

In December 2004, CSH completed an archaeological monitoring report for Ala Wai Boulevard Improvements (Esh and Hammatt 2004). A single cow skeleton was encountered at the intersection of Ala Wai Boulevard and Seaside Avenue; the skeleton was redeposited and no other archaeological remains were encountered.

5.1.10 O’Leary et al. 2006

In 2006, CSH conducted an archaeological assessment of 0.5 acres of the Royal Kāhili Condo property. No significant sites, human remains, or Hawaiian artifacts were discovered during the survey (O’Leary et al. 2006).

5.1.11 Esh and Hammatt 2006

In 2006, CSH conducted archaeological monitoring on Kūhiō Avenue. No cultural material or human remains were encountered during monitoring, although an in situ dog burial was uncovered in the natural sand layer at the Kanekapolei Street and Kūhiō Avenue intersection. No cultural material was associated with the dog remains (Esh and Hammatt 2006).

5.1.12 Petrey et al. 2008

In 2008, CSH conducted an archaeological monitoring program for the City & County of Honolulu’s Emergency Sewer Bypass project, Ala Wai Canal to Magic Island (Petrey et al. 2008). No cultural deposits were identified. The project area’s subsurface deposits appeared to have been partially disturbed by importation of fill sediments into the project area, which were observed at Kai‘olu Street and at the Ala Wai Canal. Fill sediments were observed above the natural historic shoreline surface at Ala Moana Park Drive.

5.1.13 Yucha et al. 2009

In 2009, CSH conducted an AIS for the proposed Waikiki Shopping Plaza redevelopment project (Yucha et al. 2009). This investigation found that subsurface deposits consisted of several strata of early twentieth century land reclamation and hydraulic fill overlying a culturally modified wetland ground surface, SIHP # -5796, at a depth in excess of 1.5 m below surface. Jaucas sand deposits were absent within the project area. A monitoring program was recommended.

5.1.14 Park and Collins 2010

In 2010, Pacific Consulting Services, Inc. (PCSI) completed an archaeological monitoring report for ground-altering activities associated with the construction of the Ala Wai Garden Plaza. No archaeological cultural deposits or human remains were identified as a result of the project’s monitoring program (Park and Collins 2010).

5.1.15 Sroat et al. 2011

Between June 2009 and January 2010, CSH conducted archaeological monitoring for the Waikīkī Shopping Plaza Redevelopment project. This investigation identified portions of SIHP # -5796, a culturally modified wetland ground surface, in the side walls of several excavations throughout the project area, specifically in excavations reaching depths between 129-200 cm below surface.

5.1.16 LaChance and Hammatt 2014

Between January 2010 and May 2011, CSH conducted archaeological monitoring for the Beachwalk to Ala Moana Park Sewer project. No cultural deposits were identified. Subsurface deposits appear to have been disturbed by past land use, which likely included extensive earthmoving activity and importation of fill sediments into the project area.

5.1.17 Gosser and Collins 2014

In 2012, PCSI conducted archaeological monitoring in support of traffic control signal improvements at the intersection of Kuhio Avenue and Namahana Street (Gosser and Collins

2014). No above-ground or subsurface historic properties or human skeletal remains were recorded during the project.

5.1.18 Pammer et al. 2014

In 2014, CSH conducted an AIS for the proposed 2139 Kūhiō Avenue project (Pammer et al. 2014). This investigation identified wetland sediments (SIHP # -5796) consistent with those identified by Yucha et al. (2009). The wetland sediments were encountered in 24 of the 26 trenches (excluding Trenches 16 and 17) and generally consisted of dark gray clay or sandy clay containing freshwater snail shells and, in some instances, a peat-rich layer. The investigation also identified a pond (Feature A) and a berm (Features B–E), which were considered components of the SIHP # -5796 wetland surface. Jaucas sand deposits were absent within the project area.

Several wetland sediment (SIHP # -5796) samples were taken from Trench 14 for radiocarbon, snail, and pollen analyses. The upper portion (Stratum IIa) of SIHP # -5796 in Trench 14 yielded a 2-sigma calibrated date range of AD 1790-1950 (52.5% probability), while the lower portion (Stratum IIb) yielded a 2-sigma calibrated date range of AD 1480-1650 (95.4% probability). A sample of the pond sediment (Stratum IId) in Trench 14 yielded a 2-sigma calibrated date range of AD 1800-1930 (70.2% probability). Snail analysis identified both native and introduced species of freshwater snails in the lower wetland sediments (Stratum IIb) from Trench 14. Meanwhile, the pollen analysis of the wetland sediments identified an abundance of sedges and grasses, typical of a marshland environment. Based on the results of the pollen and radiocarbon analyses, the study concluded the wetland surface may have been utilized for taro cultivation.

5.1.19 Lima et al. 2014

Between September 2012 and March 2013, CSH conducted archaeological monitoring for the Waikīkī Sewer Rehabilitation project (Lima et al. 2014). No cultural deposits were identified as a result of the monitoring program. The project area's subsurface deposits appear to have been disturbed by past land use, which likely included extensive earth-moving activity and importation of fill sediments into the project area.

5.1.20 Morriss and Hammatt 2015

In 2014, CSH conducted an AIS for the proposed Beachwalk Wastewater Pumping Station project (Morriss and Hammatt 2015). This investigation identified wetland sediments (SIHP # -5796) consistent with those identified by previous studies, located beneath several layers of imported fill, including crushed coral and hydraulic-dredged marine sediments. The wetland sediments were encountered in all five test excavations (TE 1–5) and generally consisted of very dark grayish brown or dark gray silty clay and loamy clay. In general, the wetland sediments were either overlying a gravelly marine clay, or they were directly atop the coral shelf. They were encountered at an average depth of between 1.96 and 2.59 m below surface.

5.1.21 Martel and Hammatt 2016

In 2016, CSH conducted an AIS for the Ala Wai 46kV Underground Cables Relocation project (Martel and Hammatt 2016). This investigation identified two previously recorded historic properties: SIHP #s -5796 and -9757. SIHP # -5796, an original wetland surface, was originally identified by LeSuer et al. 2000. SIHP # -5796 was identified within a series of test excavations

and shovel test pits (Trench 1 [T-1] through T-3, T-5, Shovel Test Pit 3 [STP-3], and STP-5). SIHP # -5796 is assessed as significant pursuant to HAR §13-284-6 under Criterion "d" (has yielded, or may be likely to yield, information important in prehistory or history). SIHP # -9757, the Ala Wai Canal, was originally documented by Maly et al. (1994). SIHP # -9757 is assessed as significant under Criterion "A" (be associated with events that have made an important contribution to the broad patterns of our history) of the National and Hawai‘i Registers evaluation criteria and under Criterion "a."

5.2 Historic Property Descriptions

Two archaeological historic properties were identified within the current project area. They are summarized in Table 3 and their distributions are depicted on Figure 35.

Table 3. Historic Properties Identified within the Current Project Area

SIHP #	Formal Type	Function
50-80-14-5796	Original wetland surface	Culturally modified wetland
50-80-14-9757	Ala Wai Canal	Water control/ recreation

5.2.1 SIHP # 50-80-14-5796

FORMAL TYPE:	Original wetland surface
FUNCTION:	Culturally modified wetland
NUMBER OF FEATURES:	5
AGE:	Pre-Contact to historic (1920s)
TEST EXCAVATIONS:	T-1 through T-3, T-5, and STP-3 through STP-5 in Martel and Hammatt (2016)
TAX MAP KEY:	[1] 2-6-016 and 017 (Right-of-Ways [ROW], current project); 2-6-018:010 and 087 (LaSuer et al. 2000); 2-6-019:056 and 016 (Yucha et al. 2009); 2-6-018:043, 045, 046, and 054 (Pammer et al. 2014); 2-6-018:011 (Morriss and Hammatt 2015)
LAND JURISDICTION:	State of Hawai‘i (current project)
PREVIOUS DOCUMENTATION:	LeSuer et al. (2000), Yucha et al. (2009), Sroat et al. (2011), Pammer et al. (2014), Morriss and Hammatt (2015)

SIHP # -5796 consists of a sequence of layers or deposits of agricultural wetland sediments, non-agricultural wetland sediments, peat sediments, pond sediments, and pond berms dating from the pre-Contact period to the early 1900s. The wetland sediments represent an extension of the previously identified historic property first documented by LeSuer et al. (2000) during subsurface testing for King Kalākaua Plaza, located approximately 120 m to the southwest of the current project area. Additional portions of this site were identified by Yucha et al. (2009) during an AIS for the Waikīkī Shopping Plaza redevelopment project located approximately 350 m south of the

current project area; Pammer et al. (2014) during an AIS for the 2139 Kūhiō Avenue project, located approximately 120 m southwest of the current project area; and Morriss and Hammatt (2015) during an AIS for the Beachwalk Wastewater Pumping Station project, located approximately 120 m south of the current project area. In 2016, CSH conducted an AIS for the current Ala Wai 46Kv Underground Cables Relocation project (Martel and Hammatt 2016). During that fieldwork, SIHP # -5796 was identified within a series of test excavations and shovel test pits (Trench 1 (T-1) through T-3, T-5, Shovel Test Pit 3 (STP-3), and STP-5) (Figure 36).

The stratigraphy observed during this study is consistent with the LeSeur et al. (2000), Yucha et al. (2009), Sroat et al. (2011), Pammer et al. (2014), and Morriss and Hammatt (2015) studies. LeSeur et al. (2000) found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796) (Figure 37, Figure 38 and Table 4). The study described SIHP # -5796 as varying between a dark gray sandy loamy clay, sandy clay loam, and one trench that contained clay loam with an underlying layer of peat. The site was found to contain organic materials, roots and rootlets, and charcoal flecking, as well as historic artifacts (ceramic fragment, a shoe, and milled wood) and midden (LeSeur et al. 2000).

Yucha et al. (2009) also found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796) (Figure 39, Figure 40 and Table 5). The study encountered the site in eight of the nine test trenches, and found it to consist of two highly organic soils, composed of a dark gray to dark brown clay loam and containing freshwater snail shells, rootlets, decomposing organic material, and charcoal flecking. Radiocarbon analysis was performed on two bulk samples collected from SIHP # -5796, Strata IIIa (Trench 6) and IIIb (Trench 9). Stratum IIIa produced a calibrated 2-sigma date range of AD 1440 to 1640 at a 95.4% probability, while the sample collected from Stratum IIIb produced a calibrated 2-sigma date range of AD 1390 to 1490 at a 94.4% probability. Though the dates indicate a pre-Contact period, the project area continued to be utilized for banana cultivation through the early twentieth century, suggesting the area was likely continually utilized from the fourteenth century until land reclamation activities in the 1920s.

Sroat et al. (2011) also identified natural wetland sediments (SIHP # -5796) located beneath thick layers of varying fill materials, including hydraulic fill and crushed coral fill imported during early twentieth century land reclamation activities (Figure 41, Figure 42 and Table 6). The study encountered the site in eight of a total of nine test trenches between depths of 1.5 to 2.05 m below surface. The wetland sediment was typically presented as very dark gray to very dark grayish brown clay loam. This sediment was identified as culturally modified due to the soil matrix and content (suggestive of a wetland agricultural environment) and the wavy topography of *mauka-makai* soil ridges separated by shallow parallel *'auwai* within three of the test trenches. These modifications were determined to be suggestive of possible banana cultivation during the historic era, preceded by probable pre-Contact to early post-Contact taro farming.

Pammer et al. (2014) also identified natural wetland sediments (SIHP # -5796) located beneath thick layers of varying fill materials, including hydraulic fill and crushed coral fill imported during early twentieth century land reclamation activities. The study encountered the site in 24 of the 26 trenches, typically presented as a dark gray clay or sandy clay containing freshwater snail shells

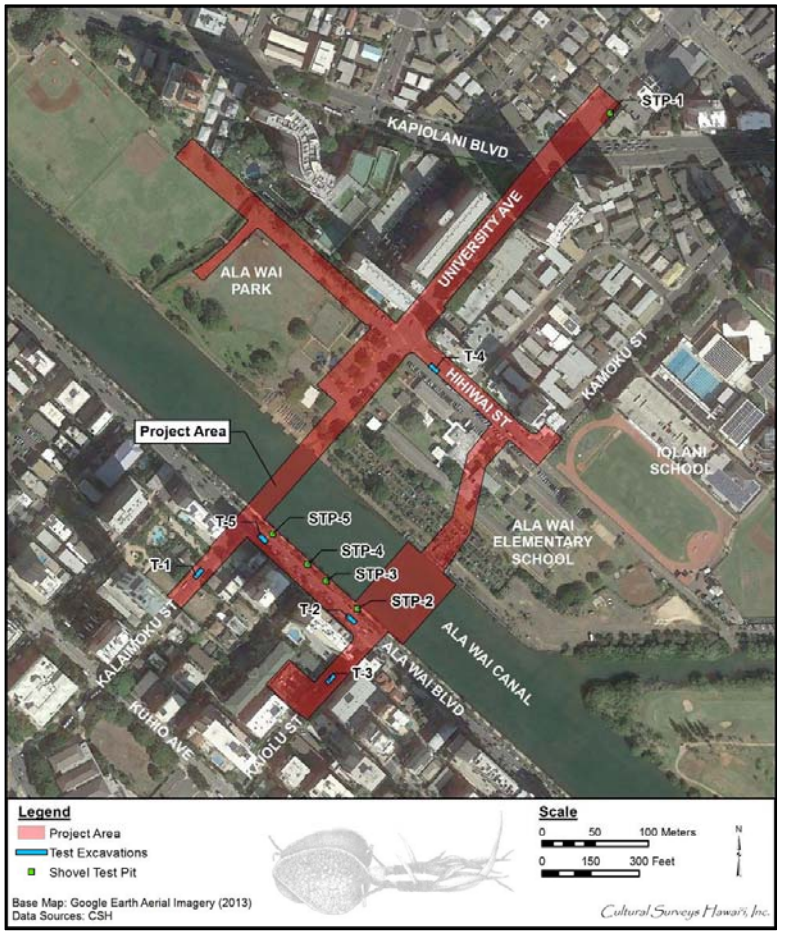


Figure 36. A 2013 aerial photograph (Google Earth) showing the location of the test trenches within the current project area (Martel and Hammatt 2016)

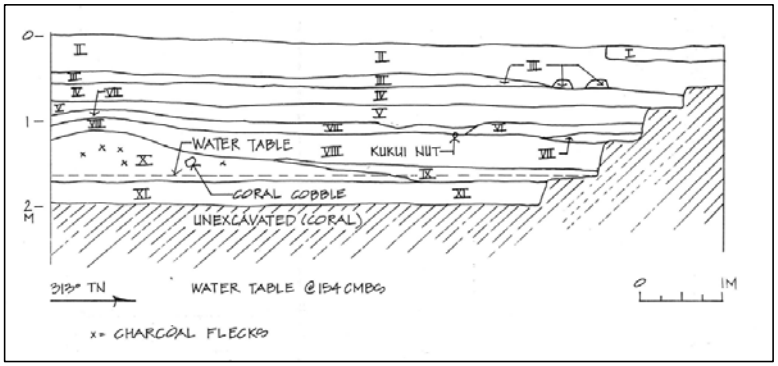


Figure 37. Sample profile of T-3 from LaSuer et al. (2000)

Stratigraphy:

Stratum I	Recent construction or demolition refill.
Stratum II	1920-1930 Ala Wai land-reclamation fill event
Stratum III	1920-1930 Ala Wai land-reclamation fill event
Stratum IV	1920-1930 Ala Wai land-reclamation fill event
Stratum V	1920-1930 Ala Wai land-reclamation fill event
Stratum VI	1920-1930 Ala Wai land-reclamation fill event
Stratum VII	1920-1930 Ala Wai land-reclamation fill event
Stratum VIII	1920-1930 Ala Wai land-reclamation fill event
Stratum IX	Prehistoric-historic agricultural wetlands (pre land-reclamation)
Stratum X	Prehistoric-historic agricultural wetlands (pre land-reclamation)
Stratum XI	Natural sand deposits, during the formation of Waikīkī.

Figure 38. General stratigraphic description of T-3 from LaSuer et al. (2000)

Table 4. Stratigraphic Description of T-3 from LaSuer et al. (2000)

Strata	CMBS	Description
I	0-15 @ 1m	2.5 YR 3/4 dark reddish brown, Sandy Clay Loam, gravelly, compact, structureless, inclusions: few roots & rootlets, coral pebbles & cobbles, and some asphalt and bottle glass fragments; abrupt-wavy lower boundary
II	4-33	10 YR 5/4, 5/2 light yellowish brown mottled with gray brown, Loamy Sand, gravelly (mostly medium size), slightly compact, structureless, inclusions: few roots & rootlets, and abundant coral pebbles & cobbles; abrupt-wavy lower boundary
III	33-48	10 YR 5/2, 6/4, 4/4 gray brown, light yellowish brown, dark yellowish brown, Very Fine Sand Microstratigraphy, loose, structureless, inclusions: few roots & rootlets; very abrupt-smooth discontinuous lower boundary
IV	48-69	10 YR 6/4 light yellowish brown, Fine Sand Microstratigraphy with Very Fine Clay Lenses, slightly compact, structureless, inclusions: few roots & rootlets; very abrupt-smooth lower boundary
V	69-90	10 YR 5/3 brown, Silty Clay Microstratigraphy, compact, structureless; moist, sticky & plastic; inclusions: very few roots & rootlets; very abrupt-smooth lower boundary
VI	87-104 @2.5m	10 YR 6/4 light yellowish brown, Fine Sand Microstratigraphy with Very Fine Clay Lenses, slightly compact, structureless, inclusions: few roots & rootlets; very abrupt-smooth lower boundary
VII	90-104	10 YR 4/4 - 5/2 dark yellowish brown to grayish brown Sandy Clay Loam Very Fine Microstratigraphy, loose to slightly compact, structureless, inclusions: very few roots & rootlets, a few charcoal flecks, and one Kukui nut at base; very abrupt-smooth/discontinuous lower boundary
VIII	104-137	N 4/0, N 2.75/0 dark gray, very dark gray/black Silty Clay Microstratigraphy, slightly compact, structureless; moist, sticky & plastic; inclusions: very few roots & rootlets; very abrupt-smooth lower boundary
IX	137-148	10 YR 3/1 very dark gray, Silty Clay, slightly compact, structureless; moist, sticky & plastic; inclusions: preserved organic material (possibly leaves); abrupt-smooth lower boundary
X	100-160 @ 7.4 m	5 GY 4/1 dark greenish gray Clay Loam, slightly compact, structureless, inclusions: charcoal flecking; abrupt-smooth lower boundary
XI	160-185	N 5/0 gray Coarse Sand, loose, structureless, no inclusions, abrupt-smooth lower boundary



Figure 39. Photograph of T-3 from Yucha et al. (2009)

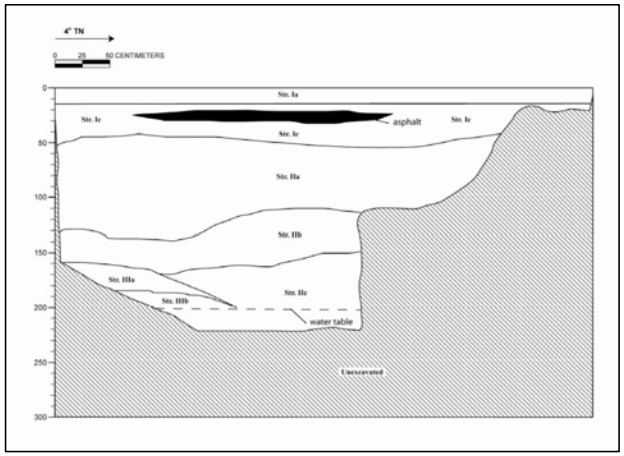


Figure 40. Profile of T-3 from Yucha et al. (2009)

Table 5. Stratigraphic Description of T-3 from Yucha et al. (2009)

Stratum	Depth (cmbs)	Description
Ia	0-15	Concrete Slab
Ic	15-50	Fill; 10 YR 3/3, dark brown; clay loam; weak medium crumb structure; friable moist consistency; slightly plastic; no cementation; terrestrial origin; very abrupt lower boundary; smooth topography. Contains construction debris and 1950's-era trash
IIa	50-135	Fill; 10 YR 4/3 brown; fine sand; structureless; loose moist consistency; non-plastic; no cementation; marine origin; abrupt lower boundary; smooth topography. Contains 90% crushed coral/coral cobbles. Land-reclamation fill.
IIb	110-165	Fill; 10 YR 5/3 brown; sandy clay; strong fine granular structure; non-sticky wet consistency; slightly plastic; no cementation; mixed origin; abrupt lower boundary; smooth topography. Land-reclamation fill.
IIc	150-BOE*	Hydraulic Fill; 10 YR 5/1 gray; clay; strong fine single grain structure; very sticky wet consistency; plastic; no cementation; mixed origin; abrupt lower boundary; wavy topography. Land-reclamation fill
IIIa	160-185	10 YR 3/1 very dark gray; clay loam; moderate medium crumb structure; non-sticky wet consistency; slightly plastic; no cementation; terrestrial origin; clear lower boundary; wavy topography. Contains land snail shells, rootlets, and decomposing organic material. Previous land surface.
IIIb	185-BOE*	10 YR 3/3 dark brown; clay loam; moderate medium crumb structure; non-sticky wet consistency; slightly plastic; no cementation; terrestrial origin; abrupt lower boundary; wavy topography. Contains land snail shells, rootlets, and charcoal flecking. Previous land surface.



Figure 41. Photograph of Profile 3 from Sroat et al. (2011)

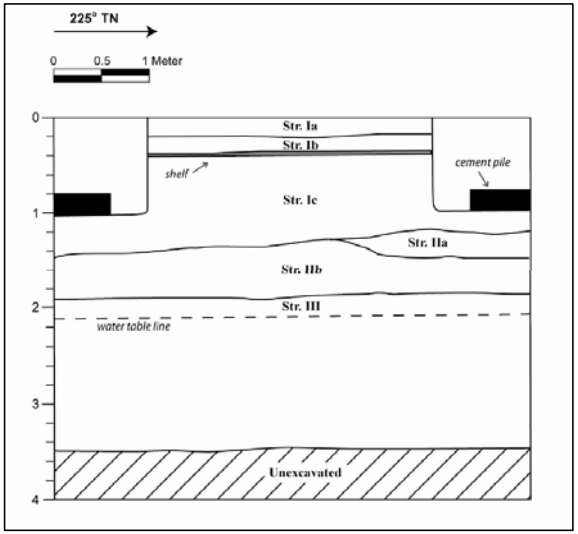


Figure 42. Profile 3 from Sroat et al. (2011)

Table 6. Stratigraphic Description of Profile 3 from Sroat et al. (2011)

Stratum	Depth (cmbs)	Description
Ia	0-20	Fill; 10 YR 8/2 (very pale brown); coral; coarse, structureless; dry, hard consistency; no cementation; non-plastic; marine sediment; very abrupt and smooth topography; imported crushed coral fill
Ib	20-37	Fill; 2.5 YR 3/6 (dark red); gravel; coarse, structureless; dry, very hard consistency; no cementation; non-plastic; terrestrial sediment; very abrupt and smooth topography; imported gravel fill
Ic	37-143	Fill; 10 YR 4/2 (dark grayish brown); sandy clay loam; moderate, medium to coarse, crumb structure; dry, slightly hard consistency; weak cementation; slightly plastic; terrestrial and marine sediment; abrupt and smooth topography; terrigeous fill mixed with crushed coral and sand
IIa	120-150	Fill; 10 YR 6/6 (brownish yellow); clay; moderate, fine, granular structure; wet, sticky consistency, no cementation; plastic; terrestrial and marine sediment; abrupt and broken topography, hydraulic dredge fill
IIb	129-190	Fill; 10 YR 3/2 (grayish brown); clay; moderate, fine, granular structure; wet, very sticky consistency; no cementation; very plastic; terrestrial and marine sediment; very abrupt and wavy topography; hydraulic dredge fill
III	129-not visible	Natural; 10 YR 3/2 (very dark grayish brown); clay loam; moderate, fine, crumb structure; moist, friable consistency; no cementation; slightly plastic; terrestrial and marine sediment; natural wetland sediment with organic material

and, in some instances, a peat-rich layer. The study also identified five features associated with SIHP # -5796 (Figure 43, Figure 44, Table 7,

Table 8).

Feature A is a pond (Trench 14) observed on early twentieth century historic maps. The natural wetland sediments appear to extend over the pond material, suggesting this represents a berm feature located on the edge of the pond, constructed of the surrounding natural wetland materials. This pond feature may represent a natural environmental feature of the SIHP # -5796 wetlands or may be a duck pond related to twentieth century banana cultivation based on historical research. Features B–E are portions of a large berm (Trenches 18, 19, 21, and 24). Based on its configuration, the berm likely marks the edge of a *lo‘i*, possibly associated with the berm separating LCA 6367 and Grant 2785, shown on the 1881 Bishop map (see Figure 15). A 1920 aerial photo of Waikīkī also depicts what appears to be a berm separating the various banana crops, suggesting the continued construction and/or use of berms in twentieth century agricultural fields.

Several wetland sediment (SIHP # -5796) samples were taken from Trench 14 for radiocarbon, snail, and pollen analyses. The upper portion (Stratum IIa) of SIHP # -5796 in Trench 14 yielded a 2-sigma calibrated date range of AD 1790 to 1950 (52.5 % probability), while the lower portion (Stratum IIb) yielded a 2-sigma calibrated date range of AD 1480 to 1650 (95.4 % probability). A sample of the pond sediment (Stratum IId) in Trench 14 yielded a 2-sigma calibrated date range of AD 1800 to 1930 (70.2 % probability). Snail analysis identified both native and introduced species of freshwater snails in the lower wetland sediments (Stratum IIb) from Trench 14. Meanwhile, the pollen analysis of the wetland sediments identified an abundance of sedges and grasses, typical of a marshland environment. Based on the results of the pollen and radiocarbon analyses, the study concluded that the wetland surface may have been utilized for taro cultivation.

Morriss and Hammatt (2015) also observed natural materials, overlaid by land reclamation fill sediments, consisting of wetland sediments and marine sediment formed atop the degrading coral shelf (Figure 45, Figure 46, and Table 9). The wetland sediments were determined to be a portion of the previously identified wetland surface (SIHP # -5796) and were observed within all five test excavations at an average depth of between 1.96 and 2.59 m below the existing surface. They contained decomposing organics, freshwater and brackish water snails, charcoal flecking, and in some test excavations, seeds (possibly of *‘akulikuli* or *olonā*). Although pond deposits and a large sand berm associated with SIHP # -5796 were identified in an adjacent property (Pammer et al. 2014), no similar deposits or features were observed within the current project area during AIS fieldwork. Additionally, there was no evidence of the former *lo‘i* wall shown on a late nineteenth century map. Based on the findings from the Martel and Hammatt (2016) study, as well as those from the adjacent Pammer et al. (2014) study, it seems probable the wetland deposits (SIHP # -5796) are still extant throughout the majority of the project area.

Martel and Hammatt (2016) also found land reclamation fill sediments associated with the dredging of the Ala Wai Canal overlying former agricultural wetland sediments (SIHP # -5796). The current study encountered the site in seven of the ten subsurface excavations (T-1 through T-3, T-5, and STP-3 through STP-5), and found it to consist of similar materials as identified in the previous studies. The agricultural wetland sediments were encountered at an average depth of between 0.8 m and 1.4 m below the existing surface. The sediments were typically presented as



Figure 43. Photograph of T-5 from Pammer et al. (2014)

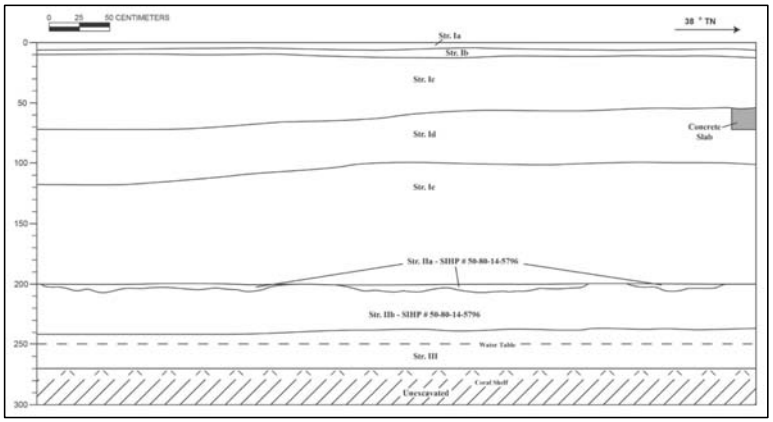


Figure 44. Profile of T-5 from Pammer et al. (2014)

Table 7. Stratigraphic Description of T-5 from Pammer et al. (2014)

Stratum	Depth (cmbs)	Description
Ia	0–5	Fill; 10YR 2/1, black; old ashalt surface
Ib	5–10	Fill; 5YR 4/3, reddish brown; gravelly sandy clay; moderate, medium, blocky structure; dry slightly hard consistency; no cementation; slightly plastic; terrigenous origin; very abrupt boundary; smooth topography; imported fill, asphalt base course
Ic	10–70	Fill; 10YR 4/3, brown; gravelly sandy loam; structureless single-grain; dry loose consistency; no cementation; non-plastic; marine origin; abrupt boundary; smooth topography; imported fill
Id	55–115	Fill; 10YR 4/6, pale yellowish brown; loamy sand; structureless single-grain; dry loose consistency; no cementation; non-plastic; mixed origin; abrupt boundary; smooth topography; imported crushed coral fill
Ie	100–200	Fill; 10YR 6/3, pale brown; silty sand; structureless single-grain; moist loose consistency; no cementation; non-plastic; marine origin; abrupt boundary; smooth topography; imported hydraulic (dredge) fill
IIa	200–205	SIHP # -5796, wetland sediment; 10YR 2/2, very dark brown; silty clay; weak, fine, crumb structure; moist friable consistency; no cementation; plastic; mixed origin; clear boundary; irregular/broken topography; natural agricultural wetland sediment with peat material; freshwater snail shells observed
IIb	200–240	SIHP # -5796, wetland sediment; 2.5Y 3/4, very dark gray; silty clay; weak, fine, blocky structure; moist loose consistency; no cementation; non-plastic; mixed origin; abrupt boundary; smooth topography; natural agricultural wetland sediment; freshwater snail shells observed
III	235–270 (BOE)	Natural; 5Y 5/1, gray; gravelly/deteriorated coral bedrock; structureless single-grain; wet slightly sticky consistency; weak cementation; marine origin; deteriorating coral bedrock shelf

Table 8. SIHP # -5796 Features

Feature #	Type	Previous documentation
A	Pond	Pammer et al. (2014)
B	Berm remnant	Pammer et al. (2014)
C	Berm remnant	Pammer et al. (2014)
D	Berm remnant	Pammer et al. (2014)
E	Berm remnant	Pammer et al. (2014)



Figure 45. Photograph of TE-5 from Morriss and Hammatt (2015)

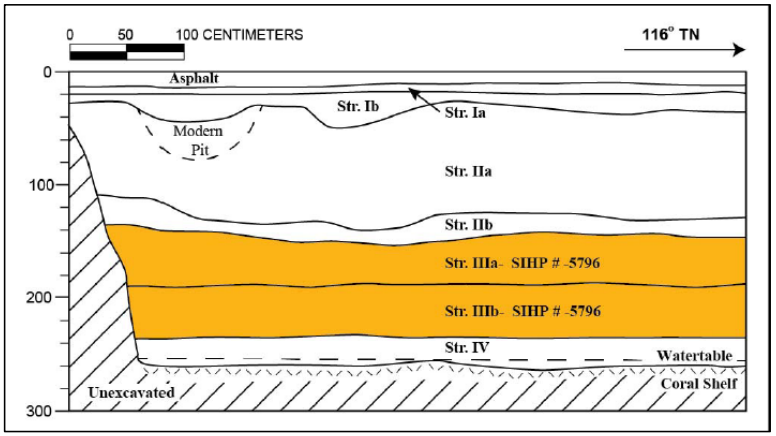


Figure 46. Profile of TE-5 from Morriss and Hammatt (2015)

Table 9. Stratigraphic Description of TE-5 from Morriss and Hammatt (2015)

Stratum	Depth (cmbs)	Description
N/A	0–15	Asphalt
Ia	10–19	Fill; 10YR 3/1, very dark gray; extremely gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt boundary, smooth topography; imported basalt gravel base course utilized for construction of the existing asphalt surface
Ib	30–140	Fill; 2.5Y 4/4, olive brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt boundary; wavy topography; imported fill associated with construction of the existing asphalt surface
Modern Pit	34-79	Modern pit; 10YR 5/4, yellowish brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt boundary; wavy topography; modern pit associated with the deposition of Stratum Ib
IIa	30–140	Fill; 10YR 6/4, light yellowish brown; gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt boundary; wavy topography; common fine to medium roots observed; imported crushed coral fill related to historic land reclamation
IIb	110–155	Fill; GLEY 1 6/N, gray; silty clay; structureless, massive; moist, firm consistency; plastic; mixed origin; clear boundary; smooth topography; imported hydraulic-dredged fill related to historic land reclamation
IIIa	135–190	Natural; 2.5Y 3/1, very dark gray; loamy clay; weak, fine, blocky structure; moist, friable consistency; slightly plastic; mixed origin; clear boundary; smooth topography; few fine to medium roots observed; charcoal flecking observed; decomposing organics and land snails observed; naturally deposited wetland sediment associated with SIHP # -5796
IIIb	190–235	Natural; 2.5Y 3/2, very dark grayish brown; loamy clay; weak, fine, blocky structure; moist, friable consistency; slightly plastic; marine origin; clear boundary, smooth topography; common fine to coarse roots observed; high content of decomposing organics; naturally deposited wetland sediment associated with SIHP # -5796
IV	235–260	Natural; 2.5Y 4/1, dark gray; very gravelly silty clay; weak, fine, blocky structure; wet, slightly sticky consistency; slightly plastic; mixed origin; lower boundary not visible; naturally deposited marine sediment formed by the decomposing coral shelf

very dark gray to black clay rich materials containing decomposing organics, rootlets, freshwater and brackish water snails, charcoal flecking, and, in some test excavations, *ruppia maritima* seeds. Although pond deposits and a large sand berm associated with SIHP # -5796 were identified in an adjacent property during a previous study (Pammer et al. 2014), no similar deposits or features were observed within the current project area. Similar features to the *paukū/kuāuna* feature (SIHP # -6407 Feature A) documented in LCA 1775 and identified by Borthwick et al. (2002), were also not identified during the Martel and Hammat (2016) study.

As part of the Martel and Hammatt (2016) study, six column samples (three each from T-1 and T-2) of the agricultural wetland sediment (SIHP # -5796) from Stratum V were submitted for pollen and radiocarbon analysis. The upper portion (S-1) of SIHP # -5796 in T-1 yielded a 2-sigma calibrated date range of AD 1490 to 1670 (95.4% probability), while the middle portion (S-2) yielded a 2-sigma calibrated date range of AD 1720 to 1820 (50.7% probability) and the lower portion (S-3) yielded a 2-sigma calibrated date range of AD 1460 to 1640 (95.4% probability). The upper portion (S-4) of SIHP # -5796 in T-2 yielded a 2-sigma calibrated date range of AD 1390 to 1450 (85.1% probability), the middle portion (S-5) yielded a 2-sigma calibrated date range of AD 1420 to 1520 (91.4% probability) and the lower portion (S-6) yielded a 2-sigma calibrated date range of AD 1380 to 1440 (66.0% probability). The results indicate most of the material sent for analysis was utilized during the pre-Contact era, while the results from Sample 2 (the middle portion of Stratum V) suggest some mixing and use during post-Contact times. The results of the pollen analysis by Phillips (2016) support a marshland environment:

> Sedge pollen dominated all samples, reflecting the marshlands and fields described in historic accounts of the area. Subdominant were grass pollen of both regular- and large-sized grains. In both locations, sedge pollen percentages were consistent within the sampled columns, suggesting marsh environments persisted throughout the time span represented by the samples. Varying grass pollen frequencies could reflect changing farming strategies and/or land use in and around the project area. The large grass pollen grains likely come from *ko* or *laiki*. A spike and then decline in charcoal concentration in the middle and upper portion of the sample column of Trench 1 reflects an increase in land clearance, possibly followed by a fallow period. [Phillips 2016:4]

Furthermore, “No unequivocal historical introductions were identified (Phillips 2016:2).” This information does not contradict the date ranges obtained from the radiocarbon analysis.

In summary, SIHP # -5796 represents the original pre-Contact to early twentieth century agricultural wetland. According to background research and previous archaeological studies, it is likely wetland sediments similar to those encountered within the project area exist beneath the fill throughout the surrounding Waikīkī area. The site remained a natural agricultural and wetland habitat until it was covered during early twentieth century land reclamation fill events. The record of human modification of these sediments spans from pre-Contact and post-Contact traditional Hawaiian farming practices, primarily in the form of taro cultivation, but also including bananas, sugarcane, and other utilitarian crops. In the nineteenth and early twentieth centuries, the agricultural focus shifted more to rice and bananas. SIHP # -5796 was previously determined significant under Hawai‘i state historic property significance criterion “d” (have yielded, or may

be likely to yield information important for research on prehistory or history) pursuant to HAR §13-284-6 (Pammer et al. 2014). The historic property may reflect land use activities in Waikīkī during the pre- and post-Contact period (i.e., wetland agriculture, fishpond aquaculture, and historic rice or banana cultivation) and has the potential to offer insight into these practices.

5.2.2 SIHP # 50-80-14-9757

FORMAL TYPE:	Ala Wai Canal
FUNCTION:	Water control, recreation
NUMBER OF FEATURES:	3 (non-contributing)
AGE:	Historic (1921-1928)
TEST EXCAVATIONS:	N/A
TAX MAP KEY:	[1] 2-3-(various plats), 2-6-(various plats), and 2-7-036
LAND JURISDICTION:	State of Hawai‘i
PREVIOUS DOCUMENTATION:	Maly et al. (1994)

SIHP # -9757, the Ala Wai Canal, is a stone and concrete drainage canal. The Ala Wai Canal was constructed from 1921 to 1928 by Hawaiian Dredging Company and is approximately 3,000 m long with a width varying between 50 m and 76 m (see Section 3.1.3.1). The depth is variable depending upon the amount of siltation that occurs. The Ala Wai Canal was constructed to drain water from the low-lying swamp areas of Waikīkī in order to create more land for development. Three bridges (non-contributing features) span the canal at Ala Moana Boulevard, Kalākaua Avenue, and McCully Street. The Ala Wai Canal is listed on the State Register of Historic Places and was recommended eligible to the National Register of Historic Places in 1992 (see Appendix A).

The current project proposes to conduct horizontal drilling across/below the Ala Wai Canal in the vicinity of University Avenue/Kalaimoku Street. There are also proposed plans to remove existing Hawaiian Electric cables from the Ala Wai Canal in the vicinity of Kaiolu Street.

SIHP # -9757 is assessed as significant under Criterion “A” (be associated with events that have made an important contribution to the broad patterns of our history) of the Hawai‘i Register of Historic Places evaluation criteria and under Criterion “a” pursuant to HAR §13-284-6. The Ala Wai Canal is deemed significant due to its role in the process of developing Waikīkī during the twentieth century into residential neighborhoods and eventually into a world-class tourist destination.

Section 6 Community Consultation

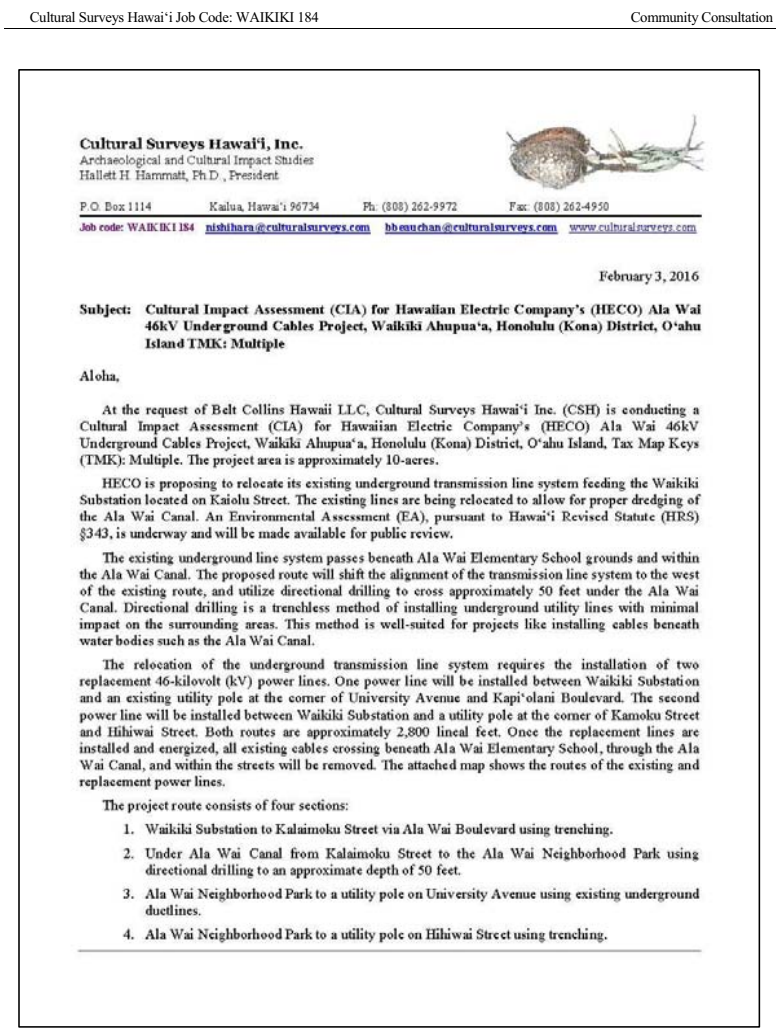
6.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian Organizations (NHO), agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise and/or knowledge of the *ahupua‘a* of Waikīkī. CSH initiated its outreach effort in January 2016 through letters, email, telephone calls, and in-person contact. CSH completed the community consultation in June 2016.

6.2 Community Contact Letter

Letters (Figure 47 and Figure 48) along with a map and an aerial photograph of the project were mailed with the following text:

> At the request of Belt Collins Hawaii LLC, Cultural Surveys Hawai‘i Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for Hawaiian Electric Company’s (HECO) Ala Wai 46kV Underground Cables Project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu Island, Tax Map Keys (TMK): Multiple. The project area is approximately 10-acres.
>
> HECO is proposing to relocate its existing underground transmission line system feeding the Waikiki Substation located on Kaiolu Street. The existing lines are being relocated to allow for proper dredging of the Ala Wai Canal. An Environmental Assessment (EA), pursuant to Hawai‘i Revised Statute (HRS) §343, is underway and will be made available for public review.
>
> The existing underground line system passes beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the transmission line system to the west of the existing route, and utilize directional drilling to cross approximately 50 feet under the Ala Wai Canal. Directional drilling is a trenchless method of installing underground utility lines with minimal impact on the surrounding areas. This method is well-suited for projects like installing cables beneath water bodies such as the Ala Wai Canal.
>
> The relocation of the underground transmission line system requires the installation of two replacement 46-kilovolt (kV) power lines. One power line will be installed between Waikiki Substation and an existing utility pole at the corner of University Avenue and Kapi‘olani Boulevard. The second power line will be installed between Waikiki Substation and a utility pole at the corner of Kamoku Street and Hihiwai Street. Both routes are approximately 2,800 lineal feet. Once the replacement lines are installed and energized, all existing cables crossing beneath Ala Wai Elementary School, through the Ala Wai Canal, and within the streets will be removed. The attached map shows the routes of the existing and replacement power lines.
>
> The project route consists of four sections:



Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950
Job code: WAIKIKI 184 nishihara@culturalsurveys.com bbeauchan@culturalsurveys.com www.culturalsurveys.com

February 3, 2016

Subject: Cultural Impact Assessment (CIA) for Hawaiian Electric Company’s (HECO) Ala Wai 46kV Underground Cables Project, Waikiki Ahupua‘a, Honolulu (Kona) District, O‘ahu Island TMK: Multiple

Aloha,

At the request of Belt Collins Hawaii LLC, Cultural Surveys Hawai‘i Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for Hawaiian Electric Company’s (HECO) Ala Wai 46kV Underground Cables Project, Waikiki Ahupua‘a, Honolulu (Kona) District, O‘ahu Island, Tax Map Keys (TMK): Multiple. The project area is approximately 10-acres.

HECO is proposing to relocate its existing underground transmission line system feeding the Waikiki Substation located on Kaiolu Street. The existing lines are being relocated to allow for proper dredging of the Ala Wai Canal. An Environmental Assessment (EA), pursuant to Hawai‘i Revised Statute (HRS) §343, is underway and will be made available for public review.

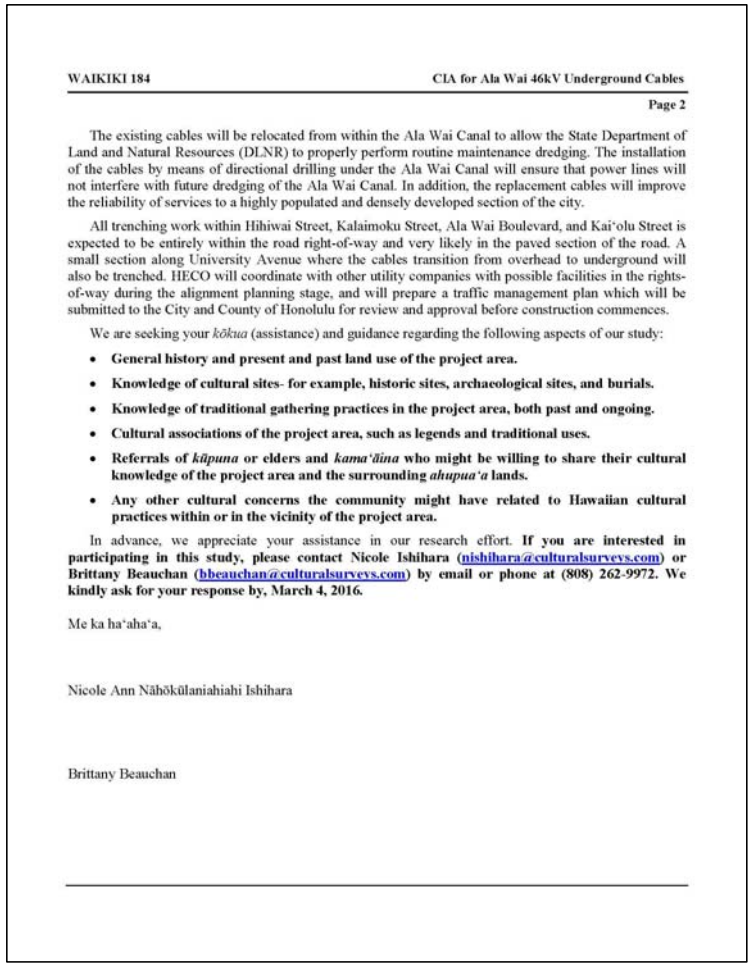
The existing underground line system passes beneath Ala Wai Elementary School grounds and within the Ala Wai Canal. The proposed route will shift the alignment of the transmission line system to the west of the existing route, and utilize directional drilling to cross approximately 50 feet under the Ala Wai Canal. Directional drilling is a trenchless method of installing underground utility lines with minimal impact on the surrounding areas. This method is well-suited for projects like installing cables beneath water bodies such as the Ala Wai Canal.

The relocation of the underground transmission line system requires the installation of two replacement 46-kilovolt (kV) power lines. One power line will be installed between Waikiki Substation and an existing utility pole at the corner of University Avenue and Kapi‘olani Boulevard. The second power line will be installed between Waikiki Substation and a utility pole at the corner of Kamoku Street and Hihiwai Street. Both routes are approximately 2,800 lineal feet. Once the replacement lines are installed and energized, all existing cables crossing beneath Ala Wai Elementary School, through the Ala Wai Canal, and within the streets will be removed. The attached map shows the routes of the existing and replacement power lines.

The project route consists of four sections:

1. Waikiki Substation to Kalaimoku Street via Ala Wai Boulevard using trenching.
2. Under Ala Wai Canal from Kalaimoku Street to the Ala Wai Neighborhood Park using directional drilling to an approximate depth of 50 feet.
3. Ala Wai Neighborhood Park to a utility pole on University Avenue using existing underground ductlines.
4. Ala Wai Neighborhood Park to a utility pole on Hihiwai Street using trenching.

Figure 47. Community consultation letter, page one



WAIKIKI 184 **CIA for Ala Wai 46kV Underground Cables**

Page 2

The existing cables will be relocated from within the Ala Wai Canal to allow the State Department of Land and Natural Resources (DLNR) to properly perform routine maintenance dredging. The installation of the cables by means of directional drilling under the Ala Wai Canal will ensure that power lines will not interfere with future dredging of the Ala Wai Canal. In addition, the replacement cables will improve the reliability of services to a highly populated and densely developed section of the city.

All trenching work within Hihiwai Street, Kalaimoku Street, Ala Wai Boulevard, and Kai‘olu Street is expected to be entirely within the road right-of-way and very likely in the paved section of the road. A small section along University Avenue where the cables transition from overhead to underground will also be trenched. HECO will coordinate with other utility companies with possible facilities in the rights-of-way during the alignment planning stage, and will prepare a traffic management plan which will be submitted to the City and County of Honolulu for review and approval before construction commences.

We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

- **General history and present and past land use of the project area.**
- **Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing.**
- **Cultural associations of the project area, such as legends and traditional uses.**
- **Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* lands.**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.**

In advance, we appreciate your assistance in our research effort. **If you are interested in participating in this study, please contact Nicole Ishihara (nishihara@culturalsurveys.com) or Brittany Beauchan (bbeauchan@culturalsurveys.com) by email or phone at (808) 262-9972. We kindly ask for your response by, March 4, 2016.**

Me ka ha‘aha‘a,

Nicole Ann Nāhōkūlaniahiahi Ishihara

Brittany Beauchan

Figure 48. Community consultation letter, page two

1. Waikiki Substation to Kalaimoku Street via Ala Wai Boulevard using trenching.
2. Under Ala Wai Canal from Kalaimoku Street to the Ala Wai Neighborhood Park using directional drilling to an approximate depth of 50 feet.
3. Ala Wai Neighborhood Park to a utility pole on University Avenue using existing underground ductlines.
4. Ala Wai Neighborhood Park to a utility pole on Hihiwai Street using trenching.

The existing cables will be relocated from within the Ala Wai Canal to allow the State Department of Land and Natural Resources (DLNR) to properly perform routine maintenance dredging. The installation of the cables by means of directional drilling under the Ala Wai Canal will ensure that power lines will not interfere with future dredging of the Ala Wai Canal. In addition, the replacement cables will improve the reliability of services to a highly populated and densely developed section of the city.

All trenching work within Hihiwai Street, Kalaimoku Street, Ala Wai Boulevard, and Kai‘olu Street is expected to be entirely within the road right-of-way and very likely in the paved section of the road. A small section along University Avenue where the cables transition from overhead to underground will also be trenched. HECO will coordinate with other utility companies with possible facilities in the rights-of-way during the alignment planning stage, and will prepare a traffic management plan which will be submitted to the City and County of Honolulu for review and approval before construction commences.

We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

•General history and present and past land use of the project area.

•Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.

•Knowledge of traditional gathering practices in the project area, both past and ongoing.

•Cultural associations of the project area, such as legends and traditional uses.

•Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* lands.

•Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.

In most cases, two or three attempts were made to contact individuals, organizations, and agencies.

6.3 Community Contact Table

Below in Table 10 are names, affiliations, dates of contact, and comments from NHOs, individuals, organizations, and agencies contacted for this project. Results are presented below in alphabetical order.

Table 10. Results of Community Consultation

Name	Affiliation	Comments
Abordo, Chelsea Malia Kananionapua	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Arcalas, Cara	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Alama, Puanani	Resident, *kūpuna, kumu hula* of Alama Hula Studio	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Apaka, Jeff	Waikīkī Community Center	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Battle, Cherie Kahealani Keohokālole	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Becket, Jan	Author, photographer, and retired teacher from Kamehameha Schools Knowledgeable in cultural sites Kona Moku Representative, Council of Hawaiian Civic Club's Committee on the Preservation of Historic Sites and Cultural Properties	Emailed letter and figures 5 February 2016 Mr. Jan Becket responded 10 February 2016: *Yes, I would be interested in participating in this project. I do know of several pre-contact sites in the hills above the area, at Wa'ahila. It is always good to re-visit those places and participating in this project would give me a good opportunity to go back there.* *In the makai area, I do know that Kupalaha Heiau once stood*

Name	Affiliation	Comments
		approximately where the Kapi'olani Bandstand is now, not far from where my mother grew up on Makee Rd. Not sure if that is in the project area for the purposes of your report. CSH emailed back and Mr. Becket responded 17 February 2016: *What would be a good day for a walk up into Wa'ahila? Sometimes I have worked it so that we drop down from the park. I am free on most weekdays*. CSH replied 17 February 2016: *Anytime this week would be good, either this Friday February 19th, or the following week, such as Monday February 22nd or Wednesday February 24th.* Mr. Becket replied 17 February 2016: *How about Friday? We could meet around 9:30 at Kanewai park parking lot. It's probably all parked up w/ student cars, but maybe there will be a spot somewhere to leave one car and head up to the park.* *If the weather looks junk, maybe we can arrange to pick a fallback day next week.* CSH called Mr. Jan Becket 18 February 2016 to confirm 9:30am meeting for field consultation at Wa'ahila. 18 February 2016 met in field at Wa'ahila to discuss project, and *heiau* located within Waikiki Ahupua'a.
Caceres, Norman "Mana" Christopher Moore Kaleilani	Cultural descendant, O'ahu Island Burial Council Representative	Emailed letter and figures 5 February 2016 Mr. Caceres responded 22 February 2016: *Aloha e Brittany,* *Mahalo nui for the email. I will speak with my ohana and see if there is any information/mana'o they'd like to share*

Name	Affiliation	Comments
		regarding the area that we are discussing. Mahalo hou. *Me ka leo ha'aha'a,* *Mana*
Crabbe, Kamana‘opono	Ka Pouhana of OHA	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
DaMate, Leimana	Executive Director, Aha Moku Advisory Committee for DLNR	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016
Del Toro, Benjamin	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Del Toro, Daniel	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Del Toro, Rachel	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Del Toro, Samuel	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Feeser, Andrea	Author and researcher of *Waikīkī: A History of Forgetting and Remembering*	Emailed letter and figures 29 February 2016 Ms. Feeser responded 1 March 2016: *Brittany, I would be honored to help in any way that I can! I look forward to hearing from you. Warmly, Andrea* CSH responded 1 March 2016: *Aloha Andrea,* *Mahalo Nui loa! I will be in touch with you by phone! Please let me know a day and time that would work for you. Additionally, as a participant for this project I would need you to sign an*

Name	Affiliation	Comments
		Authorization and Release form. I have attached that form into this email. If you would be so kind to sign and send back to me? If it's easier to send you a paper copy to sign, I can most certainly do that, along with a stamped envelope to return with! CSH scheduled a phone interview with Ms. Feeser 14 April 2016 CSH conducted the phone interview with Ms. Feeser 14 April 2016
Finley, Robert J.	Chair, Waikīkī Neighborhood Board No. 9	Emailed 5 February 2016 Mailed letter 18 February 2016 Called back by Mr. Jeff Merz 9 February 2016. Discussed project, and stated to CSH will share consultation letter and figures at that evening's (9 February 2016) Neighborhood Board Meeting. Also stated he will explain to *kūpuna* that CSH is looking for information with cultural significance. Mr. Finley responded 1 March 2016: *Aloha Nicole,* *Once again I lack the knowledge to be an "expert" on the cultural impact of the proposed HECO project.* *Happily I have been part of many projects that all identify a "Hawaiian Sense of Place" and lately have heard more than I can really comprehend about Waikiki* *Homes of the Monarchy and other historical sites prior to the Ala Wai Canal are key points in most project research.* *Water flow prior to the canal is always a huge point for design of new and renovated properties.* *Wind direction from the valleys to the ocean and the religious implications are now being considered.*

Name	Affiliation	Comments
		Natural design elements, like colors and contours of natural elements, are becoming more and more important. The stars and seasons are now being incorporated in building design. Having said that I am concerned with the project design (yes, I am an advocate of building a bridge and selling space to HECO for cables) that drills down 50 feet and tunnels under the canal. I am certainly no expert but how does HECO plan to protect buried historic bones and avoid the current buried utility pipes and cables that may not be on any maps? And with this project going below the water table will corrosive sea water impact the cost and design. Thank you for asking me for a few thoughts. -Bob Finley CSH responded 1 March 2016: *My name is Brittany Beauchan, and as you may know, Nicole is currently out on maternity leave. I am currently the main point of contact for the CIA regarding the HECO Ala Wai 46kV Underground Cables Project. Mahalo nui loa for sending your best wishes… her and baby Kailo are doing good! Thank you so much for sharing your mana‘o and concerns. I will make a special point to discuss water flow and wind direction as it relates to traditional Hawaiian occupation and practices within the Waikīkī area. I may be able to address some of your concerns regarding the archaeological aspect, specifically, the possible inadvertent discovery of human remains during construction work.*

Name	Affiliation	Comments
		In the event that human remains are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of the inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, would follow. All stakeholders, including cultural and lineal descendants would be notified. For this CIA, CSH has consulted with cultural/lineal descendants to include their comments/recommendations regarding the potential presence and protection of human burials. These comments/recommendations will be forwarded to HECO. Thus far, CSH has completed an archaeological inventory survey (AIS) recommending project construction proceed under an archaeological monitoring program with on-site monitoring. This monitoring helps to ensure compliance with all laws. Also of note, during testing for the AIS, no human burials were encountered. Regarding the engineering questions, I apologize that I cannot offer any answers. However, I will pass along these concerns to HECO, in addition to including all your questions and concerns within the Draft CIA Report (to be delivered to HECO). Once again, Mahalo nui loa for reaching out to us! Please do not hesitate to call or email me if you’d like to discuss further.
Gomes, Jeffrey	Cultural descendant	Mailed letter and figures 3 February 2016

Name	Affiliation	Comments
		Mailed letter and figures 18 February 2016
Gomes, Phoebe	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Gomes, Robin	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Grace, Nadine	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Gora, Amelia	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Harris, Cy K.	Cultural descendant	Undeliverable – email address failed Mailed letter and figures 5 February 2016
Hilo, Regina	SHPD, Burial Sites Specialist (O‘ahu)	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016
Joto, Lorelei	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kaleikini, Ali‘ikaua	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kaleikini, Haloa	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kaleikini, Kala	Cultural descendant	Mailed letter and figures 3 February 2016

Name	Affiliation	Comments
		Mailed letter and figures 18 February 2016
Kaleikini, Moehonua	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kaleikini, No‘eau	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kaleikini, Paulette Ka‘anohi	Cultural descendant	Mailed letter and figures 3 February 2016 Emailed letter and figures 5 February 2016 Mailed letter and figures 18 February 2016 Ka‘anohi Kaleikini responded by email: *I will be responding soon. Mahalo* *CSH responded on February 9, 2016:* *Aloha e Aunty Ka‘anohi,* *Thank you so much for your quick response. I just wanted to update you that Nicole Ishihara, the project director for this project, will be leaving very soon on maternity leave. I will be the point of contact for this project for the next few months, so you can direct emails or any correspondence to bbeauchan@culturalsurveys.com or call our office at 808-262-9972. I’m also available by cell phone 808-387-2030. We look forward to hearing from you, and also we are hoping, if your schedule permits, to perhaps have a meeting in person at/near the project area (or any location that is convenient for you) to discuss the project with you, any of your concerns, or mana‘o.* Ka‘anohi Kaleikini responded by email 13 February 2016: *Aloha no e Brittany,*

Name	Affiliation	Comments
		Kalamai i‘au for taking so long to respond. *I will share here, my mana'o of the area regarding this HECO project. If you still would like to meet at the site, let me know, I may have time next week.* *Before the Ala Wai was dug, during pre-contact times, the project area was one land mass. There were many natives living in there. The lands were fertile and water ran through it as well. In the ancient times, where they lived, is usually where they died and was buried.* *Traces of their lives on the land may be intact unless the land was already heavily disturbed by present development. Pre-contact iwi kupuna was found during road work a little mauka and more iwi was found towards Diamond Head of this project area. This is evidence that natives lived in the area of the project.* *During the Mahele, lands were given by the King to natives. The lands were inhabited by the 'ohana until the islands were occupied by the United States and the lands were stolen from them. Some of my kūpuna were such natives/'ohana who lived on those lands. Most of the lands in Waikiki, were given by the King to 'ohana who were his relatives.* *That's all I have to share for now.* *Mahalo Brittany* *Aunty Kaanohi* CSH responded by email 15 February 2016: *Aloha e Aunty Ka‘anohi,* *Thank you so much for sharing your mana'o, I will include all this information in the report, for you to*

Name	Affiliation	Comments
		review, once I have completed writing it. I would still very much like to meet, anytime this week, at the site, or anywhere that’s convenient for you. My schedule is flexible all week! Once again, mahalo nui loa for your response and all that you shared; please feel free to call or contact again if you have any other concerns or questions. CSH reached out to Ka‘anohi Kaleikini a second time 22 February 2016 regarding a possible site visit: *Aloha e Aunty Ka‘anohi,* *I just wanted to keep you updated on the project so far; I’ve mailed out a second round of letters to your home (per CSH protocol), for you and your ohana, regarding the project. But I have already noted for the report that you have responded to us via email, and shared how rich the lands were surrounding the Ala Wai during pre-contact times, and the presence of sites, as well as iwi kūpuna just Diamond Head of the project area. I just wanted to touch base if you have any free time in your schedule (I know you’re really busy!), just in case you wanted to meet in the project area, or perhaps point out areas of major concern for you, or just discuss in general. I completely understand if your schedule doesn’t allow it though. Mahalo nui loa once again for all your time and help with this project.* Ka‘anohi Kaleikini responded that she could not commit to a site visit, but reiterated her concerns: *Aloha Brittany*

Name	Affiliation	Comments
		Of major concern to me is the entire Waikiki ahupuaa. This was an area where thousands of native Hawaiians lived. There's proof in all the human remains that have been found and most of them disturbed by development of Waikiki. *Kalamai, I cannot commit to a visit time just now.* *Mahalo for all you do in trying to document our cultural history.* *aloha aina,* *aunty*
Kaleikini, Tuahine	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kamai, Dwynn	Secretary, Waikīkī Hawaiian Civic Club	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016
Kanoa, Manly	Lecturer of Management of Cultural Values at the University of Hawai‘i and owner of Hokupa‘a Learning Center, LLC	Emailed letter and figures 29 February 2016 CSH called Mr. Kanoa 1 March 2016, he noted that he would be willing to participate if CSH organized a group interview involving Mr. Joe Recca. He noted the responsibility to organize this meeting would be CSH's, if they could coordinate with Mr. Joe Recca.
Keana‘āina, Betty	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keana‘āina, Kīhei	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keana‘āina, Luther	Cultural descendant	Mailed letter and figures 3 February 2016

Name	Affiliation	Comments
		Mailed letter and figures 18 February 2016
Keana‘āina, Noelani	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keana‘āina, Regina	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keana‘āina, Vicky	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keana‘āina, Wilsam	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keanu, Josphine	Resident, *kupuna*	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016
Keli‘inoi, Kalahikiola	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keli‘inoi, Kilinahe	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keli‘inoi, Moani	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keli‘ipa‘akaua, Justin	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016

Name	Affiliation	Comments
Kelley, Dr. Richard	Chairman of the Board Emeritus of Outrigger Enterprises Group	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016 Mr. Kaipo Ho responded by email on 29 February 2016: *Aloha e Nicole,* *I am responding to your letter addressed to Dr. Richard Kelley, dated February 3, 2016, requesting cultural information for the designated Ala Wai area.* *I humbly apologize that Outrigger is unable to participate. However, may I recommend a few resources that could be of service to you and the project?* *Jeff Apaka– japaka@waikikicommunitycenter.org, 808.923.1802* *Joe Recca – 8082275376@txt.att.net, 808.227.5376* *Peter Young – PeterYoung@Hookuleana.com, 808.226.3567* *Manly Kanoa – mkkanoa@hotmail.com, 808782.3951* *Kai Markell – kaim@oha.org, 808.594.0220* *Peter Young headed a project in 2013 entitled Waikiki – Kauhale O Ho‘okipa Scenic Byway to designate Waikiki as a National and State Scenic Byway. Peter could provide you with a wealth of information.* *Me ka ha‘aha‘a,* *Kaipo Ho* CSH responded 29 Februrary 2016: *Aloha e Kaipo,* *Thank you so much for your reply. Nicole is currently on maternity leave,*

Name	Affiliation	Comments
		so I will now be the main contact for the project. But once again, mahalo for the contacts! These are truly appreciated, and I will make sure to reach out to Mr. Young. *Mahalo piha* *Brittany* Dr. Richard R. Kelley responded to CSH 5 March 2016 via email with an attached letter in PDF format (See Appendix B)
Kelley, Dr. Charles R.	Chairman of the Board of Outrigger Enterprises Group	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, Adrian K.	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, Dennis Ka‘imina‘auao	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, Emalia E.	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, James Hoapili	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, Jeanine Leikeonaona	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Keohokālole, Joseph Moses Keaweaheulu	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016

Name	Affiliation	Comments
Keohokālole, Lori Lani	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kini, Debbie (Norman)	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kini, Nalani	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Koko, Kanaloa Kanaina Kekino	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Kuhia, Glenn Kealoha	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lew, Haumea	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lopes, Darren	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lopes, Kamaha‘o	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lopes, Leina‘ala, (Moses-Hukiku)	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lopes, Po‘ohui	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016

Name	Affiliation	Comments
Lopes, Puahone Kini	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Lopes, Wilfred	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Luka, Alika	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Makua, Barbara	Resident, *kupuna*	Delivered letter and figures in person at Queen Emma Summer Palace Lecture Series 30 January 2016 CSH interviewed Mrs. Makua at Queen Emma Summer Palace 30 January 2016 and at Zippy’s Honolulu location 4 February 2016
Mamac, Violet Leihulu Medeiros	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Matson, Michelle	Waikīkī Residents Association	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Medeiros Jr., Clarence	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Medeiros, David	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Nobrega-Olivera, Malia	President, Waikīkī Hawaiian Civic Club	Emailed letter and figures 5 February 2016 Emailed letter and figures 2 February 2016

Name	Affiliation	Comments
Norman, Carolyn	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Norman, Eileen	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Norman, Kaleo	Cultural descendant	Emailed letter and figures onFebruary 5, 2016 Emailed letter and figures on February 22, 2016
Norman, Keli‘inui	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Norman, Theodore	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Papa Jr., Richard Likeke	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Pascua, Bruce H.	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Rash, Regina	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Recca, Joe “Pekelo”	Musician, narrator, storyteller, and cultural descendant	Emailed letter and figures 29 February 2016 On 1 March 2016 Mr. Recca requested CSH call him back to discuss the project CSH called Mr. Recca 1 March 2016: He stated that he could not commit to a date in the immediate future to discuss

Name	Affiliation	Comments
		the project in person or be interviewed, but stated he would call to schedule a meeting when he had free time.
Shirai, Jacqueline	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Shirai, Thomas T.	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Silva, Lisa Gomes	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Soares, Moani Kaleikini	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Solis, Sheleigh Christina Ka‘āhiki	SHPD, Cultural Historian (O‘ahu)	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016 Ms. Solis responded 23 February 2016: *Aloha e Brittany,* *Mahalo for your email! I will include a resource list that I hope will help you in your work! If I can be of any more kokua please let me know!* *Mahalo,* *Kaahiki* Ms. Solis attached a word document containing the resource list to her email (See Appendix C)
Spinney, Charles	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Suzuki, Ashley	Cultural descendant	Mailed letter and figures 3 February 2016

Name	Affiliation	Comments
		Mailed letter and figures 18 February 2016
Suzuki, Kimberly	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Takaki, Moses	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Theone, Nicole Gulia	Cultural descendant	Mailed letter 3 February 2016 Mailed letter 18 February 2016
Waikīkī Community Center	Contact: Jeff Apaka	Mailed letter 3 February 2016 Mailed letter 18 February 2016
Wong-Kalu, Hinalei	Kona Representative and Chair for the O‘ahu Island Burial Council	Emailed letter and figures 5 February 2016 Emailed letter and figures 22 February 2016
Yokooji, Dayleen	Cultural descendant	Mailed letter and figures 3 February 2016 Mailed letter and figures 18 February 2016
Young, Peter	President of Ho‘okuleana, LLC	Emailed letter and figures 29 February 2016 Mr. Young responded back 29 Februrary 2016: *Thanks. I will be at your office tomorrow morning (9 am, Tues, Mar 1) for a conference call (I am working with you guys and others on the Wao Kele O Puna master plan.) If you are there then, we can discuss that.* *Yes – I am interested.* *Thanks,* *Peter.* CSH called Mr. Young 1 March 2016. Mr. Young did not schedule a meeting but suggested CSH look through his archives of photographs, maps, and articles available at the Ho‘okuleana website to add to the background

Name	Affiliation	Comments
		research of the report. He stated should CSH have additional questions to please call him, however, he also noted most of the data within his articles derives mostly from CSH reports for the Waikīkī area. He requested to see information regarding Iolani School’s Olympic Rowing Team (who trained in the Ala Wai Canal) included within the background section of the report (See Section 4.3.4 ‘Iolani School Olympic Rowing Team added per Mr. Young’s request).

6.4 *Kama‘āina* Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana‘o* and *‘ike* with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and in no way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

6.4.1 Email Correspondence with Paulette Ka‘anohi Kaleikini

CSH mailed and emailed letters and figures regarding the current Ala Wai 46kV Underground Cables Project to Paulette Ka‘anohi Kaleikini in February of 2016. Paulette Ka‘anohi Kaleikini and her *‘ohana* are cultural descendants of Waikīkī Ahupua‘a; Paulette Ka‘anohi Kaleikini is also the current owner of ‘Ōiwi Cultural Resources, a cultural monitoring firm. CSH has also worked with ‘Ōiwi Cultural Resources in the field, on the Archaeological Inventory Survey (AIS) component for the current project.

Paulette Ka‘anohi Kaleikini emailed CSH with her comments regarding the current project on 13 February 2016:

> Aloha no e Brittany,
>
> Kalamai i‘au for taking so long to respond.
>
> I will share here, my mana‘o of the area regarding this HECO project. If you still would like to meet at the site, let me know, I may have time next week.
>
> Before the Ala Wai was dug, during pre-contact times, the project area was one land mass. There were many natives living in there. The lands were fertile and water ran through it as well. In the ancient times, where they lived, is usually where they died and was buried.

> Traces of their lives on the land may be intact unless the land was already heavily disturbed by present development. Pre-contact iwi kupuna was found during road work a little mauka and more iwi was found towards Diamond Head of this project area. This is evidence that natives lived in the area of the project.
>
> During the Mahele, lands were given by the King to natives. The lands were inhabited by the ‘ohana until the islands were occupied by the United States and the lands were stolen from them. Some of my kupuna were such natives/'ohana who lived on those lands. Most of the lands in Waikiki, were given by the King to 'ohana who were his relatives.
>
> That’s all I have to share for now.
>
> Mahalo Brittany
>
> Aunty Kaanohi

CSH responded to Paulette Ka‘anohi Kaleikini by email on 15 February 2016:

> Aloha e Aunty Ka‘anohi,
>
> Thank you so much for sharing your *mana‘o*, I will include all this information in the report, for you to review, once I have completed writing it. I would still very much like to meet, anytime this week, at the site, or anywhere that’s convenient for you. My schedule is flexible all week! Once again, *mahalo nui loa* for your response and all that you shared; please feel free to call or contact again if you have any other concerns or questions.

CSH reached out to Paulette Ka‘anohi Kaleikini on 22 February 2016 regarding a possible site visit:

> Aloha e Aunty Ka‘anohi,
>
> I just wanted to keep you updated on the project so far; I’ve mailed out a second round of letters to your home (per CSH protocol), for you and your *‘ohana*, regarding the project. But I have already noted for the report that you have responded to us via email, and shared how rich the lands were surrounding the Ala Wai during pre-contact times, and the presence of sites, as well as *iwi kūpuna* just Diamond Head of the project area. I just wanted to touch base if you have any free time in your schedule (I know you’re really busy!), just in case you wanted to meet in the project area, or perhaps point out areas of major concern for you, or just discuss in general. I completely understand if your schedule doesn’t allow it though. Mahalo nui loa once again for all your time and help with this project.

Paulette Ka‘anohi Kaleikini responded that she could not commit to a site visit, but re-iterated her concerns to CSH:

> Aloha Brittany
>
> Of major concern to me is the entire Waikiki ahupuaa. This was an area where thousands of native Hawaiians lived. There's proof in all the human remains that have been found and most of them disturbed by development of Waikiki.

> Kalamai, I cannot commit to a visit time just now.
>
> Mahalo for all you do in trying to document our cultural history.
>
> aloha aina,
>
> aunty

6.4.2 Summary of Barbara Makua Interview

CSH interviewed Barbara Makua, *kupuna* and longtime resident of Waikīkī, on 30 January 2016 and 4 February 2016. The initial 30 January 2016 interview occurred as part of the ‘Imi Na‘auao “Talk Story” Lecture Series at the Queen Emma Summer Palace and hosted by the Daughters of Hawai‘i. Mrs. Barbara Makua and Mrs. Phyllis “Leimomi” Stephenson were both featured speakers in the lecture, with the focus of the lecture on “old Waikīkī.” A second interview was conducted with Mrs. Makua on 4 February 2016 to specifically discuss the current project. Information from both interviews are summarized below.

Mrs. Barbara Makua is well known as the loving wife of renowned beach boy Blue Makua, Sr. Originally raised in Portland, Oregon, Mrs. Makua identified Hawai‘i as her second home. She arrived on O‘ahu in 1956 for government work as a “medical technologist” for Tripler Hospital. As Mrs. Makua recalled, she allowed herself “only a month in Waikīkī,” as she had originally intended to work her “way around the world.” She had also planned, as an avid water woman, on devoting her free time to the array of water activities available on the Waikīkī beach front during the 1950’s. However, upon her arrival to the islands, her government employer made the decision to institute an RIF or reduction in force; Mrs. Makua soon realized she would be staying in Hawai‘i much longer than she had originally anticipated. Shortly thereafter, she applied to the Medical Group, finding employment as a medical technician in Kailua. Although employed in Kailua, she continued to live and recreate in Waikīkī. She explained,

> So I lived in Waikīkī of course, when you first come [to O‘ahu] you live in Waikīkī, and that is where I really met the people that were so important to me, I was staying at the Hawaiiana Hotel on Beachwalk, and our right of way was there between the Halekulani, the old Halekulani, and the Reef Hotel. And it just so happened there was a female Hawaiian who was the beach attendant, and I got to know her, and to make a long story short she became my sister in law. She introduced me to her friends, and all these wonderful local girls, and they sort of took me in, and this is how I met my husband. And so I really knew Waikīkī before all the buildings started, when I first came down, the Princess Ka‘iulani was just built, it wasn’t occupied yet, and there was still the really old, I think it was the Waldorf Hotel that was there in Waikīkī… that was it the Biltmore, not the Waldorf. Living in Wakīkī, strangely enough now, the condo that my dad bought is a half a block from where I originally stayed, there on Ka‘iulani Street. So I was able to see old Hawai‘i at the time, and unfortunately now the new Hawai‘i.

While inquiring for beach services she befriended a young Hawaiian girl, who in turn, would often invite Mrs. Makua to her family home in Papakōlea. During one such gathering, Mrs. Makua

was introduced to the young girl's brother, Blue Makua. Mrs. Makua elaborated on the circumstances leading to her and her husband's meeting,

> The girl who was the beach attendant was Blue's sister, and it was through her, and of course she invited me to all her parties, and one of them was up at their home in Papakōlea . . . he was living there with his mother and brother at the time too, and he came home, and we were introduced, and thereby hangs a tale. But anyway, while I had been a newcomer to Waikīkī, I gone down, I was a water person from the time that I was born, so I was naturally attracted to the ocean, and I'd go down and watch the canoe races, which just really fascinated me, and Blue at that time was the head coach at the Waikīkī Surf Club . . . so I had seen him before I met him.

As the wife of the legendary beach boy Blue, Mrs. Makua quickly became a part of the Hawaiian watersports *'ohana*, as well as a part of the famed beach boy era. As both *kupuna*, and longtime resident of Waikīkī, Mrs. Makua recounted for CSH the "golden era of Waikīkī," with descriptions of *hoe wa'a* (canoe paddling), *he'e nalu* (surfing), and *pana* (places) within her *hali'a aloha o Hawai'i* (fond remembrances of old Hawai'i). In particular Mrs. Makua recalled the thrill of riding waves in the canoe with her husband Blue, especially on days when the sets were particularly large,

> He was a steersman for the canoes there at Waikīkī, for Royal, so each hotel had their own canoes, now it's entirely different, so when we were going together, I would be down at the beach swimming and surfing, and would be able to go out in the canoe with him when the surf was high. That was the exciting time, and a lot of times if he didn't have any guests that went with him, because sometimes the waves were a little intimidating, and so he would steer and I would sit in the boat and honestly that is the most exciting thing to sit in these canoes coming down on the wave. So that was a real introduction for me, and of course meeting all the other beach boys he worked with, Panama Baptiste, Chick Daniels. Each hotel had their own head beach attendant like the Moana had Jimmy Ahakuelo, and the Royal had Chick, plus a couple others, and Panama of course, and then the Reef had their own canoe, and Splash Lyons, who was also an entertainer, was their canoe captain, and it was always so much fun seeing him come in, because he'd come down the wave, then paddle down toward the reef, and he'd stand up paddle!

Mrs. Makua also recalled the old boundaries of Waikīkī, noting the current area of Waikīkī had been expanded over the years since the 1950's; it originally only encompassed the area from the Moana Hotel (currently the Moana Surfrider) to the Royal Hawaiian Hotel. Mrs Makua explained,

> Shortly before Kui Lee passed away, we went down to see him, where he was entertaining down by Queen's Surf, and Kui would remember things about Blue, because Waikīkī, when Blue was working there, the wall by the Moana was the border, and Waikīkī only extended to the Royal Hawaiian, it didn't even include Halekulani, it was just that short distance, and Kui remarked to Blue, that he remembered when Blue used to kick him back over the wall because he'd come into 'Waikīkī,' and he wasn't one of the beach boys.

Mrs. Makua recalled younger beach boys by the name of Coco, Zulu, and Eddie Bush, one of the boys lived close to Mrs. Makua's residence near Ala Wai Boulevard: "Zulu lived around the corner on the Ala Wai [Boulevard] and Kaiulani […] they would walk down the beach, Eddie especially, and be playing his *'ukulele* (musical instrument), it was just, just a real free time."

In addition to discussing the Waikīkī Beach Boys, she highlighted numerous *pana* or notable places of 1950's Waikīkī, including the Waikīkī Surf Club, the Waikīkī Tavern, the Merry Go Round Bar, the Blue Dolphin Room, the Waikīkī Biltmore Hotel, and the Roselei Apartments (named after famed Waikīkī singer Rosalie Stephenson, the mother in law of Aunty Leimomi Stephenson, the second guest speaker at the 'Imi Na'auao Lecture Series). Mrs. Makua clarified that the Rosalei was named after Mrs. Rosalie Stephenson, despite the variation of the spelling. The Rosalei apartment building, located at 445 Kai'olu Street, was not only Waikīkī's first high-rise apartment building but one of its tallest (*Honolulu Star Bulletin* 1953;1; Mason Architects, Inc. 2004).

> The Rosalei was designed by architects Earl W. Morrison & Donald N. McDonald. At the ground-breaking ceremony on April 27,1954, Lloyd W. Martin of Fairbanks, Alaska wielded a gold-painted spade with Mrs. Rosaline A. Stephenson, a Honolulu schoolteacher and singer, for whom the new building was to be named (with a slight variation of her stage name) (*Honolulu Advertiser* 1954*:*C25.Mason Architects, Inc. 2004:38-39)

Mrs. Stephenson performed at various Waikīkī venues such as the Moana Hotel and the Royal Hawaiian Hotel from the early 1920s to the late 1940s. In particular, her moving performance of the Hawaiian Wedding Song or *Ke Kali Nei Au* helped to establish her as one of the top local musicians on the island. Her talent and popularity eventually led to performances with other renowned local musicians such as Andy and Simeon Bright, Squeeze Kamana, David Kelii and Al Kealoha Perry (Mason Architects, Inc. 2004:39). Throughout the 1930s, Mrs. Stephenson was known as the Royal Hawaiian Band's soloist, in addition to being known as the voice greeting tourists arriving on Pan American flights at Pearl City Peninsula (Mason Architects, Inc. 2004:39). By1948, Mrs. Stephenson began her long-term singing engagement at Don the Beachcomber's in Waikīkī (Mason Architects, Inc. 2004:39). Mrs. Makua described watching Rosalie Stephenson perform the Hawaiian Wedding Song at Don the Beachcomber's,

> When Blue and I were going together, a friend of ours took us to dinner there at Don the Beachcomber's, and [Aunty Leimomi Stephenson's] mother in law was singing, and the way the restaurant was set up they had a stream going through with a little bridge, and I'm getting goosebumps thinking about it, because Rosalie would be on one side and come over this bridge, and Alfred [Apaka] would be on the other side and they would sing the Hawaiian Wedding song, it was just beautiful.

She noted that the Rosalei Apartments, retaining the majority of its original design features and construction materials, represents some of the last vestiges of old Waikīkī still visible along the Ala Wai Canal:

> There are pockets [of old Waikiki], the condo that I live in, my dad bought back in ’66, and it’s on the street, not only the Ala Wai, but the next street is Tusitala, which was Stevenson, Robert Louis Stevenson’s name in Samoan, and then of course the next street over was Cleghorn, but at the end of that was where ‘Āinahau was. And at the end of our street, there for a long time until the Daughters [of Hawai‘i] resurrected it . . . part of the old banyan tree that was part of ‘Āinahau, and that was at the end of Tusitala, and I remember when the condo was built it was one of the first ones, where you could from the living room you could look out and have a full view of Diamond Head . . . well forget that [now], but I remember there being some of the old houses along, looking down, and actually seeing where the little grass shack that he [Robert Louis Stevenson] had was, was right down there on Tusitala, and I guess that’s why they named it Tusitala. But there’s still on our street [Ala Wai Boulevard], the old two story bungalows, and down a ways there are a couple of bungalows, you go back toward Honolulu from where I am, it’s all changed. The only thing is the Rosalei [Apartments].

Due to the large “talk story” format of the lecture, the area surrounding the Ala Wai Canal was not particularly discussed, and thus a second meeting was scheduled with Mrs. Barbara Makua to further discuss the project area on 4 February 2016 at Zippy’s Restaurant in Honolulu.

Upon showing Mrs. Makua additional maps of the project area, and discussing the project proponent and project purpose, Mrs. Makua related her connection to the area. She recalled living at the end of the Ala Wai Canal, at an apartment building called the Ala Wai Terrace. This apartment building consisted of two stories. In discussing the changing costs of living for the area, she related that at the time, her two-bedroom apartment rented for $97.50 a month. Mrs. Makua also recalled fisherman berms that extended into the canal. Most of the fisherman were of Asian ancestry, and they could be seen off of little platforms extending about 6 feet into the water. Over the years Mrs. Makua had observed the gradual disappearance of the fisherman’s berms. When CSH inquired if her and her family ever swam or utilized the canal for recreation, Mrs. Makua commented that they never went swimming in the canal, but they used to catch Samoan crab on occasion. She recalled a time when the Makua *‘ohana* owned a little boat, and launched it from Ala Wai Boat Harbor area, and headed up the canal. She also recalled little paddle boats that could be rented from the *mauka* end of McCully Street Bridge, near the southwestern portion of Ala Wai Park.

Prior to arriving to Honolulu, Mrs. Makua recalled reading about the Ala Wai Canal. She discussed how the feature had been romanticized for a mainland audience. Mrs. Makua said, “But you know when I was coming down, and I read about the Ala Wai canal, I thought oh how romantic, I imagined boats would come up and unload people there, because there are steps you know, but I never saw that.” In discussing Walter Dillingham’s original intention of the canal being the Venice of the Pacific, Mrs. Makua recalled that prior to her arrival, she had “visualized gondolas or something like that” in the canal.

The reality of the canal had been very different from what Mrs. Makua originally envisioned, however, the area still retained its charm as it was still relatively undeveloped at the time of her arrival to Waikīkī. She recalled when her father had purchased the apartment along the Ala Wai

Canal (where Mrs. Makua currently resides) there existed an unobstructed view of Diamond Head (see Figure 49):

> When mother and dad moved in . . . we’re just on the eighth floor, and they took a picture from the living room, and there was Diamond Head, and there was only one building, and now you can’t see Diamond Head anymore.

The apartment also provided views of the Ala Wai Canal itself. Observations of water quality and canal debris could be made from the apartment. Mrs. Makua commented:

> I remember . . . heavy rains, all kinds of stuff would come down from Mānoa and Pālolo, because Pālolo [stream] comes in almost by the library, and then of course Mānoa is right there, and then of course Makiki is way down, but the weirdest stuff comes down the canal.

She added that she has observed animal carcasses in the past, but with recent heavy rains has only observed bushes and branches flowing down the canal. “But it’d be nice if they could clean it up to some degree where you could have ducks [and various other flora and fauna flourishing].”

Regarding the flourishing of flora and fauna, CSH briefly discussed with Mrs. Makua former Governor Benjamin Cayetano’s plan to convert the Ala Wai Golf Course to an urban central park.

In 2000, Ala Wai watershed issues came to a head, in particular, concerns were raised regarding how to reduce flooding and silt, how to improve water quality, and how to create a viable ecosystem (Sanburn 2015). Suggestions were made to “restore the stream beds as close as possible to their natural conditions” (Sanburn 2015), resulting in Governor Ben Cayetano proposing the 146-acre Ala Wai Golf Course be converted to a park. It was proposed that,

> […] the new park should incorporate reconstituted wetlands. The Mānoa-Pālolo Drainage Canal could be diverted through them to slow down the water and spread it out, reducing the silt and other pollutant-laden run-off that otherwise would wind up in the already scandalously polluted Ala Wai Canal. [Sanburn 2015]

This plan for a kind of natural reserve in the area surrounding the Ala Wai Canal was summarily rejected. Mrs. Makua stated no other concerns regarding the current project.



Figure 49. Unobstructed view of Diamond Head taken from apartment building located along the Ala Wai Canal (Photo courtesy of Mrs. Barbara Makua)

6.4.3 Summary of Jan Becket Interview

Jan Becket, a retired Kamehameha Schools teacher, is a specialist in regards to knowledge of cultural sites throughout the island of O‘ahu. As a photographer and author, Mr. Becket is well recognized for his black-and-white photographic documentation of sacred sites. He has conducted extensive archival research on sites of cultural significance, learned from *kūpuna* (elders), and photographed many undocumented sites on O‘ahu, which resulted in a co-written book, *Pana O‘ahu* (Becket and Singer 1999). He is a member of the Committee for the Preservation of Historic Sites and Properties under the O‘ahu Council of Hawaiian Civic Clubs, and reports back to the chair of the committee (Shad Kāne) on issues concerning cultural sites in the Kona district of O‘ahu.

On 10 February 2016, Mr. Becket led CSH on a *huaka‘i* (journey) to a cultural site within the *ahupua‘a* of Waikīkī. The *huaka‘i* included visual inspection and photographic documentation of the site. Mr. Becket additionally provided photographs of the cultural site (see Figure 50 through Figure 53). CSH met Mr. Becket at a City Mill located at 3086 Waialae Avenue, and was directed to continue up St. Louis Heights towards Wa‘ahila Ridge State Recreation Park. The terrain in the vicinity of the recreation park is described by Nā Ala Hele Trail and Access Program as “dry, mountainous, [and] partly native forest” (State of Hawai‘i DLNR, Division of Forestry and Wildlife). Upon reaching Wa‘ahila Ridge State Recreation Park, CSH and Mr. Becket began hiking in the *makai* direction along a trail located southwest of the Wa‘ahila Ridge State Recreation Park parking lot. Following this southwestern trail along a path of telephone poles, Mr. Becket then veered off the trail, towards Diamond Head, into a thicket of dense vegetation (see Figure 54 through Figure 56).

Numerous species of vegetation were observed at the beginning of the hike; vegetation included *koa* (*Acacia koa*), *‘ōhi‘a lehua*, (*Metrosideros polymorpha*) strawberry guava (*Psidium cattleyanum*), ironwood (*Casuarina equisetifolia*) trees, and Norfolk Island pine (*Araucaria heterophylla*) trees. Utilizing a personal GPS unit, CSH and Mr. Becket were able to cut a trail through the dense thicket of *koa haole* (*Leucaena leucocephala*) and California grass (*Brachiaria mutica*) towards the cultural site.



Figure 51. Photograph of portion of *makai* facing basalt stone wall, note prominent *pōhaku* in middle ground (Photo courtesy of Jan Becket 1998)



Figure 50. Photograph of damaged *pā* (enclosure) at Wa‘ahila Ridge, view to south. The Waikīkī skyline is partially visible in background. (Photo courtesy of Jan Becket 1998)



Figure 53. Photograph documenting portion of a homeless encampment within the Wa‘ahila cultural site (Photo courtesy of Jan Becket 2012)



Figure 52. Photograph of damaged portion of west-facing basalt stone wall; note the ramp created by mountain bikers to jump over the prominent *pōhaku* pictured in middle ground (Photo courtesy of Jan Becket 2002)



Figure 54. General view of Wa‘ahila Ridge State Recreation Park; trail to cultural site located southwest of parking lot, view to northeast



Figure 55. General view of Diamond Head and *makai* portion of Waikīkī Ahupua‘a (taken from trail); view of project area obscured by vegetation, view to southeast



Figure 56. General view of a portion of the trail traveled during Mr. Becket's and CSH's *huaka‘i* to the Wa‘ahila Ridge cultural site, view to north

While hiking towards the site, CSH and Mr. Becket crossed over a series of dry, intermittent or ephemeral streams (See Figure 57 and Figure 58). Intermittent streams are described as being "dry during some periods but receiv[ing] ground-water discharge or water from surface sources during other periods" (Oki n.d.). Ephemeral streams are described as "flow[ing] only in direct response to rainfall, and their stream channels are above the water table" (Oki n.d.). The 2015-2016 *El Nino* cycle may partially be responsible for the dry condition of the streams observed on the *huaka‘i*. According to Oki, "prolonged periods of less than average rainfall may be related to climatic cycles such as *El Nino* and result in periods of less than long-term average streamflow at a site" (n.d.).Additionally, a February 2016 Precipitation Summary produced by the National Oceanic and Atmospheric Administration (NOAA) stated:

> The El Nino-induced dry weather pattern that brought record-breaking low rainfall totals to the Hawaiian Islands in January persisted through February. Although fewer records were broken, most locations received less than 50 percent of the average rainfall for the month. Most of the days featured weak large-scale winds which allowed land and sea breezes to dominate local conditions. Drought impacts increased in areal coverage and intensity during the month […] almost all of the gages on Oahu recorded below average rainfall totals for the month of February with most amounts at less than 40 percent of average. [NOAA 2016]

The observance of these dry streams prompted a brief discussion with Mr. Becket regarding surface water resources in the area. It was surmised that these intermittent streams most likely originate in either Mānoa or Pālolo Valley, and are associated with the Ala Wai watershed. Mr. Becket noted that he had previously brought Mrs. Karen Ah Mai, the Executive Director of the Ala Wai Watershed Association to the site, as it is an important cultural feature within the mountain watershed area. Moreover, "the surface- water resources of Hawaii," such as those observed and crossed during the *huaka‘i*, "are of significant economic, ecologic, cultural, and aesthetic importance" (Oki n.d.).

Following the crossing of the streams, the site was immediately recognized below a large banyan tree. This cultural site is located in the center of Wa‘ahila Valley on the lower slope of Wa‘ahila Ridge, *mauka* of the Kamakakuokalani Center for Hawaiian Studies at the University of Hawai‘i at Mānoa. This site, nestled between a rock face, a steep drop-off and three low, basalt walls, would have commanded an impressive view of Waikīkī were it not for the unchecked vegetation and homeless encampment. When last the site was visited by Mr. Becket, it was composed of two small terraces built upon natural rock, a *po‘o pōhaku* (a stone with an outcropping that looks like a head), and an area of loose cobbles and boulders. An enclosing wall also ran along the *makai* side of the site. Based on information provided to Mr. Becket by Mr. Shad Kane (former member of the O'ahu Island Burial Council) burials may possibly exist in the general vicinity of the site as well. Due to the covering of the entire site by a homeless encampment, and concerns regarding safety and health, CSH was unable to confirm the current condition of walls, terraces, and the *po‘o pōhaku*.

Mr. Becket discussed with CSH the numerous threats facing this site. He recounted an incident that had occurred approximately 10 years prior where organized groups of mountain bikers had



Figure 57. General view of a portion of a dry, intermittent stream



Figure 58. General view of a portion of a dry, intermittent stream

removed basalt boulders from the *mauka* wall of the enclosure to create a ramp or “jump” off the *po‘o pōhaku*. These mountain bikers razed a damaging path directly through the site. Mr. Becket helped inform the State of the site’s ongoing destruction by bikers; his action eventually resulted in the closing of the biker’s access trail. The State DLNR currently notes that biking and/or mountain biking is prohibited within the Wa‘ahila Ridge State Recreational Park and along the Wa‘ahila Trail. As part of this *huaka‘i* CSH documented the current condition of the site. On previous site visits Mr. Becket had noted the presence of one homeless individual living in close proximity to the site. While CSH did not observe any recent destruction due to biking, the site is currently threatened by a large homeless encampment; this encampment has been utilizing many of the site’s prominent features to anchor in place a large shelter made of tents and tarps. CSH did not encounter any homeless individuals during this visit, but made note that the entire site complex is completely covered with tents, tarps, and chicken wire (Figure 59 through Figure 61). The exterior of the terraces are wrapped in chicken wire while the interior portions are filled with storage containers. The number of individuals currently living at the site was not determined.

Paul Rosendahl assessed this cultural site as part of an archaeological inventory survey in a nearby area in 1996 though no excavations were made. Designated as Site 5463, Rosendahl (1996:22) described it as “an area used for agriculture, with some potential for containing habitation features” likely associated with pre-Contact activity (Figure 62).

Mr. Becket and other members of the Committee for the Preservation of Cultural Sites and Properties, under the O‘ahu Council of Hawaiian Civic Clubs, collectively felt that Site 5463 may be a possible *heiau*. In a letter to the DLNR in 2001, the preservation committee explains their reasoning:

> . . . It is the only ancient structure in that area, with no features usually associated with agriculture (‘auwai, lo‘i) either in the surrounding forest or within the structure itself. Although the structure sits on marginal upland soil, it lies above the Mānoa/Mō‘ili‘ili plain, one of the richest growing areas on O‘ahu. This unusual placement raises the question of which crops might have been raised so far from habitations and from other, far more productive cultivation areas. No house platforms are evident within the enclosure.
>
> On the other hand, no information about the rectangular enclosure contradicts the interpretation of its function as ceremonial. It looks out over Waikiki, directly over the ancient seat of political power for the entire island since the time of Ma‘ilikukahi: Helumoa (or ‘Apuakehau), now the location of the Royal Hawaiian Hotel. Often, heiau were deliberately placed so that they would command such sweeping views. Furthermore, at the center of the enclosure lies an unusual and prominent stone [the po‘o pōhaku]. Our cultural resource experts tell us that some heiau were constructed around such prominent stones, which were the focus of the structures, their reason for existing. Although no one can be absolutely sure at this point, the enclosure does appear to be constructed around such a stone, although the archaeological survey makes no mention of it.



Figure 59. General view of homeless encampment utilizing site features to anchor tents and tarps, view to southeast



Figure 60. General view of homeless encampment utilizing site features to anchor tents and tarps, view to south

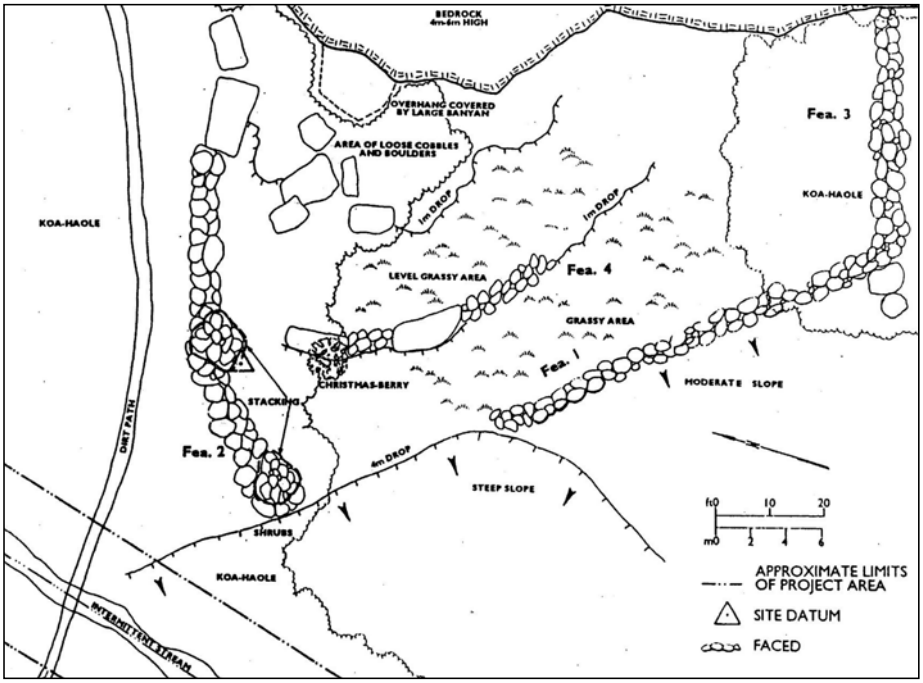


Figure 62. Sketch of Site 5463 (Rosendahl 1996:22)



Figure 61. General view of current site conditions; note the entirety of the cultural site covered by tents and tarps, view to south

The preservation committee elaborated on how the area surrounding Site 5463 is culturally significant in several ways. The ridge of Wa‘ahila is a *wao nahele* (upland forest zone) close to the city for gathering and other cultural activities. The ridge is also associated with one of the early gods—Kauhi, whose form can be seen along the ridgeline from Mānoa. This *wahi pana* of Kauhi makes the ridge, to some degree, a *wao akua* (abode of the gods), according to the preservation committee. In addition to the preservation committee's comments regarding the significance of the area surrounding Site 5463, Wa‘ahila is also remembered as the route Queen Lili‘uokalani's supporters took in a last stand effort, to protest the overthrow of the Hawaiian Monarchy. In a 1997 letter to the editor published in the *Honolulu Star-Bulletin*, a Ms. Thalya De Mott recounts the historical significance of the Wa‘ahila area:

> Regarding the June 16 Star-Bulletin editorial which followed the announcement that Wa‘ahila Ridge qualifies as one of our country's most endangered historic places, it is not such a 'puzzle' that it deserves this designation.
>
> If you read chapter six of the book, 'Manoa, The Story of a Valley,' you will learn about 'The Rebellion of 1895.' After the overthrow of Queen Lili‘uokalani and the Hawaiian monarchy, a group of the queen's loyalists created a revolt against the new government. Outnumbered but determined, these men were forced to retreat into the mountains when their supplies and ammunition ran low.
>
> The 50 remaining men climbed through the pass over Wa‘ahila Ridge and into Mānoa Valley, where they fought in a final effort.
>
> The rebellion was a turning point in Hawai‘i's history when the queen's loyal subjects fought for and lost their attempt to restore the crown.
>
> This ridge area—connecting Mānoa and Pālolo valleys, which took part in the monarchy's 'last stand'—is also where Hawaiian Electric now proposes to install its high electrical towers.
>
> For these reasons, Wa‘ahila Ridge has great historic significance, and its desecration might be considered a serious affront to native Hawaiians. [De Mott 1997]

Mr. Becket also remarked on the general lack of interest from groups or organizations to clean and restore the site. He noted that although knowledge of the traditional function of the site has been lost, cultural activities should still occur at the site. He mentioned the traditional importance of ceremonial drumming at *heiau*. Drumming remains an important cultural practice, just as it was in ancient days:

> […] the sharkskin drum was brought to Hawai‘i from Tahiti 'sounding over the oceans' by La‘amaikahiki sometime around A.D. 1250. The *pahu,* as it is also known in Tahiti and other parts of central Polynesia, was the instrument of *ali‘i* (chiefs) used in *heiau* (temple) rituals and in *hula kapu* (sacred dance). La‘amaikahiki is credited for the introduction of both the large temple drum, *pahu heiau*, and the smaller dance drums, *pahu hula.* [Office of Folklife Programs, Smithsonian Institution 1989]

Pahu heiau were traditionally used by *kahuna* to "signal the activities of complex ceremonies, significant events such as the births of chiefs, and to accompany the prayers and movements of *kahuna* and *ali‘i*" (Office of Folklife Programs, Smithsonian Institution 1989). Prayers (identified as "composed, memorized, handed-down chants" by Pukui et al. 1972:123): "for public ceremonies and in high *ali‘i* circles […] were often accompanied by sacrifices to the gods, embellished by ritual, [or] enhanced by the beat of the *pahu* (prayer drum) […]" (Pukui et al. 1972:123). Mr. Becket also recalled reading within Thrum's Hawaiian Annual the practice of drumming on nights of Kāne. Thrum often made mention of drumming occurring at *heiau* throughout the Hawaiian Islands, especially on nights of Kāne, but also known to occur on nights of Kū and Lono as well. Mr. Becket suggested and advocated for the revival of this cultural practice at the site. Mr. Becket stated no other concerns regarding the current project.

6.4.4 Summary of Andrea Feeser Interview

CSH interviewed Andrea Feeser, former professor at the University of Hawai‘i (UH) at Mānoa and co-author of *Waikīkī: A History of Forgetting and Remembering*, on 14 April 2016. The interview was conducted over the telephone, as Ms. Andrea Feeser currently lives in South Carolina, employed as a professor of modern and contemporary art history, theory, and criticism at Clemson University. Information from the interview is summarized below.

Ms. Feeser was born in Zama, Japan just outside of Tokyo, to Robert Feeser from Pennsylvania and Elaine Baltzer from New York. She discussed with CSH how she came to live and work in Hawai‘i, and why she was particularly drawn to the history of Waikīkī. According to Ms. Feeser, "I got my first tenure track job at the University of Hawaii at Mānoa, that's what brought me to the islands." Regarding her interest in Waikīkī and the Ala Wai Canal, Ms. Feeser discussed the many individuals and social issues that inspired her initial interest and later research:

> My colleague and friend Gaye Chan, with whom I did the work, and now is the chair of the art department at UH, she and I became good friends and collaborators, and since I was new to the islands and really had no understanding of its complex history and how that was affecting current circumstances, we talked a lot together [about these issues]. And I suppose because she came to Hawai‘i as a child of folks leaving China or Hong Kong at a time of conflict, she herself also was somebody who didn't have immediate or long standing roots. So one of the things we did was explore Waikīkī as a way of understanding how the place that we were living near, had been so dramatically impacted by things from outside of it, much as we were. You know we saw ourselves as outsiders that were yet present and in there, and we're both very interested in and critical of colonialism and capitalism, and how both historically, and presently have dramatically changed people and places. So through that lens, we spent a lot of time looking at and thinking about Waikīkī together. Since I research contemporary art, and she's a contemporary artist, it became a way for us to process what we were learning [about the area] and put it into some sort of shape that we can share with other people.

Ms. Feeser elaborated on learning and writing about Waikīkī and the Ala Wai Canal's complicated history. She touched upon the cultural entanglements that occur when an "outsider" begins to learn of, and connect with individuals who have been affected by "colonialism and capitalism" and subsequently enculturated within a post-colonial world:

> One of the first things I experienced coming to Hawai‘i was becoming an ethnic minority. I’ve had that experience once before, right after college I went to live and work in Japan for awhile and it was a really important experience to have had been, and to have also had in Hawai‘i. As a white woman coming from comfortable economic circumstances, I’ve never really had to reflect on my place, it was just sort of oh yeah the world is here for me to experience on my own terms, and obviously living in Japan, and then Hawai‘i made me take up a really critical relationship to that way of thinking and taught me a kind of humility that I think enabled me then to not react to a lot of the criticisms of outsiders in Hawai‘i, not to react in these sort of knee jerk ways, like oh I can’t handle that kind of criticism, how can you, you know, look at me, and think of me, and talk about me in these ways. I wanted to be really open and the beautiful thing about that is, you know, my students. Because, you know, right from the beginning and throughout the six years I was privileged to live and work in Hawai‘i, they [students] were my best teachers. And so I felt that through them, and then through the work that Gaye and I did along with many, many other people on this project, welcomed me into a place that I’ll always be an outsider in relation to, but gave me a kind of closeness to look at history and try and represent it in a way that I hope, in some small way, pays tribute to the people and the place [Waikīkī].

Ms. Feeser emphasized the people of Waikīkī, especially those who had been born, lived, worked, and eventually died within that *ahupua‘a*. To connect CSH with the stories of these individuals, and to aid in the research of the Ala Wai area, Ms. Feeser created a list of resources and notes; she clarified, “I emailed you notes that I felt were relevant to the section of Waikīkī that you directed me to. You’ll have that as a kind of summary of what I think I can offer.”

CSH inquired of Ms. Feeser the reasoning behind the particular stylistic approach she took for her book, *Waikīkī: A History of Forgetting and Remembering*, specifically, why some text was printed in blue and other portions of text printed in black. Ms. Feeser clarified,

> […] all of the blue text has to do with water, and just like water, you know the water that was mostly drained from Waikīkī with the canal, even though a lot of it is mostly gone, a lot of it still bubbles up often in unexpected places. So I wanted the sort of typical text we see in books to be some way interrupted by language that had to do with water. So for me it was visual metaphor to give the water a kind of voice in the writing.

In discussing the unexpected way water still bubbles up in locations throughout the *ahupua‘a* of Waikīkī, Ms. Feeser made special note of “a remnant of Pi‘inaio Stream run[ning] beneath Dori Apartments, [at] 443 Kuamo‘o Street.” She directed CSH to look at Veneeta Acson’s book *Waikiki: Nine Walks through Time*, to learn more regarding the underground flow of water, and how such water, in a few locations, still manages to *kikī* (to spout forth). Per Ms. Feeser’s request, CSH examined the Acson resource and learned that the Pi‘inaio was responsible for the creation of the “muddy delta” area of Kālia, allowing for an environment perfectly suited for *loko i‘a* (fishpond) and *lo‘i kalo* (taro patch) (Acson 2003:16, 27). According to Acson, the current Makiki Stream “most likely follows the flow of the ancient Pi‘inaio Stream” (2003:28). In terms of natural resources, Ms. Feeser also notes in her book that from the Ala Wai Canal, if one were to look

mauka, they would see the original mountain watershed, as well as the three main valleys of Makiki, Mānoa, and Pālolo. The Pi‘inaio, ‘Āpuakēhau, and Ku‘ekaunahi originated from these valleys; these three streams, in turn, were responsible for feeding all of Waikīkī. Although Ms. Feeser noted that these three streams have been radically altered and diminished due to the construction of the Ala Wai Canal, she mentioned that a remnant of Ku‘ekaunahi may exist directly across Wai Nani Way, a small portion of ‘Āpuakēhau may flow alongside the canal between the streets of Paoakalani and Ka‘iulani, and a portion of Pi‘inaio currently runs under a condominium along Kuamo‘o Street (Feeser and Chan 2006:26).

Ms. Feeser also highlighted that the planned removal of water from the area precipitated the removal of the very people who lived and worked on those Waikīkī lands. The portion of Waikīkī that the Ala Wai Canal currently transects was originally a large expanse of marshland. This marshy area was converted by Hawaiian, Japanese, and Chinese farmers into either rice and taro patches, or fish and duck ponds. Ms. Feeser directed CSH to a thesis paper written by Barry Seichi Nakamura in which he devotes a portion of the paper to describing the historic population and landscape of the Ala Wai area. Nakamura obtained a firsthand account of the area by a Mr. Clinton G. Ballentyne, who wrote: “passing through an algaroba grove beneath which the cattle are feeding, speeds across the great rice fields and duck ponds of the Chinese, and here you see the thousands of ducks swimming about in canals between tongues of land that are planted in bananas, and here too are the ponds in which these industrious Chinese raise the thousands of mullets that are sold daily in the market. Everything is utilized-water for raising fish, for duck ponds, and for edible frogs, and the land, every inch of it out of water, for intense cultivation (Nakamura 1979).

Ms. Feeser’s own research was most affected by the stories of the people who lived in the vicinity of the project area. Ms. Feeser begins her chapter on the Ala Wai Canal (within her book *Waikīkī: A History of Forgetting and Remembering)* with an *‘ōlelo no‘eau,* or proverb intended to impart traditional Hawaiian “aesthetic, historic, and educational values” (Pukui 1983:vii). The proverb comes from Mary Kawena Pukui within her publication of *‘Ōlelo No‘eau*; the proverb “*Inā e lepo ke kumu wai, e hō‘ea ana ka lepo i kai*,” translates as “If the source of the water is dirty, the muddy water will travel on” (Feeser and Chan 2006:25; Pukui 1983:134). This *‘ōlelo no‘eau* warns that “where there is evil at the source, the evil travels on” (Feeser and Chan 2006:25; Pukui 1983:134). According to Ms. Feeser, the *‘ōlelo no‘eau* used at the beginning of her discussion of the Ala Wai Canal “literally and figuratively describes the work of the Ala Wai Canal: it destroyed wetlands, lives from Waikīkī flatlands to the shore, and now collects toxins and trash and channels them into the sea” (Feeser and Chan 2006:37). She added that “the Ala Wai is the mark on the land - indeed the scar on the *‘āina* – responsible for creating the Waikīkī we know today” (Feeser and Chan 2006:25). She made special note of the individuals, Walter F. Dillingham, Lucius E. Pinkham, and Sanford B. Dole who were largely responsible for the reclamation project, in addition to discussing the individuals and families, Native Hawaiian, Japanese, and Chinese alike, whose lives were severely impacted by the reclamation project. Regarding those responsible, Ms. Feeser wrote,

> […] the [reclamation] enterprise was a gigantic business deal orchestrated largely by two men, Dillingham and Lucius E. Pinkham, the groundwork for reclamation was laid by Sanford B. Dole’s republic, which stole Hawai‘i’s government from the Hawaiian monarchy in 1893.

Upon noting that Waikīkī “was a thriving site of agriculture and aquaculture” (Feeser and Chan 2006: 25), she went on to elaborate that the area of the Ala Wai and its surrounding environs were “carefully tended by Native Hawaiians and by Asian immigrants who often first worked in Hawai‘i as contract labor” (Feeser and Chan 2006:25). Ms. Feeser devotes a portion of her chapter to describing the impacts of the Ala Wai Canal construction on these very families. Besides noting impacts upon the numerous *mahi‘ai* (farmers) and their families, Ms. Feeser goes on to share that “the waters of Waikīkī are not completely buried under fabricated land, a concrete jungle, and the false advertising that represents today’s Waikīkī as a “natural” paradise. They live on” (Feeser and Chan 2006:25).

She commented that, when she researched the book, she tried to thank every single person who shared their *mana‘o* with her, or from whom she had collected information from their writing. She also commented that she could not remember an instance where she had not used any information or *mo‘olelo* shared with her, and thus her book was fairly complete in those regards. Ms. Feeser also informed CSH that Barry Nakamura’s thesis paper on the Waikīkī reclamation project is one of the best resources available. She added that there also exists a paper by Harlan Lee discussing reclamation. That resource was particularly noteworthy because of the hand drawn maps that were included within the paper. She shared that one of the things she can still see in her mind is the map Harlan Lee drew of his father’s farm, as well as maps of the neighbor’s farms, that had been seized during the Waikīkī reclamation project. She noted that she wasn’t sure if these farms had been located within the current project area, but suggested that these maps may yield additional information pertinent to the current project.

Regarding burials, Ms. Feeser informed CSH that the Paia *‘ohana* may have lived in the vicinity of the project area, and “buried ancestors (chiefs) on the property taken from them.” She directed CSH to read Helen Geracimos Chapin’s *The Role of Newspapers in Hawai‘i*; upon conducting the research requested by Ms. Feeser, CSH learned that the growth of the tourism industry in the nineteenth century spurred the many fill episodes marking the “reclamation” of Waikīkī.

The area of Waikīkī was heavily marketed as a top travel destination throughout the nineteenth century, with many English language newspapers in the islands commenting that the area was known as the favored residence of *ali‘i* due to its “beauty of coconut groves, white sand beaches, gentle breezes, and temperate waters” (Chapin 1996:148). To lay the foundation for a then tender tourist trade, the reclamation of the Waikīkī marshland had to begin in earnest. However, land (intended for reclamation) was owned by either Hawaiian families on *kuleana* parcels or Chinese and Japanese farmers (Chapin 1996:148-149). Land was seized, and tenants were removed as the reclamation of Waikīkī moved forward. However, one Hawaiian family remained on their *kuleana* tract until 1924. Chapin details:

> […] the newspapers featured the last Hawaiian family on a *kuleana* grant as they were about to be moved from their old wooden home so that it could be razed and the [Ala Wai] canal completed. The Paias had been forced to sell their one-acre tract for $3,012 to the territory. The *Advertiser* reported that Mrs. Paia was reluctant to leave ‘until the dredge was literally at their door.’ Not only the living, but the dead were in the way as well. Mrs. Paia’s ancestors, Chief Kamuali‘i and Kaaikuala, were buried there: ‘Bones of a Hawaiian Chief Reverently Exhumed for Improvement in Waikiki.’ [*Advertiser,* 16 April 1924; Chapin 1996:149–151]

Ms. Feeser also voiced her own strong feelings regarding the proper handling of burials and documentation of historic properties should they be uncovered:

> I think it’s really evident in a number of texts that I point to that capture voices of people who once lived there and who buried their families there. So in the email that I sent to you specifically, the Paia family who buried a lot of their ancestors there, and the work done by other archaeologists and anthropologists who found burials and the work that they did, and I always thought about this, I’ve always had sort of strong feelings about how we have remains of people who came before us, and not only the remains of the way they marked their lives for us, the things they have done, but through their actual remains. I just find it overwhelming that those remains are not respected… I think one of the things I point to, and maybe ask people to be aware of is how many remains are still in Waikīkī, and maybe not just human remains but also the remains of *heiau* and the remains of other structures like some of the agricultural spaces that were formed for fishponds, and so forth. And I just think they are important and need to be documented, and handled carefully, and incredibly respectfully when they are uncovered, and obviously involve those who have a very personal and close connection to those remains human and otherwise.

CSH discussed with Ms. Feeser the role of cultural monitoring alongside archaeological monitoring, and how such work allows for the following of specific protocol should an inadvertent discovery of human remains or cultural material occur. Mrs. Feeser replied that the inclusion of cultural and/or lineal descendants, and the following of cultural protocol (informed by consultation with those individuals who have a “personal and close connection” to *iwi kūpuna*, cultural material, and/or Waikīkī) was “great” and “wonderful.” Ms. Feeser recommended, during project construction, individuals be aware of the number of burials, in addition to being aware of possible remains of *heiau*, fishponds, and any other historically significant structures. Should burials and/or historic features be uncovered, she recommended that those “remains” “be documented,” “handled carefully, and incredibly respectfully.”

6.5 Summary of *Kama‘āina* Interviews

Based on Mrs. Paulette Ka‘anohi Kaleikini’s email correspondence, and Mrs. Barbara Makua’s, Mr. Jan Becket’s, and Ms. Andrea Feeser’s reviewed and approved summaries, the following is a synthesis of findings within Waikīkī Ahupua‘a.

Paulette Ka‘anohi Kaleikini and her *‘ohana* are cultural descendants of Waikīkī Ahupua‘a. As current owner of ‘Ōiwi Cultural Resources, Mrs. Paulette Ka‘anohi Kaleikini, her *‘ohana*, and employees have worked in the field with CSH on numerous projects within Waikīkī and Kaka‘ako. ‘Ōiwi Cultural Resources worked with CSH on the AIS component for the current project.

Mrs. Paulette Ka‘anohi Kaleikini shared with CSH the history of Waikīkī, specifically the area of the Ala Wai where the current project are is located; she discussed how the project area was once utilized during pre-Contact times. According to Paulette Ka‘anohi Kaleikini the project area was considered “one [large] land mass.” She noted that the area was inhabited by “many natives;”this was largely attributable to the fact that the Waikīkī “lands were fertile and water ran through it.” The “water” discussed by Mrs. Paulette Ka‘anohi Kaleikini was ubiquitous throughout

the *ahupua‘*a, undoubtedly influencing its Hawaiian name, literally translated as “water spurting from many sources,” (Kanahele 1995:8). Mrs. Paulette Ka‘anohi Kaleikini also made note that “in the ancient times, where they lived, is usually where they died and was buried.” She pointed out to CSH that “traces of their lives” might very well be intact in pockets of Waikīkī land still, as of yet, undisturbed by construction and development. CSH made special note of her comment that pre-contact *iwi kūpuna* have been inadvertently discovered during roadwork “a little *mauka*” of the project area, she added that additional sets of human remains had been found towards the Diamond Head direction of the project area. Mrs. Paulette Ka‘anohi concluded that the presence of *iwi kūpuna* within the vicinity of the project area is “evidence that natives lived in the area of the project.”

Mrs. Paulette Ka‘anohi Kaleikini reiterated her connection to the *ahupua‘a* of Waikīkī. The Great Māhele, commonly understood as the division of Hawaiian lands that thereby introduced the concept of private property into Hawaiian society, resulted in lands being “given by the King to natives.” These gifted lands were “inhabited by the *‘ohana*,” lovingly cared for, and stewarded by families “until the islands were occupied by the United States and the lands were stolen from them.” Mrs. Paulette Ka‘anohi Kaleikini noted that some of her *kūpuna* were the ones who had lived and worked on those lands, prior to them being stolen. She clarified that most of the lands in Waikīkī, were given by the King to his relatives and other members of their extended *‘ohana*. CSH inquired if Mrs. Paulette Ka‘anohi Kaleikini would be able to commit to a site visit; due to her busy schedule she was unable to schedule a formal site visit with CSH. However, she restated to CSH that she is concerned for the entire Waikīkī Ahupua‘a because the “area [was] where thousands of Native Hawaiians lived. [There is] proof in all the human remains that have been found and most of them disturbed by [the] development of Waikīkī.

Mrs. Makua recalled living at various locations across Waikīkī Kai and Waikīkī Waena. Mrs. Makua currently lives in an apartment building right off the Ala Wai Boulevard. Originally from Portland, Oregon, Mrs. Makua arrived on O‘ahu in 1956 for government work as a “medical technologist.” Mrs. Makua noted that she first lived in Waikīkī and stayed for a time at the Hawaiiana Hotel on Beachwalk. The Hawaiiana Hotel was originally situated between the original Halekūlani Hotel and the Reef Hotel. A short distance from her hotel was the illustrious beach front of Waikīkī. Describing herself as an avid “water woman,” Mrs. Makua made a point of inquiring about beach services. Her inquiry resulted in her meeting with “a female Hawaiian;” this young woman soon befriended Mrs. Makua. Due to this newfound friendship Mrs. Makua soon found herself invited to parties at the young woman’s home in Papakōlea. During one of these gatherings, Mrs. Makua met the young woman’s brother, the legendary beach boy Blue Makua. Following a period of courtship, Blue Makua and Mrs. Barbara Makua were married.

As the wife of beach boy Blue, Mrs. Makua was intimately involved with the Hawaiian watersports revival. As both *kupuna*, and longtime resident of Waikīkī, Mrs. Makua recounted stories from the “golden era of Waikīkī,” with descriptions of *hoe wa‘a*, *he‘e nalu*, and *pana*. CSH made particular note of a little known fact that the old boundaries of Waikīkī (during the mid-twentieth century) originally only encompassed the area from the Moana Hotel (currently the Moana Surfrider) to the Royal Hawaiian Hotel (historically known as the area of Helumoa). Mrs Makua related a story regarding the heavily guarded borders of Waikīkī whereby her husband Blue, upon catching the famed singer Kui Lee sneaking “over the wall” into Waikīkī, promptly threw him out. According to Mrs. Makua, “Blue used to kick him back over the wall because he’d

come into ‘Waikīkī,’ and he wasn’t one of the beach boys.” Mrs. Makua also recalled many of the younger beach boys living in bungalows near Ala Wai Boulevard: “Zulu lived around the corner on the Ala Wai [Boulevard] and Kaiulani.”

Mrs. Makua also made particular note of the historic standing buildings of Waikīkī. Her recollections of historic standing buildings included a discussion of the Roselei Apartments (named after famed Waikīkī singer Rosalie Stephenson). It was clarified to CSH that the Rosalei Apartments were named after Mrs. Rosalie Stephenson, despite the variation of the spelling. The Rosalei apartment building, located at 445 Kai‘olu Street, was not only Waikīkī’s first high-rise apartment building but one of its tallest (*Honolulu Star-Bulletin* 1953;1; Mason Architects, Inc. 2004). While discussing the Rosalei Apartments, Mrs. Makua described to CSH an occasion where she had attended a performance Mrs. Rosalie Stephenson, listening to a particularly moving rendition of the Hawaiian Wedding Song or *Ke Kali Nei Au*. Mrs. Makua commented that the Roselei Apartments, named after Mrs. Rosalie Stephenson, is one of the last vestiges of old Waikīkī still visible along the Ala Wai Canal.

A formal sit down interview was conducted with Mrs. Makua on 4 February 2016 at a Zippy’s Restaurant in Honolulu. She reiterated her long time connection to Waikīkī, telling CSH she had once lived at the end of the Ala Wai Canal, at an apartment building called the Ala Wai Terrace. From this apartment, she was afforded views of the Ala Wai Canal area. In particular, she remembered that fishing berms had once extended about 6 feet into the canal. These fisherman’s berms, however, disappeared over the decades. When questioned if she or her family had used the canal for recreation or traditional cultural practices, Mrs. Makua commented that they never went swimming in the canal, but they used to catch Samoan crab from the canal bridges. She also shared that she and her *‘ohana* would occasionally sail from the Ala Wai Boat Harbor area, and head towards Diamond Head, up the canal. Mrs. Makua also discussed the romanticization of the Ala Wai Canal. She herself had imagined a kind of “Venice of the Pacific,” but found nothing of the sort upon her arrival to Waikīkī.

Mrs. Makua mentioned on several occasions how her father had purchased an apartment along the Ala Wai Canal (Mrs. Makua currently resides in this apartment). From this apartment it was once possible to view Diamond Head. She quickly added that currently the unobstructed views of Diamond Head no longer exist. While currently unable to view Diamond Head, Mrs. Makua’s apartment still affords views of the Ala Wai Canal and surrounding area. Over the years she has made regular observations of canal water quality and canal debris. She commented that on some occasions she has seen animal carcasses flow down the canal by way of the Mānoa-Pālolo Drainage Canal. Mrs. Makua recommended that some form of restoration occur in the Ala Wai Canal area as to encourage the return of healthy flora and fauna to the environment.

Mr. Jan Becket, a former Kamehameha Schools teacher (with 28 years dedicated to teaching at the institution), is knowledgable about various pre-Contact sites throughout the Kona District of O‘ahu. Mr. Becket led CSH on a *huaka‘i* to inspect a significant cultural site located on Wa‘ahila Ridge within the Ahupua‘a of Waikīkī. The *huaka‘i* included visual inspection and photographic documentation of the site. The site was located off the southwest Wa‘ahila Ridge State Recreation Park trail. To reach the site, CSH and Mr. Becket crossed over a series of either intermittent or ephemeral streams. At the time of the *huaka‘i*, all encountered streams were dry. The dry condition of the streams was attributed to the 2015-2016 *El Nino* cycle that resulted in “record-breaking low

rainfall totals” for the Hawaiian Islands as a whole (NOAA 2016). CSH briefly discussed with Mr. Becket the types of surface water resources in the Wa‘ahila area. Mr. Becket suggested that these intermittent streams possibly are associated with the Ala Wai watershed. Mr. Becket also commented that he had previously brought Mrs. Karen Ah Mai, the Executive Director of the Ala Wai Watershed Association to the site, due to the location of the cultural feature within the mountain watershed area. Moreover, “the surface- water resources of Hawaii,” such as those observed and crossed during the *huaka‘i*, are considered to be economically, ecologically, culturally, and aestheticallysignifcant (Oki n.d.).

Upon reaching the site with Mr. Becket, CSH noted that the site faces *makai* and would have commanded a view over the current project area (were it not for the heavy overgrowth of invasive vegetation). Mr. Becket noted that when he had last visited the site it was composed of two small terraces built upon natural rock, with a prominent *po‘o pōhaku*, and area of loose cobbles and boulders. Mr. Becket also noted that during a prior visit to the site with Mr. Shad Kāne (former member of the O’ahu Island Burial Council), it was suggested that burials may possibly exist in the general vicinity of the site as well. During the *huaka‘i* visibility and inspection was limited due to the safety and health factors. The finding of a homeless encampment within the cultural site generated a concern from both CSH and Mr. Becket regarding health and safety. This homeless encampment spanned the entire site, covering walls and terraces, and obscuring the view of the *po‘o pōhaku*.

Upon observing the poor condition of the site, Mr. Becket was prompted to recount the numerous threats facing the site. In particular, he discussed with CSH an incident that had occurred approximately ten years prior where mountain bikers had dismantled the site to construct a ramp, allowing them to jump their bikes off the stacked basalt terraces. Mr. Becket helped inform the State of the site’s ongoing destruction by bikers, with his action resulting in the closing of the Wa‘ahila Ridge State Recreational Park trails to bikers.

Mr. Becket also discussed previous archaeological studies conducted at the site. He made reference to a 1996 Paul Rosendahl AIS report. Rosendahl (1996:22) designated the cultural site as a historic property, labeling it as Site 5463. Regarding the function of the site, Rosendahl stated that the historic property is “an area used for agriculture, with some potential for containing habitation features” likely associated with pre-Contact activity.

Mr. Becket voiced his disagreement with Rosendahl’s interpretation of the site, and guided CSH to a document created by the Committee for the Preservation of Cultural Sites and Properties, under the O‘ahu Council of Hawaiian Civic Clubs, where Rosendahl’s interpretation was challenged. The commitee attested to, and provided evidence for Site 5463 possibly being a *heiau*.

Mr. Becket lamented on the general lack of interest from groups or organizations to clean, restore, and maintain the site. He suggested that the possible lack of interest may be attributable to the fact that knowledge of the traditional function of the site has been lost. Although knowledge regarding traditional function has been lost, he still believed that cultural activities such as ceremonial drumming should be brought back to the site.

Ms. Andrea Feeser, former professor at the University of Hawai‘i (UH) at Mānoa and co-author of *Waikīkī: A History of Forgetting and Remembering*, recalled how she came to live and work in Hawai‘i, and why the history of Waikīkī stood out prominently as a lesson of the effects of colonialism and capitalism within the islands. According to Ms. Feeser, “I got my first tenure track

job at the University of Hawaii at Mānoa, that’s what brought me to the islands.” The complicated socio-political history of the islands especially piqued her interest; she believed Waikīkī and the Ala Wai Canal, perfectly exemplified this history. Additionally, as the neighborhood of Waikīkī became her new home, she felt even more compelled to share aspects of its history that have been mostly forgotten over the years. She noted,

> […] so one of the things we did was explore Waikīkī as a way of understanding how the place that we were living near, had been so dramatically impacted by things from outside of it, much as we were. You know we saw ourselves as outsiders that were yet present and in there, and we’re both very interested in and critical of colonialism and capitalism, and how both historically, and presently have dramatically changed people and places.

While discussing her book and research into Waikīkī, Ms. Feeser made it clear to CSH that her emphasis was on the people of Waikīkī, especially those who had been born, lived and worked, and eventually died within that *ahupua‘a*. In particular, she shared stories that highlighted Waikīkī’s importance to *kama‘āina* as “a thriving site of agriculture and aquaculture” (Feeser and Chan 2006: 25). She highlighted how the current project area was “carefully tended by Native Hawaiians and by Asian immigrants who often first worked in Hawai‘i as contract labor” (Feeser and Chan 2006:25). She also discussed with a paper by Harlan Lee that expressly dealt with the Waikīkī reclamation process. That resource stood out prominently in her mind’s eye as she could still remember the map that Harlan Lee had drawn of his father’s farm, as well as maps of the neighbor’s farms, that had been seized during the Waikīkī reclamation project. She noted that she wasn’t sure if these farms had been located within the current project area, but suggested that these maps may yield additional information pertinent to the current project.

Ms. Feeser also discussed with CSH the possibility of finding burials during the project. She informed CSH that the Paia *‘ohana* may have lived in the vicinity of the project area, and “buried ancestors (chiefs) on the property taken from them.” Ms. Feeser maintained very strong opinions regarding the proper handling and documentation of burials and historic properties (should they be uncovered). CSH made careful note of her concerns:

> I think it’s really evident in a number of texts that I point to that capture voices of people who once lived there and who buried their families there . . . the Paia family who buried a lot of their ancestors there [either in the project area or in the vicinity of the project area], and the work done by other archaeologists and anthropologists who found burials and the work that they did, and I always thought about this, I’ve always had sort of strong feelings about how we have remains of people who came before us, and not only the remains of the way they marked their lives for us, the things they have done, but through their actual remains. I just find it overwhelming that those remains are not respected… I think one of the things I point to, and maybe ask people to be aware of is how many remains are still in Waikīkī, and maybe not just human remains but also the remains of *heiau* and the remains of other structures like some of the agricultural spaces that were formed for fishponds, and so forth. And I just think they are important and need to be documented, and handled carefully, and incredibly respectfully when they are uncovered, and obviously

> involve those who have a very personal and close connection to those remains human and otherwise.

CSH explained the role of cultural monitoring to Ms. Feeser and how such work allows for the following of specific protocol should an inadvertent discovery of human remains or cultural material occur. Mrs. Feeser replied that the inclusion of cultural and/or lineal descendants, and the following of cultural protocol was “great” and “wonderful.” Ms. Feeser concluded with a recommendation that during project construction, individuals (such as archaeologists and construction workers) be aware of the number of burials, in addition to being aware of possible remains of *heiau*, fishponds, and any other historically significant structures. Should burials and/or historic features be uncovered, she additionally recommended that those “remains” “be documented,” “handled carefully, and incredibly respectfully.”

Section 7 Traditional Cultural Practices

Timothy R. Pauketat succinctly describes the importance of traditions, especially in regards to the active manifestation of one’s culture or aspects thereof. According to Pauketat,

> People have always had traditions, practiced traditions, resisted traditions, or created traditions . . . Power, plurality, and human agency are all a part of how traditions come about. Traditions do not simply exist without people and their struggles involved every step of the way. [Pauketat 2001:1]

It is understood that traditional practices are developed within the group, in this case, within the Hawaiian culture. These traditions are meant to mark or represent aspects of Hawaiian culture that have been practiced since ancient times. As with most human constructs, traditions are evolving and prone to change resulting from multiple influences, including modernization as well as other cultures. It is well known that within Hawai‘i, a “broader “local” multicultural perspective exists” (Kawelu 2015:3) While this “local” multicultural culture is deservedly celebrated, it must be noted that it has often come into contact with “traditional Hawaiian culture.” This contact between cultures and traditions has undoubtedly resulted in numerous cultural entanglements. These cultural entanglements have prompted questions regarding the legitimacy of newly evolved traditional practices. The influences of “local” culture are well noted throughout this section, and understood to represent survivance or “the active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry” (Vizenor 1999:vii). Acknowledgement of these “local” influences help to inform nuanced understandings of entanglement and of a “living [Hawaiian] contemporary culture” (Kawelu 2015:3). This section strives to articulate traditional Hawaiian cultural practices as were practiced within the *ahupua‘a* in ancient times, and the aspects of these traditional practices that continue to be practiced today; however, this section also challenges “tropes of authenticity,” (Cipolla 2013) and acknowledges the multicultural influences and entanglements that may “change” or “create” a tradition.

This section integrates information from Sections 3-6 in examining cultural resources and practices identified within or in proximity of the project area in the broader context of the encompassing Waikīkī landscape. Excerpts from interviews are incorporated throughout this section where applicable.

7.1 Gathering of Plant and Food Resources

Located near the southeastern coast of O‘ahu and extending *mauka* towards the Ko‘olau Mountain Range, the Ahupua‘a of Waikīkī traditionally was a center of chiefly residence, in addition to being a center of agricultural and aquacultural activities. Historic documents from the late eighteenth century are amongst the first written observations of the Waikīkī environment; included in these observations are notes on the area’s agricultural and aquacultural practices. Captain George Vancouver, arriving at “Whyteete” in 1792, described the area in detail. His written observations provide key insight into the types of resource extraction occurring in Waikīkī during the early post-Contact period. He noted numerous, large villages, in “good repair” situated in an extremely fecund area. This area was “interspersed with deep, though not extensive valleys;

which, with the plains near the sea-side, presented a high degree of cultivation and fertility" (Vancouver 1798:161). He continued with his observations, describing *lo‘i kalo* and *kula* (fields):

> [Our] guides led us to the northward through the village, to an exceedingly well-made causeway, about twelve feet broad, with a ditch on each side.
>
> This opened our view to a spacious plain, which, in the immediate vicinity of the village, had the appearance of the open common fields in England; but, on advancing, the major part appeared to be divided into fields of irregular shape and figure, which were separated from each other by low stone walls, and were in a very high state of cultivation. These several portions of land were planted with the eddo or taro root, in different stages of inundation; none being perfectly dry, and some from three to six or seven inches under water. The causeway led us near a mile from the beach, at the end of which was the water we were in quest of. It was a rivulet five or six feet wide, and about two or three feet deep, well banked up, and nearly motionless; some small rills only, finding a passage through the dams that checked the sluggish stream, by which a constant supply was afforded to the taro plantations [Vancouver 1798:161–164].

The area was also noted for its aquaculture, specifically the raising of *kōloa* (native duck), and *i‘a* (fish). Archibald Menzies (1920), a naturalist accompanying Vancouver's expedition also noted the numerous types of vegetation being collected as food resource. These edible plant foods (besides the aforementioned "eddo or taro root") included yams, *‘uala* and *kapa* (identified by Menzies as the cloth plant). Menzies also noted the cultivation of *kō* (sugar cane) and *kī* on the sloped banks associated with *lo‘i kalo* and *loko i‘a*. Menzies made particular note of the numerous ponds within the Kālia portion of Waikīkī:

> Here and there we met with ponds of considerable size, and besides being well stocked with fish, they swarmed with water fowl of various kinds such as ducks, coots, water hens, bitterns, plovers and curlews. [Menzies 1920:23–24]

The production (and consumption) of *kalo* or taro was vitally important to Waikīkī Ahupua‘a as a whole. Captain James King (1779) noted that "the natives of these islands are, in general, above the middle size and well made; they walk very gracefully, run nimbly and are capable of bearing great fatigue" (Shintani 1993:10). Accordingly, the high level of physical activity and physical fitness described by Captain King was a normal part of Hawaiian life, and largely attributable to the availability of plant and food resources such as *kalo*, yams, *‘uala*, *niu*, *mai‘a* (banana), *‘ōhia ‘ai* (mountain apple), *limu*, and *i‘a*. Besides the observed contributions to stamina and health, *kalo* was also a revered staple food, believed to have derived from the first-born son of Wakea and Papa.

> . . . the supreme god Kane 'in the form of Wakea (a form associated with the earth) produced two sequential offspring: the first became kalo (taro) plant, the second became Hāloa, the ancestor of man . . . thus, in kinship terms, the taro is the elder brother and the senior branch of the family tree, mankind belongs to the junior branch, stemming from the younger brother.' [Trask 2012: 75]

Interviewee Andrea Feeser noted to CSH that Waikīkī "was a thriving site of agriculture and aquaculture" (Feeser and Chan 2006: 25), she described how the area of the Ala Wai and its

surrounding environs were "carefully tended by Native Hawaiians and by Asian immigrants who often first worked in Hawai‘i as contract labor" (Feeser and Chan 2006:25). Ms. Feeser also devoted time to explaining to CSH the impacts of the construction of the Ala Wai Canal upon the numerous *mahi‘ai* and their *‘ohana* living in the surrounding Waikīkī area. Traditional agricultural and land stewardship practices that had endured into the early twentieth century were abruptly ended with the construction of the canal.

Ms. Feeser also shared that "the waters of Waikīkī," once so essential to the cultivation of agricultural and aquacultural resources, "are not completely buried under fabricated land, a concrete jungle, and the false advertising that represents today's Waikīkī as a "natural" paradise. They live on" (Feeser and Chan 2006:25).

7.2 Religious Practice and Burials

Several *heiau* stood in Waikīkī Ahupua‘a including Papa‘ena‘ena Heiau, Kapua Heiau, Kūpalaha Heiau, Helumoa Heiau, Makahuna Heiau, Kamauakapu Heiau, Pahu-a-Maui Heiau, and Kulanihakoi Heiau (Thrum 1905:44–45). In addition to those *heiau* mentioned by Thrum, Samuel Kamakau made note of Halekumukaaha Heiau in Waikīkī (Kamakau n.d. in McAllister 1933:78), Early historic maps by C.J. Lyons (Registered Maps [RM] 726 and 727) depict the location of another *heiau*, not mentioned by either Thrum or Kamakau, known as Ōpūnahā Heiau. Waikīkī was quite notable for *heiau* functioning as *po‘okanaka*. Those *heiau* with *po‘okanaka* (literally translated as "skull") were used ceremoniously for human sacrifices (Stokes 1991:24). While Waikīkī Ahupua‘a was a location for *heiau* dedicated to human sacrifice, it was also a location for healing. Four large *pōhaku*, commonly called Nā Pōhaku ‘Ola Kapaemāhū a Kapuni or the Wizard Stones of Kapaemāhū, also constituted a religious site within Waikīkī (Thrum 1906:139–141).

The Wizard Stones of Kapaemāhū were unearthed in the late 1800s at Ainahau, the private estate of Archibald Cleghorn, and his wife and daughter, the princesses Likelike and Ka‘iulani. *Mo‘olelo* asserts that four soothsayers from the court of a Tahiti king came to Hawai‘i and helped heal many people. Four large stones were collected from Kaimukī, brought to Waikīkī, and erected in the locations of the wizards habitation and bathing places in the sea (Thrum 1906:139–141). The chief of the wizards, Kapaemāhū, named his stone after himself, and a virtuous young chiefess was sacrificed and placed beneath the stone. These *pōhaku* remain visible to this day, and are located at Kūhiō Beach Park (Thrum 1906:139–141).

In Waikīkī, however, a *wahi pana* known as Kawehewehe functioned as a tangible space for healing and the removal of illnesses both *mawaho* and *maloko* in origin. The removal of physical and spiritual illness is implied in this *wahi pana*'s name, as the word "wehe" (in Kawehewehe), translates as "to remove" (Pukui et al. 1974:383). The healing pond of Kawehewehe was located in the vicinity of the current Saratoga Road. The healing beach also known as Kawehewehe was located nearby, in the area fronting the current Halekūlani Hotel. Traditionally the sick were brought to this healing beach area where they would proceed to bathe in the healing waters of the ocean. As part of the healing ritual, the ill would wear *lei* made of *limu kala*, by submerging themselves in the water and releasing the *lei* from their neck, they would also release illness from their body.

Burials have been encountered in the coastal areas, generally within culturally-enriched Jaucas sand sediments. One human burial, SIHP # -4890 is located in the vicinity of the current project

area. This burial was inadvertently discovered during excavation for a water line at the intersection of Kalākaua Avenue and Kuamo‘o Street.

Email correspondence with Mrs. Paulette Ka‘anohi Kaleikini resulted in CSH making note of the presence of burials in the vicinity of the project area. Mrs. Kaleikini stated that, “*iwi kūpuna* was found during road work a little *mauka* and more *iwi* was found towards Diamond Head of this project area.” She added that “thousands of native Hawaiians lived [in the area]…proof [of this] in all the human remains that have been found and most of them disturbed by development of Waikīkī.” Interviewee Andrea Feeser also noted the presence of burials, and recommended that burials, in addition to any associated cultural material, be treated respectfully, following full cultural protocol.

7.3 *He‘e Nalu*

The sport of *he‘e nalu* or surfing was well known at Waikīkī. The reverence of the sport is evidenced by the construction and dedication of Papa‘ena‘ena Heiau (a *po‘okanaka* class *heiau*). This *heiau* consisted of a quadrangular paved terrace approximately 130 by 70 ft with walls on three sides from 6 to 8 ft in height and 8 ft thick at the base, and open on the western side facing the village of Waikīkī (McAllister 1933:74). This *heiau* figured largely in the cultural practice of surfing. The *kahuna* (priest) were in charge of all rites pertaining to surfing and they signaled to the people by flying a kite that the surf was running. As interviewee Andrea Feeser details in her book *Waikīkī: A History of Forgetting and Remembering*,

> The link between surfing and the sacred is evident in the rites associated with Papa‘ena‘ena Heiau on Lē‘ahi, a *heiau* used not only for sacrifice, but as a signal station for fine surfing conditions. [Feeser and Chan 2006:82]

The *mo‘olelo* of Kalamakua and His Romantic Meeting with Keleanuinoho‘ana‘api‘api also attests to the ancient significance of the sport within Waikīkī:

> Kalamakua, who was celebrated for the large taro patches he constructed and maintained at Waikīkī, recognized her as the famous surfer Kelea, a chiefess originally from Maui [Kelea, a chiefess and skilled surfer who entered the waves at Waikīkī]. When she emerged from the waves, he offered her his feathered cape (a sign of high rank) and made her his *ali‘i wahine mō‘ī.* [Feeser and Chan 2006:82]

Following Western contact, surfing declined in Waikīkī. It was not until the beginning of the twentieth century that the sport began experiencing a revival. The emergence of the Waikīkī beachboys fueled the popularity of the ancient sport once more. According to Ms. Feeser,

> Because the first beachboys were both great water sportsmen and world-famous Waikīkī icons, the beachboy phenomenon reflects bothe the strength and beauty of traditional *kanaka maoli* water sports and the spell these “exotic” pursuits cast on *haole* who settled in and visited Hawai‘i. [Feeser and Chan 2006:82]

Inteviewee Mrs. Barbara Makua was the wife of famed beach boy Blue Makua. Mrs. Makua recounted for CSH the “golden age” of Waikīkī, and emphasized the numerous ocean activities that she and the entire Makua *‘ohana* participated in. These traditional ocean activities included *hoe wa‘a*, *he‘e nalu*, and *‘aukai* (swimming). Surfing is still widely practiced throughout the Waikīkī area today by both *kama‘āina* and *malihini* (foreigner or tourists) alike.

Section 8 Summary and Recommendations

CSH undertook this CIA at the request of HECO. The research broadly covered the entire *ahupua‘a* of Waikīkī, including the current project area.

8.1 Results of Background Research

Background research for this study yielded the following results:

1. Waikīkī was comprised of a vast system of irrigated taro fields which spanned from Waikīkī Kai through Waikīkī Waena, and into the valleys of Mānoa. The Waikīkī marshland was an excellent place to grow taro, even better than the revered areas of Kāne‘ohe and Kahalu‘u on the windward side of O‘ahu.
2. The Waikīkī area was full of aquatic resources including hundreds of fishponds that dotted the shoreline of the *ahupua‘a*.
3. Six *heiau* are said to have been associated with the Waikīkī area: Papa‘ena‘ena Heiau, Helumoa Heiau, Kapua Heiau, Kūpalaha Heiau, Kamauakapu Heiau, and Kulanihakoi Heiau (Thrum 1907:44). Thrum also mentions the Wizard Stones of Kapaemāhū at Waikīkī. The Wizard Stones were unearthed in the late 1800s on the premises of the Cleghorn family. According to *mo‘olelo*, four soothsayers from the court of a Tahitian king came to Hawai‘i and helped to heal many people. Four large stones were gathered from the vicinity of a “bell rock” in Kaimukī and erected in Waikīkī to commemorate them–two at their habitation and two at their bathing place in the sea. The chief of the wizards, Kapaemahu, named his stone after himself, and a virtuous young chiefess was sacrificed and placed beneath the stone. Today they are located at Kūhiō Beach Park (Thrum 1907:139–141).
4. During the first part of the twentieth century, Waikīkī evolved into a world tourist destination. Hawaiian Dredging Company, owned by Mr. Dillingham, completed most of the dredging and filling of the non-military section of Waikīkī. Barry Nakamura, in a dissertation paper, presents the cultural context for the change from the Hawaiian viewpoint.
5. The intensive development of the Waikīkī area from the early twentieth century through the early twenty-first century has resulted in an entirely modified landscape in which the original wetlands have been filled in and surfaced with paved asphalt roads, concrete walkways, manicured landscaping, hotels, timeshares, apartments, condominiums, commercial developments, and parks.

8.2 Results of Community Consultations

CSH attempted to contact NHOs, agencies, and community members. Below is a list of individuals who shared their *mana‘o* and *‘ike* about the project area and Waikīkī Ahupua‘a:

1. Paulette Ka‘anohi Kaleikini, cultural descendant and owner of ‘Ōiwi Cultural Resources
2. Barbara Makua, *kupuna* and resident of Waikīkī
3. Jan Becket, author, photographer, and retired teacher from Kamehameha Schools. Kona Moku Representative, Council of Hawaiian Civic Club’s Committee on the Preservation of Historic Sites and Cultural Properties

4. Andrea Feeser, author and researcher of *Waikīkī: A History of Forgetting and Remembering*

8.3 Non-Cultural Community Concerns and Recommendations

Based on information gathered from community consultation, participants voiced the following non-culturally relevant concern.

1. A community recommendation expressed during consultation included the clean up and restoration of the Ala Wai Canal and its associated waterways as to encourage the return of flora and fauna to the Waikīkī area.

8.4 Impacts and Recommendations

Based on information gathered from the cultural and historical background, and the community consultation, potential impacts were identified and the following preliminary recommendations were made.

1. Previous archaeological studies have indicated the presence of two State Inventory of Historic Properties (SIHP # 50-80-14-9757, the Ala Wai Canal and SIHP # -5796, culturally modified wetland sediments) within the current project area. Previous archaeological studies conducted in the vicinity of the current project area have identified four historic properties (SIHP # -4890, an inadvertent burial discovery of at least one individual; SIHP # -6680, ponded field sediment; SIHP # -6407, subsurface cultural layer; and SIHP # -4970, *‘auwai* (channel)) within an approximate 225 to 450-meter radius of the current project area. Additionally, archaeological inventory survey (AIS) fieldwork conducted within the current project area did not encounter *iwi kūpuna* (ancestral bones) despite the fact Waikīkī is known to have burials. Participants have also indicated there is a possibility of *iwi kūpuna* in the vicinity of the project area. During community consultation with Paulette Ka‘anohi Kaleikini and Andrea Feeser, the two interviewees articulated that *iwi kūpuna* and other cultural finds may be present in the vicinity of the project area.
2. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended.
3. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 9 References Cited

Abbott, Isabella Aiona
1992 *La‘au Hawaii: Traditional Hawaiian Use of Plants*. Bishop Museum Press, Honolulu.

Acson, Veneeta
2003 *Waikiki: Nine Walks through Time*. Island Heritage, Honolulu.

Akana, Collette Leimomi with Kiele Gonzalez
2015 *Hānau Ka Ua: Hawaiian Rain Names.* Kamehameha Publishing, Honolulu.

Alameida, Roy Kākulu
1997 *Na Makani o ka Mokupuni.* Hawaiian Studies Institute, Honolulu.

Armstrong, R. Warwick (editor)
1973 *Atlas of Hawai‘i*. University of Hawaii Press, Honolulu.

Ava Konohiki
2015 Ancestral Visions of ‘Āina website. Available online at http://www .avakonohiki.org/.

Baker, Ray Jerome
1910 Photograph of banana fields at Olohana Street. Honolulu.

Becket, Jan and Joseph Singer
1999 *Pana O‘ahu: Sacred Stones, Sacred Land.* University of Hawai‘i Press, Honolulu.

Beckwith, Martha
1940 *Hawaiian Mythology.* Yale University Press, New Haven, Connecticut.
1970 *Hawaiian Mythology.* University of Hawaii Press, Honolulu.

Bishop Museum
1989 *Hawaiian Fishpond Study Islands of O‘ahu, Moloka‘i and Hawai‘i.* Applied Research Group, Bernice Pauahi Bishop Museum, Honolulu.

Bishop Museum Archives
1924 Photograph of Ala Wai Canal floating dredge line. Bishop Museum Archives, Honolulu.
1927 Aerial photograph of completed Ala Wai Canal. Bishop Museum Archives, Honolulu.

Bishop, S.E.
1881 Hawaii Government Survey map. Registered Map 1398. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Bliss, William R.
1873 A Sea-Side Retreat in the Pacific. *Pacific and Commercial Advertiser* 1 February:4.

Bloxam, Andrew
1925 Diary of Andrew Bloxam, Natural of the “Blonde” on her trip from England to the Hawaiian Islands, 1824-25. Special Publication 10, Bernice Pauahi Bishop Museum, Honolulu.

Bolante and Keany
2007 50 Greatest Songs of Hawaii. *Honolulu Magazine.* 1 June 2007. Electronic document, http://www.honolulumagazine.com/Honolulu-Magazine/June-2007/50-Greatest-Songs-of-Hawai-8217i/

Borthwick et al.
2002 *Archaeological Inventory Survey of an Approximately 71,000-sq.ft. Parcel in Waikīkī, Waikīkī Ahupua'a, Kona District, Island of O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Bowen, Robert N.
1961 *Hawaiian Disposal of the Dead*. Unpublished, M.A. Thesis, University of Hawai'i, Honolulu.

Bowers, George M. (U.S. Commission of Fish and Fisheries)
1902 Report of the Commissioner, the Year Ending June 30, 1901, Part XXVII. Government Printing Office, Washington, D.C.

Brown, DeSoto
1989 *Hawai'i Goes to War: Life in Hawai'i from Pearl Harbor to Peace.* Editions Limited, Honolulu.

Bush, Anthony B., John P. Winieski, and Hallett H. Hammatt
2002 *Archaeological Monitoring Report for the Waikīkī Anticrime Lighting Improvement Project Phase II (TMK 2-6-1, 2-6-2, 2-6-3, 2-6-6, 2-6-15, 2-6-16, 2-6-18, 2-6-19, 2-6-22, 2-6-23, 2-6-26, 2-6-27).* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Chamberlain, Levi
1957 Tour Around Oahu, 1828. 65th Annual Report of the Hawaiian Historical Society for the Year 1956.

Chapin, Helen G.
1996 *Shaping History: The Role of Newspapers in Hawaii.* University of Hawaii Press, Honolulu.

Chinen, Jon J.
1958 *The Great Māhele, Hawai'i's Land Division of 1848*. University of Hawaii Press, Honolulu.

Chong, Cathy Lee
2006 A Story for the Ages: Iolani's Shot at the Olympics. *Iolani.* Electronic document, https://www.iolani.org/files/pdfs/coverstory_fall06.pdf

Cisco, Dan
1999 *Hawai'i Sports*. University of Hawai'i Press: Honolulu.

Cipolla, Craig N.
2013 Native American Historical Archaeology and the Trope of Authenticity. *Historical Archaeology.* Vol. 47, ed. 3:12-22.

Cleghorn, Paul
1996 *The Results of an Archaeological Inventory Survey at the Proposed Kalākaua Plaza, Waikīkī, O'ahu, Hawai'i (TMK 2-6-16:23, 25-26, 28, 61, and 69).* Pacific Legacy, Inc., Kailua, Hawai'i.

Cobb, J.N.
1902 *Commercial Fisheries of the Hawaiian Islands: U.S. Fish Commission, Report for 1901, 1902.* In Archaeology of Oahu, by McAllister, 1933, p. 76. Bernice Pauahi Bishop Museum, Honolulu.

Cocke, Sophie
2013 Ala Wai Canal: Hawaiis Biggest Mistake? *Civil Beat.* 20 May 2013. Electronic document, http://www.civilbeat.org/2013/05/ala-wai-canal-hawaiis-biggest-mistake/

Coulter, John Wesley and Chee Kwon Chun
1937 *Chinese Rice Farmers in Hawaii.* UH Research Publications Number 16. University of Hawai'i, Honolulu.

De Mott, Thalya
1997 "Waahila Ridge enjoys historical significance." *Honolulu Star Bulletin* 22 July 1997: n.p. *Star Bulletin Archives* Web. Available at: <http://archives.starbulletin.com/97/07/22/editorial/letters.html>.

Desha, Stephen L.
2000 *Kamehameha and His Warrior Kekūhaupi'o.* Francis N. Frazier, translator. First published in the Hawaiian language newspaper *Ka Hoku o Hawai'i* in a series of articles from 16 December 1920 to 11 September 1924. Kamehameha Schools Press, Honolulu.

Esh, Kelly and Hallet H. Hammatt
2004 *Archaeological Monitoring Report for Ala Wai Boulevard Improvements, Waikīkī Ahupua'a, Kona District, Island Of O'ahu, TMK 2-6:14, 15, 16,17, 20, 21, 24, 25, 28, 29.* Cultural Surveys Hawai'i, Inc., Kailua Hawai'i.
2006 *Archaeological Monitoring Report for Kūhiō Avenue (Kalākaua to Ka'iulani), Waikīkī Ahupua'a, Honolulu District, O'ahu Island, Hawai'i, TMK [1] 2-6-015, to 022: various parcels).* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Feeser, Andrea
2006 *Waikīkī: A History of Forgetting and Remembering*. University of Hawai'i Press, Honolulu.

Ferrall, Charles C., Jr.
1976 *Subsurface Geology of Waikiki, Moiliili and Kakaako with Engineering Application.* UH Geology and Geophysics MS, University of Hawai'i, Honolulu.

Finney, Ben and James D. Houston
1966 *Surfing – A History of the Ancient Hawaiian Sport.* Pomegranate Books, Rohnert Park, California.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawai'i Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Fornander, Abraham
1919 *Fornander Collection of Hawaiian Antiquities and Folklore.* T.G. Thrum, editor. Memoirs of the Bernice P. Bishop Museum (Vol. V, Part II). Bishop Museum Press, Honolulu.

Foreign Testimony
1846-1853 Foreign Testimony recorded by the Board of Commissioners to Quiet Land Titles, vol. 13. Hawai‘i State Archives, Honolulu.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte
2013 Online Rainfall Atlas of Hawai‘i. *Bulletin of the American Meteorological Society* volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1. Electronic document, http://rainfall.geography.hawaii.edu.

Green, Laura C. and Martha Warren Beckwith
1926 Hawaiian Customs and Beliefs Relating to Sickness and Death. *American Anthropologist.* Vol. 28 (1926):176-208.

Google Earth
2013 Aerial image. Electronic document, http://www.google.com

HawaiiHistory.org
2016 Waikiki Beachboys. Electronic document. Available at: <http://hawaiihistory.org/index.cfm?fuseaction=ig.page&PageID=394>.

Hawai‘i Holomua
1912 Article. *Hawai‘i Holomua* 21 July.

Hawai‘i State Archives
n.d. Photo of Waikīkī and fishponds. Hawai‘i State Archives, Honolulu.

Hawai‘i Tax Map Key Service
2014 Tax Map Key [1] 2-6-017 and 2-7-013, 014, 036. Hawai‘i TMK Service, Honolulu.

Hibbard, Don and David Franzen
1986 The View from Diamond Head: Royal Residence to Urban Resort. Editions Limited, Honolulu.

Higgins, J.E.
1904 *The Banana in Hawaii.* Hawaii Agricultural Experiment Station, Bulletin No. 7. Hawaiian Gazette Company, Ltd., Honolulu.

Honolulu Advertiser
1954 Ancient and Modern Hawaii At Ground Breaking Rite, April 28, 1954, p. C25.

Honolulu Star-Bulletin
1928 Article. *Honolulu Star-Bulletin* 17 October.
1953 Waikiki Apartment to Cost $1,350,000, September 21, 1953. p. 1.

Ho‘oulumāhiehie
2006 *The epic tale of Hi‘iakaikapoliopele, woman of the sunrise, Lightning-skirted beauty of Halema‘uma‘u, as told by Ho‘oulumāhiehie*. M. Puakea Nogelmeier, translator. Awaiaulu.org., Honolulu

Huapala
n.d. Waikīkī Hula. Electronic document, http://www.huapala.org/Wai/Waikiki_Hula_2.html.

‘Ī‘ī, John Papa
1959 *Fragments of Hawaiian History.* M.K. Pukui, translator. Bishop Museum Press, Honolulu.

Images of Old Hawai‘i
2016 Images of Old Hawai‘i website. Available online at http://imagesofoldhawaii.com/na-pohaku-ola-kapaemahu-a-kapuni-the-healing-wizard-stones-of-kapaemahu/

Johnson, Donald D.
1991 The City and County of Honolulu: A Governmental Chronicle. University of Hawai‘i Press, Honolulu.

Ka Hoku o Hawaii
1927 *He Moolelo Kaao no Hiiaka-i-ka-poli-o-Pele*. 19 April:1:4-6]; 3 May:1:4-6

Kailihiwa, Solomon H. and Paul L. Cleghorn
2003 *Archaeological Monitoring of Waikīkī Water System Improvements (Part IV, Units 1 and 2) on Portions of Lau‘ula Street, Waikolu Way and Royal Hawaiian Avenue, Waikīkī, Island of O‘ahu (TMK 2-6-018, 019, 022).* Pacific Legacy, Inc., Kailua, Hawai‘i.

Kamakau, Samuel M.
1992 *Ruling Chiefs of Hawaii*. Kamehameha Schools Press, Honolulu.

Kamehameha Schools
2016 Kākuhihewa. Electronic document, https://apps.ksbe.edu/kaiwakiloumoku/kakuhihewa.

Kanahele, George S.
1986 *Pauahi: The Kamehameha Legacy.* Kamehameha Schools Press, Honolulu.
1995 *Waikīkī: 100 B.C. to 1900 A.D.: An Untold Story.* Queen Emma Foundation, Honolulu.

Kawelu, Kathleen L.
2015 *Kuleana and Commitment: Working Toward a Collaborative Hawiian Archaeology*. Univeristy of Hawai‘i Press: Honolulu.

Keala Kai
n.d. Wa‘a Peleleu. Electronic document, http://www.theoriginalkealakai.com/PeleleuLg.html (accessed 14 June 2016).

LaChance and Hammatt
2014 *Archaeological Monitoring Report for the Beachwalk to Ala Moana Park Sewer Project, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu, TMKs: (1) 2-3-034:033, 2-3-037:001 and 002, 2-6, and 2-7-036 (various parcels).* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Landgraf, Anne Kapualani
1994 *Nā Wahi Pana O Ko'olau Poko: Legendary Places of Ko'olau Poko.* Fred Kalani Meinecke, translator. University of Hawai‘i Press, Honolulu.

LeSuer C. Celeste, Matt McDermott, Rodney Chiogioji, and Hallett H. Hammatt
2000 *An Archaeological Inventory Survey of King Kalākaua Plaza Phase II, Waikīkī, Waikīkī Ahupua‘a, Kona District, Island of O‘ahu, Hawai‘i.* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Lima, Pulama and Hallett H. Hammatt
2014 *Burial Site Component of a Data Recovery Plan for the Royal Hawaiian Center Re-Development Project, Waikīkī Ahupua‘a, Kona District, O‘ahu TMK: [1] 2-6-002:18.* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Malo, David
1951 *Hawaiian Antiquities (Moolelo Hawaii)*. Second edition. Nathaniel B. Emerson, translator. Bishop Museum Press, Honolulu.

Martel III, Thomas and Hallett Hammatt
2016 *Archaeological Inventory Survey Report for the Ala Wai 46kV Underground Cables Relocation Project, Waikīkī Ahupua‘a, Kona District, O‘ahu TMK: [1] 2-6-017; 2-7-013, 014, and 036 (various parcels).* Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Mason Architects, Inc.
2004 *1950s Buildings in Waikīkī and Honolulu.* Mason Architects, Inc.: Honolulu, Hawaii.

McAllister, J. Gilbert
1933 *Archaeology of O‘ahu*. Bishop Museum Bulletin 104. Kraus Reprint 1985, Millwood, New York.

McGregor, Daviana Pomaikai
1996 An Introduction to the Hoa'aina and Their Rights. *The Hawaiian Journal of History*, vol. 30 (1996):1-27.

McIntosh James D. and Paul L. Cleghorn
2004 *Archaeological Inventory Survey for the Proposed Developments at Launiu Street, Waikīkī, Hawaii (TMK: 2-6-17; 68, 70, 71, 72, 73).* Pacific Legacy, Inc. Kailua, Hawai‘i.

McKinzie, Edith and T.C. Pilialoha Campbell
2005 *Ka-lua-o-kau: A Royal Heritage.* Queen Emma Foundation, Honolulu.

McMahon, Nancy
1994 *Inadvertent Burial Discovery on April 28, 1994: Intersection of Kalakaua and Kuamo‘o Streets, Waikīkī, Kona, O‘ahu.* State Historic Preservation Office, Kapolei, Hawai‘i.

Menzies, Archibald
1920 *Hawaii Nei: 128 Years Ago*. New Freedom, Honolulu.

Mitsch, William J. and James G. Gosselick
2007 *Wetlands.* Fourth edition. John Wiley & Sons, Inc., Hoboken, New Jersey.

Monsarrat, M.D.
1897 Map of Honolulu. Registered Map 1910. Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.

Morriss, Veronica and Hallett H. Hammatt
2015 Archaeological Inventory Survey for the Beachwalk Wastewater Pumping Station Project, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu TMK: [1] 2-6-018:011. Cultural Surveys of Hawai‘i, Inc., Kailua, Hawai‘i.

Nakamura, Barry Seichi
1979 The Story of Waikiki and the “Reclamation” Project. M.A. thesis, University of Hawaii, Honolulu.

Nakuina, Moses K.
1990 *The Wind Gourd of La‘amaomao*. First edition. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

National Oceanic and Atmospheric Administration (NOAA)
2016 February 2016 Precipitation Summary. Prepared by Kevin R. Kodama for NOAA/NWS Weather Forecast Office: Honolulu.

Native Testimony
1846-1852 Native Testimony of Kuleana Claims to Quiet Land Titles in the Hawai‘i Lands. Hawai‘i State Archives, Honolulu.

Newton, L.C.
1939 *Who’s who of the Island of Hawaii, [1938]: a biographical and statistical record of men and women on the Island of Hawaii, Territory of Hawaii, U.S.A.* L.C. Newton, Honolulu.

Noda, Edward K. and Associates, Inc.
1994 *Ala Wai Canal Improvement Project. Test Boring and Monitoring Well Program, Ala Wai Golf Course, Honolulu, Hawaii, prepared for Hawaii Dept. Land and Natural Resources, Div., Water and Land Development, Rept. R-89e, 6 July 1994: boring logs, and five figures.*

Oceanit
2004 *Draft: Ala Wai Flood Abatement and Ecosystem Restoration; Ala Wai Watershed Riparian Survey.* Oceanit: Honolulu.

Office of Folklife Programs, Smithsonian Institution
1989 *Hawaiian Drum Dance Chants: Sounds of Power in Time.* Liner notes. Office of Folklife Programs, CD.

Office of Hawaiian Affairs
2015 *Papakilo Database.* Office of Hawaiian Affairs cultural and historical database. Electronic document, http://papakilodatabase.com/main/index.php

O’Hare, Constance R., David W. Shideler and Hallett H. Hammatt
2007 *Archaeological Literature Review and Field Inspection for Kamehameha Schools, University Parcels and Varsity Theater Parcel in Mānoa, Waikīkī Ahupua‘a, Honolulu District, Oahu Island*, TMK multiple. Cultural Surveys Hawai‘i Inc., Kailua, Job Code Manoa 7.

2009 *Archaeological Literature Review and Field Inspection Report for the Proposed Diamond Head Tower Moana Surfrider Hotel Redevelopment Project, Waikīkī Ahupua'a, Kona District, O'ahu TMK: [1] 2-6-001:012, por.* Cultural Surveys Hawai'i, Inc., Kailua.

Oki, Delwyn S.
n.d. *Surface Water in Hawaii.* USGS: Honolulu.

O'Leary, Owen, Rodney Chiogioji, Anthony Bush, Douglas F. Borthwick, and Hallett H. Hammatt
2006 *Archaeological Assessment of 0.5-Acres of the Royal Kāhili Condo Property, Waikīkī, Kona District, Island of O'ahu.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Paglinawan, Richard
1997 *Some Notes on the Nā Pohaku 'Ola Kapaemahu a Kapuni Restoration Project*. Queen Emma Foundation, Honolulu.

Pammer, Michelle F., David W. Shideler, and Hallet H. Hammatt
2014 *Archaeological Inventory Survey for the 2139 Kūhiō Avenue Project Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu Island TMK: (1) 2-6-018:043, 045-048.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Park, Valerie and Sara L. Collins
2010 *Archaeological Monitoring Report in Support of the Ala Wai Garden Plaza Project, Waikīkī Ahupua'a, Honolulu District, Island of O'ahu, State of Hawaii TMKs (1) 2-6-016: 056-060.* Pacific Consulting Services, Inc., Honolulu.

Petrey, Whitney, Douglas F. Borthwick, and Hallett H. Hammatt
2008 *Archaeological Monitoring Report for the City and County of Honolulu's Emergency Sewer Bypass Project, Ala Wai to Magic Island, Waikīkī Ahupua'a, Kona District, Island of O'ahu TMK: [1] 2-3-034, -036, 037; 2-6-017, -018; 2-7-036.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Pauketat, Timothy R.
2001 *The Archaeology of Traditions*. University Press of Florida: Florida.

Pope, W.T.
1926 *Banana Culture in Hawaii.* Hawaii Agricultural Experiment station, Bulletin No. 55. Hawaiian Gazette Company, Ltd., Honolulu.

Pukui, Mary Kawena
1983 *'Ōlelo No'eau: Hawaiian Proverbs & Poetical Sayings.* Bishop Museum Press, Honolulu.

Pukui, Mary Kawena, E.W. Haertig, and Catherine A. Lee
1972 *Nānā i ke Kumu (Look to the Source)* Volume 1 and 2. Hui Hānai, Honolulu.

Pukui, Mary Kawena and Laura C.S. Green
1995 *Folktales of Hawai'i.* Bishop Museum Press, Honolulu.

Pukui, Mary K. and Samuel H. Elbert
1986 *Hawaiian Dictionary.* Second edition. University of Hawaii Press, Honolulu.

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini
1974 *Place Names of Hawaii.* University of Hawaii Press, Honolulu.

Rosendahl, Paul
1996 *Archaeological Inventory Survey of the Kamoku-Pukele 138-kV Transmission Line Alignments, Lands of Mānoa, Pālolo, and Waikīkī, Honolulu District, Island of Oahu.* Pacific Health Research Institute, Hilo, Hawai'i.

Ruby, Laura, editor
2005 *Mō'ili'ili: The Life of a Community.* Mō'ili'ili Community Center, Honolulu.

Sanborn, Curt
2015 A Walk Along Palolo Stream. *Civil Beat*. Electronic Document, <http://www.civilbeat.com/2015/11/curt-sanburn-a-walk-along-palolo-stream/>.

Sanborn Map Company
1927 Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai'i State Archives, Honolulu.
1950a Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai'i State Archives, Honolulu.
1950b Fire Insurance Maps of Honolulu, Oahu, Territory of Hawaii. Hawai'i State Archives, Honolulu.

Shintani, Terry
1993 *The Wai'anae Book of Hawaiian Health.* Waianae Coast Comprehensive Health Center, Waianae.

Sroat, Ena, Douglas F. Borthwick, and Hallett H. Hammatt
2011 *Archaeological Monitoring Report for the Waikīkī Shopping Plaza Redevelopment Project, Waikīkī, Kona District, O'ahu, [TMK: (1) 2-6-019:056, 061].* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Stearns, H.T.
1978 *Quaternary Shorelines in the Hawaiian Islands*. Bishop Museum Bulletin 237. Bishop Museum Press, Honolulu.

Sterling, Elspeth P. and Catherine C. Summers
1978 *Sites of Oahu*. Bernice Pauahi Bishop Museum, Honolulu.

Stokes, John F.G.
1991 *Heiau of the Island of Hawai'i.* Tom Dye, editor. Bishop Museum Press, Honolulu.

Thrum, Thomas G.
1904 *Hawaiian Almanac and Annual for 1904.* Thomas G. Thrum Publishing, Honolulu.
1905 *Hawaiian Almanac and Annual for 1905.* Thomas G. Thrum Publishing, Honolulu.
1906 Heiaus and Heiau Sites throughout the Hawaiian Islands. *The Hawaiian Almanac and Annual for 1907*. Thos. G. Thrum, Honolulu.
1907 *Hawaiian Almanac and Annual for 1907.* Thomas G. Thrum Publishing, Honolulu.
1922 Hawaiian Place Names. In *A Dictionary of the Hawaiian Language*, by Lorin Andrews. Thomas G. Thrum Publishing, Honolulu.

1923 More Hawaiian Folk Tales. A Collection of Native Legends and Traditions. A.C. McClurg & Co., Chicago.

1926 Hawaiian Almanac and Annual for 1927. Thomas G. Thrum, Honolulu.

Timbol, Amadeo S. and John A Maciolek

1978 *Stream Channel Modification in Hawaii. Part A: Statewide Inventory of Stream; Habitat Factors and Associated Biota, Biological Services Program.* Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

Trask, Mililani

2006 Hawaiian Perspectives GMOs and Cultural Values. *Facing Hawai‘i’s Future.* Hawai‘i SEED, Koloa.

Tulchin, Todd, Douglas Borthwick, and Hallett H. Hammatt

2004 *Archaeological Data Recovery Report For Site 50-80-14-6407 Feature A At An Approximately 71,000-Sq. Ft. Parcel In Waikīkī Ahupua‘a, Kona District, Island Of O‘ahu (TMK 2-6-16: 2, 4, 6, 7, 8, 12-19, 62, 64, 70, 75, 76, and 77).* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i

UHCOH (University of Hawai‘i Center for Oral Histories)

1985 *Waikīkī, 1900–1985: Oral Histories.* Vol. IV. University of Hawai‘i at Mānoa, Honolulu.

Ulukau

2014 *Māhele Database.* Hawaiian Electronic Library, http://ulukau.org/cgi-bin/vicki?l=en..

United States Congress

1894 *Hawaiian Islands.* Report of the Committee on foreign relations, United States Senate, with accompanying testimony and executive documents transmitted to Congress from January 1, 1893, to March 10, 1894. Subject index. Government Printing Office, Washington, D.C.

U.S. Army Corps of Engineers

1910 U.S. Army Corp of Engineers Map of Waikīkī. Copies available from U.S. Army Corp Engineers Building 230, Fort Shafter, Hawai‘i.

U.S. Army War Department

1919 U.S. Army War Department Fire Control Map, Honolulu Quadrangle, showing Project area location. USGS Information Services, Denver, Colorado.

1933 U.S. Army War Department Fire Control Map, Honolulu Quadrangle. USGS Information Services, Denver, Colorado.

1943 U.S. Army War Department Terrain Map, Honolulu and Diamond Head Quadrangles. USGS Information Services, Denver, Colorado.

U.S. Department of Agriculture

2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

USGS (U.S. Geological Survey)

1953 USGS Honolulu 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

1978 U.S. Geological Service Orthoimagery, Honolulu Quadrangle. Aerial photograph. USGS Information Services, Denver, Colorado.

1998 USGS Honolulu 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

Vancouver, George

1798 A Voyage of Discovery to the North Pacific Ocean, and Round the World Performed in the years 1790-1795. Volume 1, Robinsons and Edwards, London.

Vizenor, Gerald

1999 *Manifest Manners: Narratives on Postindian Survivance.* University of Oklahoma Press: Lincoln.

Von Tempski, Armine

1940 *Born in Paradise.* Buell, Sloan and Pearce, New York.

Waihona ‘Aina

2000 *The Māhele Database*. Electronic document, http://waihona.com (accessed 10 April 2014).

Wagner, Warren L., Derral Herbst, and Sara H. Sohmer

1990 *Manual of the Flowering Plants of Hawaii*. Volume 1. Bishop Museum Special Publication 83. University of Hawaii Press and Bishop Museum Press, Honolulu.

Wall, W. A.

1887 Honolulu and Vicinity. Map by W. A. Wall. On file at Library of Congress, Geography and Map Division, Washington, D.C.

1893 Map of Honolulu. Registered Map 1690. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Wiegel, Robert L.

2008 *Waikiki Beach, Oahu, Hawaii: History of its transformation from a natural to an urban shore. Shore and Beach.* Vol. 76, No. 2. Electronic document, http://dlnr.hawaii.gov/occl/files/2013/08/Wiegel-2008-ShoreAndBeach-Waikiki-history.pdf.

Wyban, Carol Araki

1992 *Tide and Current: Fishponds of Hawai‘i.* University of Hawaii Press, Honolulu.

Yucha, Trevor, Douglas Borthwick, and Hallett H. Hammatt

2009 *Archaeological Inventory Survey Report for the Proposed Waikīkī Shopping Plaza Redevelopment Project, Waikīkī, Kona District, O‘ahu, TMK: [1] 2-6-019:056, 061.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Appendix A National Register of Historic Places Inventory Nomination Form for the Ala Wai Canal

NPS Form 10-900
(Oct. 1990)

9757
OMB No. 10024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name The Ala Wai Canal

other names/site number The Waikiki Drainage Canal

2. Location

street & number The Ala Wai Boulevard ☐ not for publication

city or town Honolulu ☐ vicinity

state Hawaii code HI county Honolulu code 003 zip code 96815

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☐ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State of Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

☐ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

The Ala Wai Canal
Name of Property

Honolulu County, HI
County and State

5. Classification

Ownership of Property
(Check as many boxes as apply)
☐ private
☐ public-local
☒ public-State
☐ public-Federal

Category of Property
(Check only one box)
☐ building(s)
☐ district
☐ site
☒ structure
☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
3 bridges		structures
		objects
		Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register

6. Function or Use

Historic Functions
(Enter categories from instructions)
EXTRACTION: extractive facility = canal
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

Current Functions
(Enter categories from instructions)
RECREATION: outdoor recreation = boating and fishing
OTHER: drainage facility = canal

7. Description

Architectural Classification
(Enter categories from instructions)
No style

Materials
(Enter categories from instructions)
foundation
walls stone and concrete
roof
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

The Ala Wai Canal — Name of Property
Honolulu County, HI — County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] **B** Property is associated with the lives of persons significant in our past.
- [ ] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] **A** owned by a religious institution or used for religious purposes.
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
COMMUNITY PLANNING AND DEVELOPMENT
SOCIAL HISTORY

Period of Significance
1921-1928

Significant Dates

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
Walter F. Dillingham, builder

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [X] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [ ] recorded by Historic American Engineering Record # _____

Primary location of additional data:

- [ ] State Historic Preservation Office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [ ] Other

Name of repository: _____

The Ala Wai Canal — Name of Property
Honolulu County, HI — County and State

10. Geographical Data

Acreage of Property 48.5 acres

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	03	62365	2353500
2	03	62050	2354875
3	03	62012	2354750
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Erica Steele
organization N/A date May 12, 1992
street & number 3735 Diamond Head Circle telephone (808) 734-3225
city or town Honolulu state Hawaii zip code 96815

Additional Documentation
Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner
(Complete this item at the request of SHPO or FPO.)

name Department of Land and Natural Resources
street & number Kalanimoku Building telephone _____
city or town Honolulu state HI zip code 96813

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7 Page 1

The Ala Wai Canal
Honolulu County, HI

Description

People smile at her beauty, but sometimes they wrinkle their noses at her aroma.
Joggers sweat their way along her banks. Sunbathers perch on her concrete shores. Lovers watch the reflection of the moon on her surface. Ancient fishermen probe her murky depths for the tasty mullet.
She is the Ala Wai Canal - a delight to tourist and Islanders alike.
But she is much more than an open space next to the sky-crowding high rises. On any given day she is a health clinic, market, rendezvous and serious playground.

Ron Youngblood
November 27, 1969

The Ala Wai Canal is a 2-mile long man-made waterway of variable depth and width located in the Waikiki district of Honolulu. The canal is fed by the Manoa-Palolo drainage ditch which drains from the Manoa and Palolo valleys, as well as a number of smaller streams, drainage ditches and storm sewers which also drain into the canal. It forms the boundary of the Waikiki district, separating Waikiki from the Makiki, Moiliili and Ala Moana areas of the city. Since its construction in 1928 the canal has been used for recreational purposes which include boating (motoring, rowing and canoe paddling) and fishing.

Constructed by the Hawaiian Dredging Company between 1921 and 1928, the canal was designed to drain low-lying wetlands in Waikiki and to provide fill that would reclaim over six hundred acres of land in the district. The canal was dredged by the "Kewalo" and consists of two straight segments joined at Kalakaua Avenue by a 45 degree elbow. The first segment of the canal, which opens to the ocean at the Ala Wai Boat Harbor, is 750 meters long and 50 meters wide. The second segment extends 2350 meters from Kalakaua Avenue to Kapahulu Avenue and is 76 meters wide.

There are three venues by which one can cross the waterway - the Ala Moana bridge, the Kalakaua bridge and the McCully bridge. When the Ala Wai Canal was originally constructed, only temporary bridges crossed it, to allow the dredge "Kewalo" to move freely about the area. Upon completion of the dredging, the Kalakaua bridge was built in 1929 by R.E. Woolley; it is a graceful multiple-arch reinforced concrete bridge. Subsequently, the McCully bridge and the bridge at Ala Moana Boulevard were added.

The length of the *makai* (ocean) side of the canal is spanned by a concrete tree-lined sidewalk, which is a popular site for jogging. Only a short stretch of the *mauka* (mountain) portion of the canal has a public walkway between the Kalakaua and Ala Moana bridges and on either side of the canal is a tranquil tree-lined footpath, the makai side of which is run by a graceful concrete arched railing. Sixteen stairwells which run the makai length of the

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7 Page 2

The Ala Wai Canal
Honolulu County, HI

Description (continued)

canal drop down from the sidewalk to the canal's surface. These additions to the canal landscape were made after the completion of the canal.

A municipal golf course, an elementary school, and a park run along the mauka side of the canal and are among the many changes bordering that side of the canal since the original construction of the Ala Wai. In addition, several high-rise apartment buildings have also been built. The surrounding visual landscape of the canal has seen enormous changes as the Waikiki, McCully and Moilili districts have developed over the years: the landscape has been transformed from an agricultural area into a residential neighborhood and finally, into a congested maze of high-rise condominiums and hotels. These alterations have had a dramatic effect upon the overall integrity of the canal landscape.

Nonetheless, there have been no significant changes to the structure of the canal itself since its original construction. Over the years, the original retaining walls contructed of stone have necessitated some repairs. In 1950 work was done to prevent crumbling masonry from falling into the canal. A new concrete facing was placed in front of the original loose stone wall. In 1992 in ongoing work the Harbors Division (the State agency responsible for the canal) is currently reinforcing portions of the wall. Some portions of the wall are being replaced because of deterioration. The main concern for the integrity of the canal is the health of its waters due to problems of siltation and water pollution caused by the sediments deposited into the canal by streams and storm drains. The sediment has necessitated occasional draining. While the original depth of the canal at the time of its construction was 10 to 25 feet, in 1990 the average depth of the canal was between 6 and 10 feet. Because of this, the canal has been dredged twice since its original construction, once in 1966 and again in 1978. It would appear ready to be dredged again, considering the current very shallow depth of water in the canal.

Despite the problem of pollution the Ala Wai "water sports park" continues to be heavily used by Waikiki residents and visitors, with an estimated daily year-round use by some 4,000 people in 1986. Throughout its history the canal has been a popular site for boating and fishing, and its banks are frequented by joggers and walkers. The Ala Wai Canal has been considered "one of the best courses for crew races in the U.S." and has been used by visiting crew's for training, including the Yale Olympic crew on their way to the games in Melbourne, Australia in 1956. The canal is used regularly by local outrigger canoe clubs, and has been for many years. Until the 1970s numerous commercial boating operations operated along the Ala Wai. For many years fishing has been a popular activity along the banks of the Ala Wai; archival photos show fishermen's perches lining the sides of the canal. Today the perches are gone, though it is not uncommon to see people hanging a line into the Ala Wai's murky waters.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 7, 8 Page 3

The Ala Wai Canal
Honolulu County, HI

Description (continued)

The Ala Wai Canal provides an important aesthetic dimension to the Waikiki neighborhood with its open space and tranquil waters. While the land surrounding the Ala Wai has undergone incredible change in the last 71 years, the environment at the canal has remained relatively constant.

Statement of Significance

The Ala Wai Canal is historically significant because of its pivotal role in the development of the Waikiki district, first as a residential neighborhood and soon after as a world-renowned resort area. The reclamation project in Waikiki, made possible by the dredging of the Ala Wai Canal, made a significant contribution to the eventual development of the State's tourism-based economy. Without the reclamation of wetlands and fishponds in Waikiki used for agriculture and aquaculture farming through 1920, Waikiki as we know it today, with its 75,000 visitors a day and the $70 million in property taxes it generates for the city, would not have been possible. The structure, which the original proposer of the canal, Lucius E. Pinkham envisioned as a great lagoon to be used for boating and recreational purposes, remains in the midst of so much change, relatively unchanged, and continues to be used regularly used by paddlers and fishermen.

Historical Background and Significance:

Since the 1500s, "Waiatite" was the seat of government for Hawaiian royalty on the island of Oahu. From that time forward Waikiki was also a documented rich and productive agricultural region, until 1921 when construction of the Ala Wai Canal began. For centuries large *loko* (fishponds) and taro *lo'i* (terraces) were fed by the many springs that flowed in Waikiki (literally, "spouting waters") and amply supplied the native Hawaiians living in the area with food. Only in the 1830s and 40s, due to a severe drop in the native population brought on by the introduction of Western diseases, did the wetlands and fishponds fall into an unproductive state. By the late 1800s and early 1900s the wetlands were again fruitful, and native Hawaiian farmers were joined by immigrant farmers who grew rice in the Waikiki area to sell to immigrant workers on the plantations.

Even after 1809, when Kamehameha I moved his court to Honolulu, Waikiki continued to be a favored haunt of Hawaiian royalty. The area was also increasingly popular with the growing number of *haole* (foreigners) living in Honolulu toward the turn of the century. As Waikiki's popularity began to grow, the value of the area could not go unnoticed for long and the community began to develop and change. The wetlands (referred to by many as "swamp lands") could, in the eyes of many in Honolulu, be put to better use than raising ducks and growing rice - but only if the land could be "reclaimed" (filled in).

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 4

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Bath houses began to be established, the first in 1881. In 1903, the Honolulu Rapid Transit Company inaugurated a service between Honolulu and Waikiki, providing easier access to the area. By 1921, the year construction of the Ala Wai Canal began, five major hotels had been constructed in Waikiki. One project that had considerable influence was the reclamation of Fort DeRussy in the Waikiki area. In the first decade of the twentieth century, the U.S. Department of War acquired 73 acres of land in Waikiki; from 1909 to 1911 the Quartermaster Corps was assigned the task of filling "a portion of the fish ponds which covered most of the fort (Fort DeRussy)." This was the first reclamation of land in the area.

Increased public concern over the mosquito problem and the potential spread of contagious and infectious diseases in Hawaii was one of the most important factors leading to the construction of the Ala Wai and the Waikiki Reclamation Project. The mosquito was accidentally introduced to Hawaii in 1826, and the Waikiki wetlands provided an ideal breeding ground for these insects. In 1909 W. C. Hodby, chief quarantine officer of the U.S. Public Health and Marine-Hospital Service, published a report entitled "The Outlook for Quarantinable Diseases in the Territory of Hawaii." In it he urged a "relentless and unceasing war against mosquitoes..." The Sanitary Commission, created by the Legislature in 1911 to address increasing concern over the danger of contagious and infectious disease introduced in Hawaii, reported that "certain swamps and low lands must be filled in order to protect our public health." With the construction of the Ala Wai Canal the mosquito-breeding wetlands were drained and filled, eliminating what many considered to be a potentially serious health hazard.

One final factor that led to the construction of the canal was the concern over the draining of wetlands on to the shores of Waikiki's beaches, at a time when bathing was becoming increasingly popular and there were a growing number of visitors to Hawaii's beaches. The proposed drainage canal would carry the runoff away from the Waikiki beaches.

The original proposal to build the Ala Wai Canal was put forward in 1906 by Lucius E. Pinkham, then president of the Board of Health of the Territory of Hawaii. In a report to the board, Pinkham recommended the reclamation of the Waikiki district of the city of Honolulu, proclaiming that the lands in Waikiki were in a deleterious and unsanitary condition. He proposed to fill in what he termed swamp lands to create an "attractive and charming" residential neighborhood . This reclamation of 625 acres would be accomplished by the construction of a "great lagoon" that would yield the necessary fill material and "create a quite marvelously beautiful, unique district, a Venice in the midst of the Pacific." He envisaged that the canal would be used for boating, providing an ideal course for racing. Thus while the canal would serve a recreational purpose upon its completion, the primary reason for its construction was to provide the necessary fill for adjacent lands and to drain runoff from the Manoa, Makiki and Palolo valleys away from Waikiki's beaches. While the proposal was shelved

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 5

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

for a number of years, upon his appointment as governor of the Territory by then-president Woodrow Wilson in 1913, Pinkham devoted much of the energy of his four-year term to the implementation of his Waikiki plan.

In 1917 under Act 102, S.L. 1917, $5,000 was appropriated to the Superintendent of Public Works to do a complete survey, map and plans for the area in Honolulu "between King Street and the sea beach, and between Kapahulu road and Sheridan street." This would become the complete area of the reclamation project in the 1920s.

Also in 1917, Act 231 was passed authorizing Governor Pinkham to appoint a commission to devise a plan for the reclamation and improvement of this area of land. The plan was to include a "main lagoon or canal" for drainage and "to receive and take care of the natural flood waters of said area."

Under Governor Pinkham, the legislature appropriated $100,000 for the excavation of the canal and passed Act 14, S.L. 1918 authorizing the Superintendent of Public Works to "acquire for public use, by condemnation, purchase, exchange or otherwise, all necessary lands and rights of way for the purpose of digging and constructing a portion of the drainage canal or lagoon..." Many of the lands in Waikiki were acquired by a practice of land condemnation. Under a 1896 law, Act 61, the Territory of Hawaii's Board of Health could judge whether any land was unsanitary and require the owners to take the necessary steps to improve the land. This usually meant filling the land. While this practice was no great hardship for property owners who were interested in developing their land for residential or commercial purposes, for wetland farmers it essentially meant the eradication of their livelihood. In addition, if under the law land owners were financially unable to fill the land, or unwilling, the government could undertake the improvement and cover the cost through a lien placed on the property. Through this process many wetland farmers in Waikiki lost their land and livelihood.

By June 1920, 85 percent of the land required for the building of the canal had been acquired and bids to dredge the canal were solicited. In December 1920, Lyman Bigelow, Superintendent of Public Works advertised for bids in the Honolulu Star-Bulletin. On December 23, 1920 the bids were opened and the contract for the project was awarded to the Hawaiian Dredging Company, owned by Walter F. Dillingham. Dillingham's bid was one of only two bids received by the Territory for the project.

In the same year under Act 220, S.L. 1921 a resolution was issued on October 14 declaring construction of the Waikiki Drainage Canal "necessary for the proper drainage and sanitation" of Waikiki and appropriating $600,000 for the canal. Act 221 confirmed the boundaries of the reclamation project and provided for a commission to plan for boulevards, streets and parks within the district.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 6

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

Two contracts were negotiated between the Territory of Hawaii and Hawaiian Dredging Company to contract for the construction of the canal. Unit 1, Job No. 2979 entitled, "Proposal for Dredging a Drainage Canal and Filling and Reclaiming Certain Unsanitary Lands at Waikiki" was the primary agreement which consisted of dredging a canal 60 feet wide some two miles inland from the "sea beach at Ala Moana Road up to and intercepting the Apuakehau Stream" and called for the construction of "a dyke 6 feet high and 10 feet wide at the top along the entire makai (south) side of this Canal." The contract for Unit 2, Job No. 2986, the "Second Unit of the Waikiki Reclamation and Sanitation Project at Waikiki" called for a canal to be dredged "from the sea beach at Ala Moana Road to a point about 500 feet toward the reef."

Construction was begun in 1921, and by January of 1922 Hawaiian Dredging Company had completed the first phase of the project, Unit 2, and was beginning work on Unit 1, Contract 2979. The hydraulic dredge "Kewalo" was used by Hawaiian Dredging Company to dredge the canal. Because of the size of the dredge it could not successfully operate in a width of 60 feet so the canal had to be cut to an approximate width of 150 feet.

By mid-1923 the "Kewalo" had cut its way almost 6,500 feet towards Kapahulu Road, cutting a channel approximately 135 feet wide and 10-20 feet deep. The Superintendent of Public Works, Lyman H. Bigelow, reported that the canal "has now intercepted Apuakehau Stream which flowed by the Outrigger Club and all the filthy waters which previously flowed on to this fine swimming beach have been diverted and now flow out to the sea by way of the canal."

By mid-1924 the canal was 150 feet wide and had been dredged "its entire length" to Kapahulu Road. In his annual report to the Governor in 1924, Bigelow stated that the canal had been excavated its entire length ending at Kapahulu Road. Due to a lack of funds the Diamond Head end of the canal, called for in Lucius Pinkham's original proposal, was put on hold until "some later date, when funds are made available." Pinkham had recommended that the canal should exit back out to the ocean at Kapiolani Park, with tides gates at the both entrances to be closed at high tide and "the waters thus forced through the lagoon to exit at the Ala Moana bridge." This portion of the canal was in fact never completed, though in 1967 the local Rotary club and other civic groups brought the idea up again - with no success.

In order to provide the additional fill material necessary to bring the Waikiki Reclamation Project to completion Act 248, S.L. 1923 was passed authorizing the widening of the canal by 100 feet.

The canal acquired its name in 1925 when the City Planning Commission requested that citizens of Honolulu submit suitable names for the renaming of the Waikiki drainage canal. Jennie Wilson, wife of Mayor Wilson, suggested the name Ala Wai, Hawaiian for "waterway."

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 8 Page 7

The Ala Wai Canal
Honolulu County, HI

Statement of Significance (continued)

The "Kewalo" headed back to McCully Street to begin dredging fill for the McCully tract, a vast area of pondfields and fishponds. By mid-1927 the filling of the McCully tract was completed and the canal was 250 feet wide almost to Kapahulu Road.

In 1928 the "Kewalo" exited the canal in and the construction of the Ala Wai was thus completed. That same year a supplement in the Honolulu Advertiser noted the dramatic increase in the value of land. According to V. Von Holt, president of the realty company Whitney & Von Holt, Ltd., land values had gone from $500 an acre for a piece of agricultural property prior to the construction of the canal to up to $4 a square foot for business property in 1928. With a great increase in available property, numerous residential development projects were undertaken in Waikiki. The number of visitors was also on the rise since the beginning of the reclamation project. Between 1921 and 1927, the number of visitors to Waikiki doubled from 8,000 to 17, 451 according to the Hawaii Visitors Bureau. In addition, in 1927 a total of 19,567 "one-day tourists" visited Hawaii's beaches as they travelled on cruise ships stopping in the islands. This same year the visitor's bureau launched its largest ever campaign to promote Hawaii and "put Waikiki and other attractions of the islands on the resort map," aggressively promoting Hawaii's "third industry" - tourism. Today tourism is the state's number one industry and Waikiki is at its core.

The Ala Wai Canal easily merits inclusion on the National Register of Historic Places, for local and state significance. This project allowed Waikiki to be transformed from an agriculturally productive region to a tourist mecca, upon which the state's economy has become increasingly dependent. Today, Waikiki's 450 acres generate $70 million in property taxes for the city annually, roughly one-third of the total property taxes received by the city. Property values in the region have skyrocketed, from an average of $840 an acre in 1917 to $22 million in 1990. Given the history of the reclamation project and resultant changes in the Waikiki district over the last 70 years, it is impossible not to conclude that the construction of the Ala Wai Canal has had a momentous impact on the development of the surrounding community and its economy, and on the economy of the entire state.

However, despite the significance of the structure, the building of the Ala Wai Canal and the reclamation project tells a sad story. The story is one in which many farmers lost their land and livelihood through a questionable practice of land condemnation and where a tranquil paradise, such as Waikiki was at the close of the 19th century, has been transformed into bustling, recreational playground with no sense of the history of the community from which it came. In fact the Ala Wai Canal is one of the only reminders of the spirit of Waikiki as it was in 1921.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9 Page 8

The Ala Wai Canal
Honolulu County, HI

Bibliography

"Canal Course Highly Praised." *Honolulu Star-Bulletin & Advertiser*, March 31, 1951.

"City Workers To Strengthen Canal's Banks." *Honolulu Advertiser*, June 30, 1950.

Finstick, Sue Ann. "The Ala Wai Canal." Term paper, University of Hawaii, 1990.

Hawaii (Territory) Board of Health. *Reclamation of the Waikiki District of the City of Honolulu, Territory of Hawaii: Recommendations--Maps--Plans and Specifications, by L.E. Pinkham, President Board of Health.* Honolulu: Hawaiian Gazette, 1906.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1915.* Honolulu: Star-Bulletin, 1915.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1916.* Honolulu: Star-Bulletin, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1917.* Honolulu: Paradise of the Pacific, 1917.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1918.* Honolulu: New Freedom Press, 1918.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1919.* Honolulu: Paradise of the Pacific, 1919.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1920.* Honolulu, 1920.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1921.* Honolulu: Paradise of the Pacific, 1921.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1922.* Honolulu: Star-Bulletin, 1922.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9 Page 9

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1923*. Honolulu: Star-Bulletin, 1923.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1924*. Honolulu: Star-Bulletin, 1924.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1925*. Honolulu: Star-Bulletin, 1925.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1926*. Honolulu: Star-Bulletin, 1926.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1927*. Honolulu: Star-Bulletin, 1927.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1928*. Honolulu: Star-Bulletin, 1928.

Hawaii (Territory) Department of Public Works. *Report of the Superintendent of Public Works to the Governor of the Territory of Hawaii for the Year Ending June 30, 1929*. Honolulu: The Printshop Company, Ltd., 1929.

Hibbard, D. and D. Franzen. *The View From Diamond Head: Royal Residence to Urban Resort*. Honolulu: Editions Limited, 1987.

Honolulu, Hawaii. Bernice Pauahi Bishop Museum. Dillingham Archives, Files W-12, W-14, W-15, W-16.

Lum, Walter and Richard Cox. "The Ala Wai Canal: From Wetlands to World-famous Waikiki." *Irrigation and Drainage Proceedings 1991*. Honolulu: IR Div/ASCE, 1991.

Miller, Jacqueline. Ecological Studies of the Biota of the Ala Wai Canal. Honolulu: 1975.

Nakamura, Barry. "Waikiki and the Reclamation Project." Master's thesis, University of Hawaii, 1979.

"New Struggle Over Ala Wai Canal Use." *Honolulu Advertiser*, May 21, 1986.

NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number 9, 10 Page 10

The Ala Wai Canal
Honolulu County, HI

Bibliography (continued)

"Opposition Swamps Canal Entrepreneur." *Honolulu Advertiser*, June 4, 1986.

"Realtor Sees Big Growth At Waikiki." *Honolulu Advertiser*, October 17, 1928.

"She's Lady of Many Moods." *Honolulu Advertiser*, November 27, 1969.

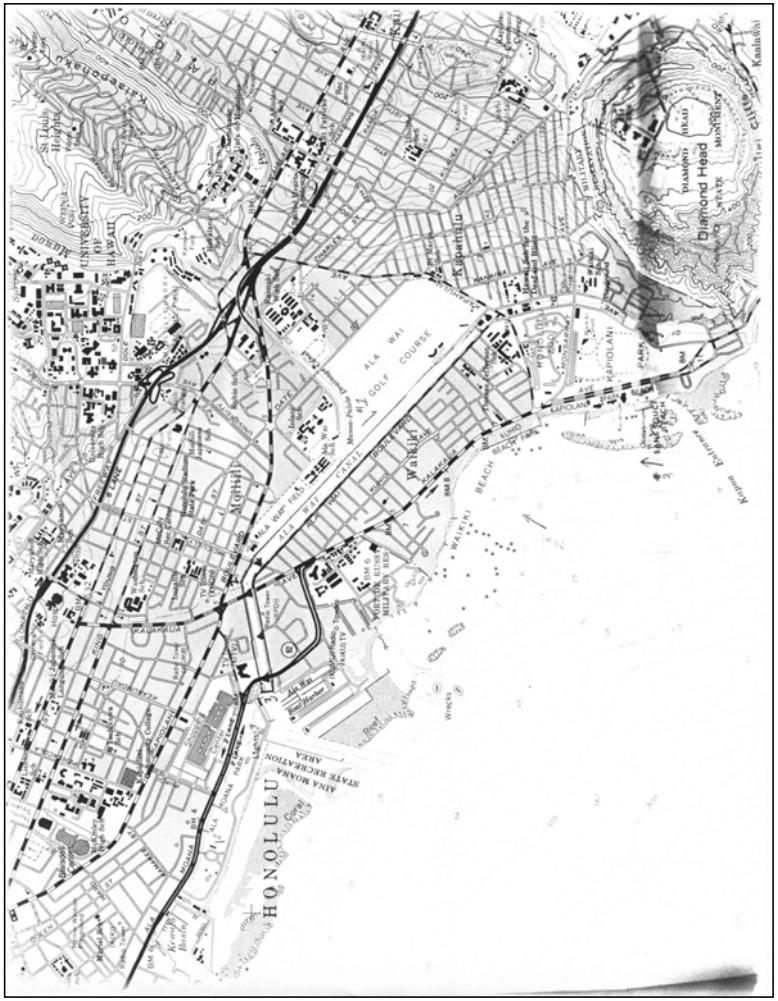
"Waikiki Magic Sends Lure World Over." *Honolulu Advertiser*, October 17, 1928.

Verbal Boundary Description

The boundary of the nominated property is delineated by the polygon whose vertices are marked by the following UTM reference points: 1) 03 623625/2353500, 2) 03 620500/2354875, 3) 03 620125/2354750.

Boundary Jusitification

The boundary of the nominated property includes the entire parcel of land historically associated with the canal ~~as well as the adjacent boulevards on the makai side of the canal~~. This area makes up the recreational "water park" that is the Ala Wai Canal today.



Appendix B Dr. Richard Kelley Response Letter

Richard R. Kelley
Chairman Emeritus

OUTRIGGER®
ENTERPRISES GROUP
Hospitality • Retail • Development

March 5, 2016

Ms. Brittany Beauchan
Cultural Researcher/Archaeologist
Cultural Surveys Hawai'i
41-1537 Kalaniana'ole Highway, Suite 204
Waimānalo, Hawai'i 96795

Dear Ms. Beauchan:

Mahalo for your email letter dated February 22, 2016 asking if I might be a possible consultant for a cultural impact assessment in the area around the Ala Wai Canal, within the Waikīkī Ahupua'a, due to my knowledge of old Waikīkī and my family's contributions to the Waikīkī area. I appreciate your kind words, but my family's history in Waikīkī began in the 1900s which is significantly later than the period of information you are seeking. In addition, my areas of knowledge and history about Waikīkī do not include the level of expertise you are seeking about Native Hawaiian cultural practices, archaeological sites, burials and gathering practices.

Perhaps the best way I can be helpful is to refer you to Christina Kemmer, a previous president of the Waikīkī Improvement Association and also a former president of Communications Pacific. Her work in both positions during the late 1980s through 2010 was often centered in Waikīkī and included a major community project with the Environmental Protection Agency to clean up the Ala Wai watershed. She also worked with lineal and cultural descendants to properly manage the Kūhiō Avenue improvements and the development of the Waikīkī memorial for repatriation of 'iwi kupuna, as appropriate. Christina is currently living in the Kona area and continues to do some consulting work. Her contact information is as follows:

Christina Kemmer
P.O. Box 39018
Keauhou, Hawai'i 96739
Mobile: (808) 388-4557

Again, thank you for your kind words and, although I am not able to assist in the way you requested, I hope this referral may be helpful to you in this important work.

Sincerely,

Richard R Kelley

4 Village Road, Englewood, Colorado 80113-4908 • Phone: 303-761-7405 • Fax: 303-761-7056 • E-mail: richard.kelley@outrigger.com

Appendix C Sheleigh Christina Ka'āhiki Solis Resource List

Kaahiki Solis Cultural Historian Oahu SHPD

State of Hawaii Bureau of Conveyances

Permanent Land Records

Maintaining an accurate, timely and permanent record system for title to real property is the responsibility of the Bureau of Conveyances. The Bureau examines, records, indexes, and microfilms over 344,000 Regular System and Land Court documents and maps annually; issues Land Court Certificates of Title; certifies copies of matters of record; and researches UCC requests. Hawaii is the only state in the nation with a single statewide recording office.

Records and Images dating back as late1800s. Public reference room Room 123. Books, Microfilm, Electronic Data base. **Name or document number** of property.

www.dlnr.hawaii.gov/boc

The website above has a list of FAQs that help guide the research by answering simple questions on how to conduct research.

The Automated Information System or "AIS" will be offered through the main telephone number at (808) 587-0147 and include a simple series of menus providing answers to the questions most often asked about the BOC. The menus address topics like recording documents, deeds and mortgages, timeshares and liens as well as questions asked by business customers like attorneys and banks.

Kalanimoku Building
1151 Punchbowl St. #120
Honolulu, HI 96813
Ph: (808) 587-0147
Fax: (808) 587-0136

AIS 808-587-0147 (Automated Information System for FAQ)

Hours of operation M-F 7:45-4:30

Recording Land Titles Room 120/122

Angel Mau at **Bureau of Conveyances**—a good resource person

Glenn Tamashiro in the **Land Survey Division Department of Accounting and General Service**.

1

Kaahiki Solis Cultural Historian Oahu SHPD

Hawaii State Archives

Hawai'i State Archives' mission is to ensure open government by preserving and making accessible the historic records of state government and to partner with state agencies to manage their active and inactive records.

The Archives Division administers the executive branch's archives and records management programs under the direction of the State Comptroller. The functions of the programs are mandated by Chapter 94, Hawai'i Revised Statutes. The Division is organized into two branches, the Historical Records Branch and the Records Management Branch.

The Historical Records Branch preserves and provides access to the State's government archives and special collections through Hawai'i State Archives. These records date from the monarchy to the current legislative session, and also include the papers of individuals and organizations, photographs, maps, artifacts, rare books, 19th century newspapers. **Hawai'i State Archives is open to the public**.

The Records Management Branch provides support services to state government agencies of the executive branches which are subject to Section 94-3, Hawai'i Revised Statutes. It maintains a warehouse facility that can house 42,000 cubic feet of non-permanent government records and stores security copies of microfilmed records. The branch develops and revises records retention and disposition schedules for the State Comptroller's approval.

Hawaii State Archives: Historical Records

- Records Management
- Forms and Fees
- Map and Library Catalog
- Photograph Collection
- Archives Research
- Genealogy Research Guide
- Description of Collections
- Newsletters

- Abraham Lincoln Documents
- Centennial Exhibit
- Hawai'i State Historical Records Advisory Board (HI SHRAB)
- Preservation Fee & Refund Information

Kekāuluohi Building 364 S. King St. Hours 9:00-4:00 M_F
'Iolani Palace Grounds Fax: (808) 586-0330 (808)586-0329
e-mail: archives@hawaii.gov

Hawai'i State Archives (http://ags.hawaii.gov/archives)

2

Kaahiki Solis Cultural Historian Oahu SHPD

Hawaii Department of Taxation

https://www.realpropertyhonolulu.com/portal/rpadcms
Every island has its own Real Property Tax office. You can find valuable information about land if you trace the tax bills on the property. This is a lateral resource you may use in land search information.

Real Property Tax Bills, Payments, Penalty, Interest
You may access your tax bill and other records on your property by visiting http://www.realpropertyhonolulu.com or contact the Treasury Division for questions regarding your tax bill or tax credit by **email** at:bfstreasmailbox@honolulu.gov.

The Treasury Division also has a website with more information at:
(http://www.co.honolulu.hi.us/budget/treasury_division.htm)

To report any discrepancies about any individual property record, contact us.

- Search by Site Address
- Search by Parcel Number (TMK)
- Search by Board of Review Scheduled Appeals
- Search by Map

Downtown Office:
842 Bethel St. Basement
Honolulu, HI 96813
(808) 768-3799

Kapolei Office:
1000 Uluohia Street, #206
Kapolei, HI 96707
(808) 768-3169

Real Property Tax Collection:
Treasury Division
P.O. Box 4200
Honolulu, HI 96812-4200
(808) 768-3980

3

Kaahiki Solis Cultural Historian Oahu SHPD

Hawaii Genealogy & LDS Family History Centers

Hawaiians love to trace their ancestry roots, but the process is often easier said than done. To ensure success in building your own family tree, check out the resources available at a Hawaii Family History Center. These offshoots of the Family History Library in Salt Lake City are operated by the Hawaii LDS Church, but they are open to the general public as well. Inside the facilities, you will discover a wealth of resources designed to help you accurately trace your ancestry, from an extensive library of microfilm and microfiche documents to print publications and computer options. These family history centers are the perfect place to launch your search of your Hawaiian family tree.

If you have any questions or comments about family history centers, please send a message to fhc@archives.com.

Hana Family History Center
Box 322 U
Hana, Hawaii 96713
(808) 248-7539
TBA

Hilo Family History Center
1373 Kilauea Ave
Hilo, Hawaii 96720
(808) 935-0711
Sat. 9-12, Sun. 2-5, Tues9-12&6-9, Wend. 9-9, Thur. 9-9
Notes: Next to 7-11 store and FHC room is in front of building; Bring a disk to save info on

Honolulu Hawaii Stake
1560 S Beretania St
Honolulu, Hawaii 96826
(808) 955-8910
8am - 4pm

Stake FHC
Lono Ave
Kahului, Hawaii 96732
(808) 871-8841
Tuesday - Saturday

Church of Jesus Christ of Latter-Day Saints
Kamehameha Hwy
Kaunakakai, Hawaii 96748
(808) 553-5296
Monday-Friday
Notes: PO Box 442

4

Kaahiki Solis Cultural Historian Oahu SHPD

LDS Family History Centers

Kihei Family History Center
187A Auhana St
Kihei, Hawaii 96753
(808) 879-7456
TBA

Laie Family History Center
Temple Grounds, 55-600 Naniloa Loop
Laie, Hawaii 96762
(808) 293-2133
Open every day
Notes: Special Collection; Family Group Sheets for Hawaiian families, also for Australia, New Zealand, Tonga, Samoa, Tahiti and other areas in the Pacific

Mililani Family History Center
95-1036 Meheula Pkwy
Mililani, Hawaii 96789
(808) 623-1712
T, Th

Pukalani/Makawao Family History Center
3160 Kihapai Pl
Pukalani, Hawaii 96768
(808) 572-7938

Hawaii State Archives
Kekauluohi Building, 'Iolani Palace Grounds
364 S. King Street
Honolulu, Hawai'i 96813
805-586-0330
Website

5

Kaahiki Solis Cultural Historian Oahu SHPD

Land and Genealogy Search Resources

Just because Hawaii became a state in 1959 doesn't mean that there aren't records to be found. While finding records for any Hawaiian ancestors, prior to pre-European contact may be difficult, there are records including vital records kept by missionaries beginning in 1826 and official birth and death records began in 1853. Prior to 1840, the King owned all the lands so don't look for land records before that year. The US Federal Census was first conducted in 1900 but before that a Royal Census Enumeration was done for some parts of Hawaii beginning in 1866 and ending in 1896.

The Hawaiian Historical Society
560 Kawaiahao Street
Honolulu, Hawaii 96813
808-537-6271
Website

Maui Historical Society
2375-A Main Street
Wailuku, HI 96793
808-244-3326
Website

University of Hawaii Hawaiian and Pacific Collections
University of Hawaii at Manoa Library
2550 McCarthy Mall
Honolulu, HI 96822
808-956-8264
Website

Kauai Historical Society

http://kauaihistoricalsociety.org/

6

Kaahiki Solis Cultural Historian Oahu SHPD

Land and Genealogy Search Resources

Commission on Water Resource Office Address

Our office is located in downtown Honolulu:
Address: Kalanimoku Building
1151 Punchbowl Street, Room 227
Honolulu, Hawaii 96813
Hours: 7:45am to 4:30pm (Mon-Fri)
Phone: (808) 587-0214
Fax: (808) 587-0219
Email: *dlnr.cwrm@hawaii.gov*

Management Direct Branch Numbers

Survey Branch	(808) 587-3868
Planning Branch	(808) 587-0216
Ground Water Regulation Branch	(808) 587-0225
Stream Protection and Management Branch	(808) 587-0234

Below are toll free numbers from:

Kauai	274-3141 + 5 digit extension*
Maui	984-2400 + 5 digit extension*
Hawaii	974-4000 + 5 digit extension*
Molokai/Lanai	1-800-468-4644 + 5 digit extension*

* 5 digit extension is the last five digits of the telephone number. For example, the 5 digit extension for the office number is 70214.

Mailing Address
Please address all postal mail to the following address:

Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

7

Kaahiki Solis Cultural Historian Oahu SHPD

Native Hawaiian Community Outreach

Association of Hawaiian Civic Clubs

http://aohcc.org

Hawaiian Civic Clubs Oahu

- 'Ahahui Siwila Hawai'i o Kapolei
- Ali'i Pauahi Hawaiian Civic Club
- 'Ewa Pu'uloa Hawaiian Civic Club
- Hawaiian Civic Club of Honolulu
- Ka Lei Maile Ali'i Hawaiian Civic Club
- Kailua Hawaiian Civic Club
- Kalihi-Palama Hawaiian Civic Club
- King Kamehameha Hawaiian Civic Club
- Ko'olauloa Hawaiian Civic Club
- Ko'olaupoko Hawaiian Civic Club
- Lualualei Hawaiian Civic Club
- Makaha Hawaiian Civic Club
- Mālama Mele o Hawai'i Hawaiian Civic Club
- Maunalua Hawaiian Civic Club
- Merchant Street Hawaiian Civic Club
- Nā Lani 'Ehā Hawaiian Civic Club
- Nānāikapono Hawaiian Civic Club
- Papakolea Hawaiian Civic Club
- Pearl Harbor Hawaiian Civic Club
- Prince Kūhiō Hawaiian Civic Club
- Princess Ka'iulani Hawaiian Civic Club
- Queen Emma Hawaiian Civic Club
- Tulipa Hawaiian Civic Club
- Wahiawa Hawaiian Civic Club
- Waialua Hawaiian Civic Club
- Wai'anae Hawaiian Civic Club
- Waikīkī Hawaiian Civic Club
- Waimānalo Hawaiian Civic Club

8

Kaahiki Solis Cultural Historian Oahu SHPD

Native Hawaiian Community Outreach

Island Burial Council List

Kauai/Niihau

Chair Keith Yap kyap@gavandrobinson.com

Maui

Chair Kapulani Antonio kaantoni@ksbe.edu

Oahu

Chair Hinaleimoana Wong-Kalu taahine.hina@gmail.com

Hawaii

Chair Edwin Miranda emiranda169@gmail.com

No Fee Data Bases for Digitized Hawaiian Kingdom Documents

Papakilo Database Office of Hawaiian Affairs

http://www.papakilodatabase.com/main/tutorial.php

Complete tutorials on how to interface with database is provided.

Kipuka Database Office of Hawaiian Affairs

Historic Sites/Land Awards/Crown Lands

http://kipukadatabase.com/kipuka/

Punawaiola Ka Huli Ao

http://punawaiola.org/

Ka Huli Ao Digital Archives is dedicated to the collection and dissemination of digitized documents of legal, historic and cultural significance for Hawai'i. Ka Huli Ao was established in 2005 at the Law School. Ka Huli Ao focuses on education, research and scholarship, community outreach, and the preservation of invaluable historical, legal, and traditional and customary materials. We also offer new courses and support Native Hawaiian and other law students as they pursue legal careers and leadership roles

9

Kaahiki Solis Cultural Historian Oahu SHPD

No Fee Data Bases for Digitized Hawaiian Kingdom Documents

AVAKONOHIKI

Ancestral Visions of Aina Konohiki

http://www.avakonohiki.org

Buke Mahele, LCA, Native Testimony, Foreign Testimony, Maps

Original Land Commission Awards and Transcript

Tutorial provided on how to interface

Neighborhood Board Commission

A means to reach the broader community of residents that live in a specific area. Go to the website below and find the street you are looking for along with the corresponding neighborhood board. See when the next meeting is and contact the group to be placed on their agenda. Create a presentation and ask for input.

http://www.honolulu.gov/rep/site/nco/nco_docs/Street_Index_2012-07_By_Board.pdf

Mission Houses Museum Library, digital collections and manuscripts (www.missionhouses.org);

Archives and Library of the Bishop Museum (www.bishopmuseum.org/research);
Historic photographs at the Hawai'i State Archives, Archives and Library of the Bishop Museum

10

Appendix D Authorization and Release Forms

D.1 Barbara Makua

January 30, 2016

CSH COPY

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950
Job code: WAIKIKI 184 hbeauchan@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Ala Wai 46kV Underground Cables, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu Island, Tax Map Keys (TMK): Multiple

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

Phyllis "Leimomi" Stephenson

I, Barbara Makua (Please print your name here), agree to the procedures outlined above and, by my signature, give my consent and release for this interview to be used as specified.

Barbara H Makua (Signature) Phyllis Leimomi Stephenson

30 January 2016 (Date)

Febraury 4, 2016

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950
Job code: WAIKIKI 184 hbeauchan@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Ala Wai 46kV Underground Cables, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu Island, Tax Map Keys (TMK): Multiple

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

I, Barbara Makua (Please print your name here), agree to the procedures outlined above and, by my signature, give my consent and release for this interview to be used as specified.

x Barbara H Makua (Signature)

February 4, 2016 (Date)

D.2 Jan Becket

February 18, 2016

CSH Copy

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: WAIKIKI 184 bbeauchan@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Ala Wai 46kV Underground Cables, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu Island, Tax Map Keys (TMK): Multiple

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

I, JAN Becket (Please print your name here), agree to the procedures outlined above and, by my signature, give my consent and release for this interview to be used as specified.

Jan Becket (Signature)

2/18/16 (Date)

D.2 Andrea Feeser

March 10, 2016

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: WAIKIKI 184 bbeauchan@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the proposed Ala Wai 46kV Underground Cables, Waikīkī Ahupua'a, Honolulu (Kona) District, O'ahu Island, Tax Map Keys (TMK): Multiple

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.

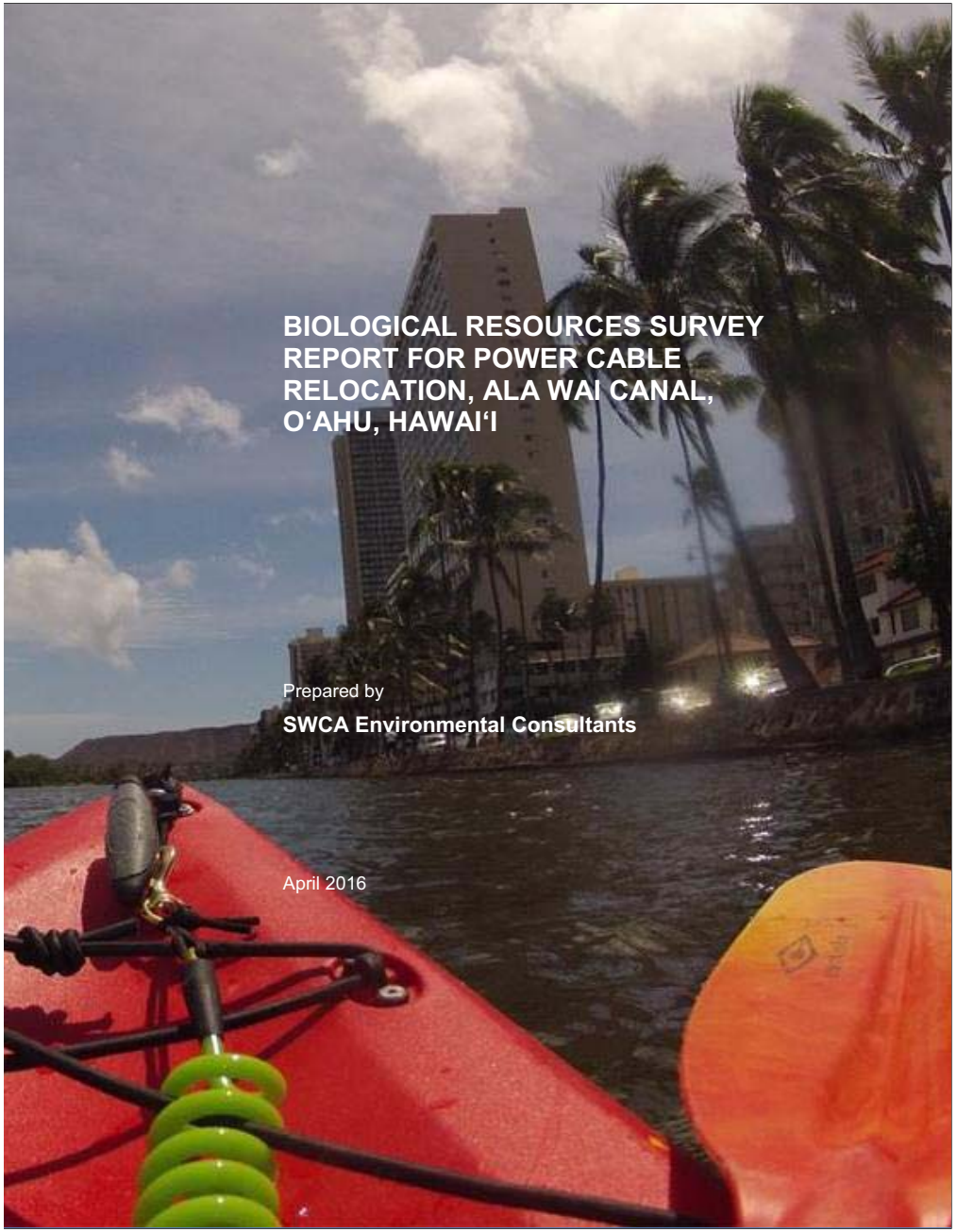
I, Andrea Feeser (Please print your name here), agree to the procedures outlined above and, by my signature, give my consent and release for this interview to be used as specified.

Andrea Feeser (Signature)

3/10/16 (Date)

APPENDIX D

BIOLOGICAL RESOURCE ASSESSMENT



BIOLOGICAL RESOURCES SURVEY REPORT FOR POWER CABLE RELOCATION, ALA WAI CANAL, O‘AHU, HAWAI‘I

Prepared by

SWCA Environmental Consultants

April 2016

BIOLOGICAL RESOURCES SURVEY REPORT FOR POWER CABLE RELOCATION, ALA WAI CANAL, O'AHU, HAWAI'I

Prepared by

SWCA Environmental Consultants
Bishop Square ASB Tower
1001 Bishop Street, Suite 2800
Honolulu, Hawai'i 96813
(808) 548-7922
www.swca.com

SWCA Project No. 25963.00

Revised April 28, 2016

EXECUTIVE SUMMARY

Belt Collins Hawaii LLC requested that SWCA Environmental Consultants (SWCA) perform a terrestrial and aquatic biological resources survey in support of the Hawaiian Electric power cable relocation, Ala Wai Canal project located within the McCully-Mō'ili'ili and Waikīkī districts on the Island of O'ahu (Figure 1). The intent of the project is to remove and relocate underground cables.

This report summarizes the findings of the biological resources survey conducted by SWCA on October 2, 2013, October 23, 2013 and January 28, 2016. A pedestrian survey was conducted to record all vascular plant species and vegetation types in the project area (Figure 1). Terrestrial fauna surveys consisted of observations between 09:30 and 11:00 am. Canal surveys consisted of benthic substrate sampling and shoreside observations.

The vegetation type and plant species identified during the survey are not considered unique. None of the 7 native plant species observed are federally and state threatened or endangered plants, proposed listed plants, or candidate plants. Therefore, the proposed project is not expected to have a significant, adverse impact on botanical resources.

Although not observed, one federally and state endangered mammal (Hawaiian hoary bat [*Lasiurus cinereus semotus*]) and one state threatened bird (white tern [*Gygis alba*]) could occur in the survey area based on available habitat. All other listed species with potential to occur on the Island of O'ahu are not likely to occur in the survey area because it is either outside the range of the species or appropriate habitat does not occur.

Small numbers of native marine fishes were observed and the fauna in the canal is dominated by introduced vertebrate and invertebrate species. Benthic samples had few living organisms and all samples smelled strongly of hydrogen sulfide indicating anoxic conditions. One speartail mudgoby (*Oxyurichthys lonchotus*) was found in the dredge sample collected near the wall of the canal along Ala Wai Boulevard. This is a native indigenous brackish water goby that is common along muddy bottoms such as the Ala Wai and Honolulu Harbor. None of the species found are on the federal or state listing of endangered, threatened or candidate species, so no mitigation is required.

CONTENTS

1. Introduction **1**
2. Description of Survey Area **3**
2.1. Location and Vicinity 3
2.2. Climate 4
3. Methods **4**
3.1. Flora Surveys 5
3.2. Fauna Surveys 5
3.3. Aquatic Surveys 5
4. Results **5**
4.1. Flora 6
4.2. Fauna 9
4.2.1. Avifauna 9
4.2.2. Mammals 10
4.2.3. Reptiles and Amphibians 10
4.2.4. Invertebrates 10
4.3. Aquatic Community 10
5. Discussion **12**
5.1. Flora 12
5.2. Terrestrial Fauna 12
5.2.1. Migratory Bird Treaty Act 13
5.2.2. Federal and state listed 13
5.3. Aquatic Fauna 14
6. Literature Cited **15**

APPENDICES

Appendix A. Checklist of Plants Observed at the Ala Wai Survey Area on October 2, 2013
Appendix B. Checklist of Aquatic Organisms Observed in the Ala Wai Canal on October 2 and 26, 2013.

FIGURES

Figure 1. Location of the survey area. 2
Figure 2. Proposed and existing cable locations. Figure adapted from Belt Collins. Note: Blue line indicates site of cable removal. 3
Figure 3. Location of cable removal in the Ala Wai Canal, and approximate locations of benthic sampling (orange dots). Figure adapted from Belt Collins. 4
Figure 4. Right-of-way along University Avenue, landscaped with hilo grass lawn and lacking trees (October 2, 2013). 7
Figure 5. Area between Ala Wai Community Garden and Ala Wai Canal, showing lack of vegetation in October 2013. 8
Figure 6. Photograph of vegetation along Kalaimoku Street, showing cultivated palm species and lawn grass. 8
Figure 7. Bottom profile of the Ala Wai Canal as measured in 2003. Figure provided by Belt Collins. 11
Figure 8. a: Benthic sample from the Ala Wai Canal before screening; b: the indigenous mud-dwelling speartail mudgoby. 12

TABLES

Table 1. Birds Observed by SWCA In and Near the Survey Area 9

1. INTRODUCTION

Belt Collins Hawaii LLC (Belt Collins) is preparing a State of Hawai'i environmental assessment (EA) in support of the removal and relocation of cables underneath and across the Ala Wai Canal, as proposed by the Hawaiian Electric. The project is located within the McCully-Mō'ili'ili and Waikīkī districts on the Island of O'ahu (Figure 1).

The proposed project will involve the following actions:

- Removing cables and conduits running under and near the Ala Wai Elementary School and community garden (Figure 2)
- Removing two energized lines and two abandoned lines and associated concrete panels from the Ala Wai Canal (see Figure 3)
- Installing a new ductbank and cables along Hīhīwai Street to University Avenue, and down to Ala Wai Canal on the mauka side of the Ala Wai Canal
- Installing cable through an existing ductbank from the Ala Wai Park to the riser (utility pole) on the corner of University Avenue and Kapi'olani Boulevard
- Horizontal directional drilling to install a new ductbank and cables under the Ala Wai Canal to Kalaimoku Street
- Installing a new ductbank and cables along Kalaimoku Street to Ala Wai Boulevard, then up Kaiolu Street to the Waikīkī substation on the makai side of the Ala Wai Canal

SWCA Environmental Consultants (SWCA), in support of the EA, conducted terrestrial flora and fauna surveys as well as aquatic surveys to document current terrestrial and aquatic natural resources that would be affected by the proposed work. This report summarizes the findings of the flora and fauna survey conducted over three survey dates. On October 2, 2013, flora and fauna surveys were conducted by SWCA Botanist Tiffany Thair, Zoologist/Marine Biologist Ling Ong, and Field Technician Bryson Luke. A photographic survey of the Ala Wai Canal bottom was attempted on October 2 but was aborted due to poor visibility. On October 23, a dredge was used to obtain benthic samples from the Ala Wai Canal. Due to changes in the project area, a supplemental flora and fauna survey was conducted on January 28, 2016, by SWCA Botanist Danielle Frohlich and Wildlife Biologist James Breeden.

The objectives of this report are to provide the following:

1. A description of flora and fauna at the project area, based on available literature and SWCA's surveys.
2. A description of the aquatic community (based on available literature and SWCA's surveys) around the submerged cables that will be removed.

A description of potential impacts of the project to the flora, fauna, and aquatic resources known to occur in the survey area, and recommendations with regard to avoidance and minimization of impacts to native and listed species (if any) during construction.

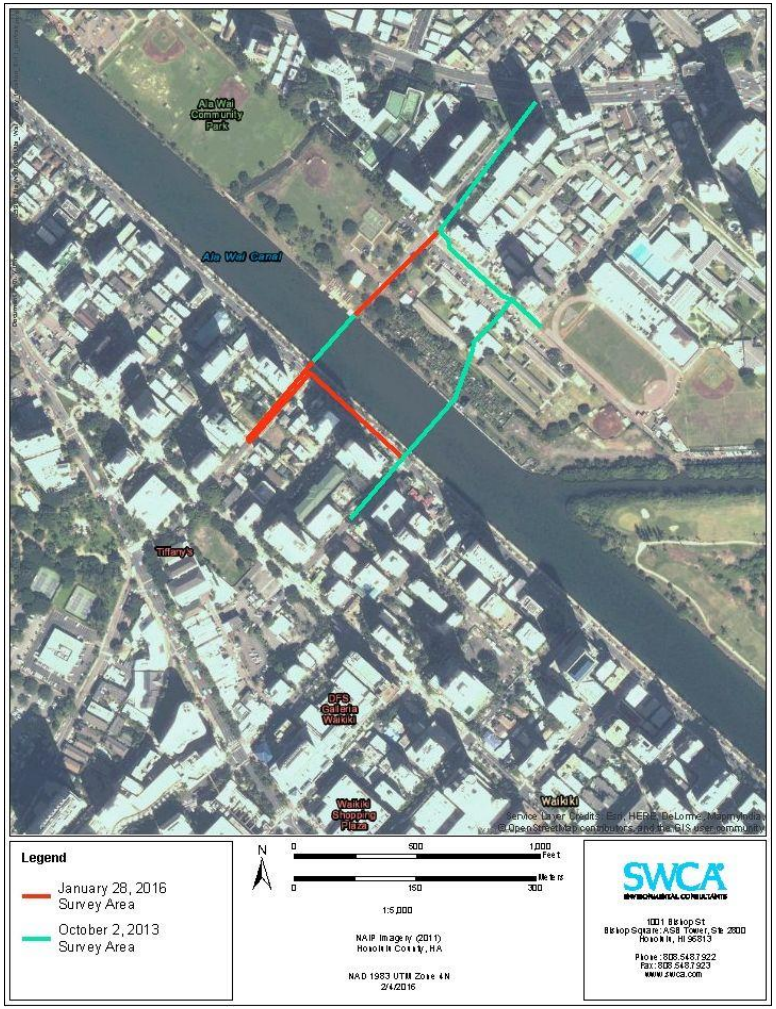


Figure 1. Location of the survey area.

2. DESCRIPTION OF SURVEY AREA

2.1. Location and Vicinity

The proposed project is located within the McCully-Mō'ili'ili and Waikīkī districts of, Honolulu, along the Ala Wai Canal. The existing cables in the survey area are all underground with portions submerged under the canal. The cables run along University Avenue and Hīhīwai Street, through Ala Wai Elementary School and Ala Wai Community Gardens (see Figures 1 and 2). The cables then cross under the Ala Wai Canal and exit on the south side of the canal (see Figure 2), and continues down Kai'olu Street to the Waikīkī substation. The new ductbank and cables will run down Hīhīwai Street, through the parking lot on the east (Diamondhead) side of Ala Wai Neighborhood Park, and then across the Ala Wai Canal. They will then run up and down Kalaimoku Street, down Ala Wai Boulevard to Kai'olu Street, and down Kai'olu Street to the Waikīkī substation (see Figures 1 and 2). The survey area is surrounded by roads, residential housing, apartments, and vacation units.



Figure 2. Proposed and existing cable locations. Figure adapted from Belt Collins. Note: Blue line indicates site of cable removal.

2.2. Climate

Mean annual rainfall for the survey area is approximately 27.3 inches (692.8 millimeters [mm]). Rainfall is typically highest in December and lowest in June (Giambelluca et al. 2013). The Palolo Fire Station (PFSH1) recorded 56% of average rainfall for 2013 through the end of October (National Oceanic and Atmospheric Administration/National Weather Service, Weather Forecast Office Honolulu 2013a). Rainfall data were not available for January 2016 during the writing of this report; however, the rain gage at the Palolo Fire Station recorded below average rainfall for December 2015 (National Oceanic and Atmospheric Administration/National Weather Service, Weather Forecast Office Honolulu 2016).

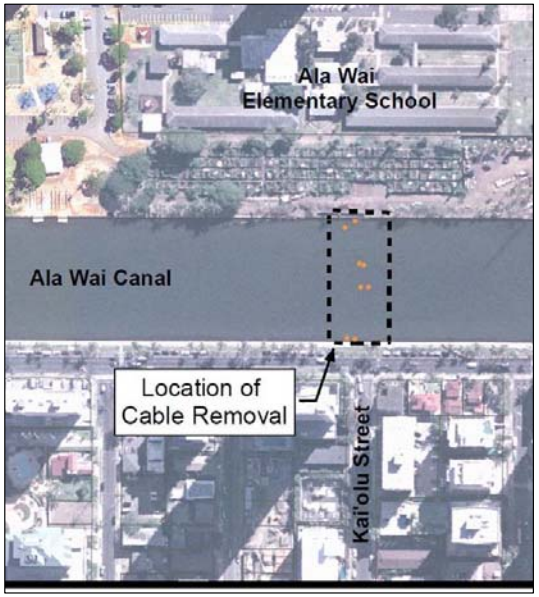


Figure 3. Location of cable removal in the Ala Wai Canal, and approximate locations of benthic sampling (orange dots). Figure adapted from Belt Collins.

3. METHODS

SWCA conducted a review of available scientific and technical literature regarding natural resources in and near the survey area. This literature review encompassed a thorough search of referenced scientific journals, technical journals and reports, EAs, environmental impact statements, relevant government documents, the U.S. Fish and Wildlife Service (USFWS) online data, and unpublished data that provide insight into the

area's natural history and ecology. SWCA also reviewed available geospatial data, aerial photographs, and topographic maps of survey area.

3.1. Flora Surveys

A pedestrian botanical survey was conducted in the survey area on October 2, 2013, and again on January 28, 2016, to document all vascular plant species and vegetation communities. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined.

Plants recorded during the survey are indicative of the season ("rainy" versus "dry") and the environmental conditions at the time of the survey. It is likely that additional surveys conducted at a different time of the year would result in minor variations in the species and abundances of plants observed.

3.2. Fauna Surveys

Pedestrian fauna surveys took place for the survey area on October 2, 2013, and January 28, 2016, during morning hours (09:00–11:00), when wildlife were most likely to be active. Visual and auditory observations were included in the survey. All observed birds, mammals, reptiles, amphibians, and invertebrate species were noted during the survey. Acoustic surveys for the Hawaiian hoary bat were not conducted, but areas of suitable habitat for roosting and foraging were noted during the survey.

3.3. Aquatic Surveys

The cable removal location is directly across from Kaiʻolu Street and approximately 100 feet (30.5 meters [m]) wide, spanning the width of Ala Wai Canal. The canal is approximately 251 feet (76.5 m) wide at that location. Aquatic surveys were conducted by two SWCA biologists at the cable-removal location in the Ala Wai Canal (see Figure 3). On October 2, attempts were made to photograph the benthos by lowering a light and an underwater camera to 39 inches (1 m) off the bottom across different portions of the canal. The camera was not successful at capturing clear images of the bottom due to the poor visibility, and this survey method was discontinued.

On October 23, benthic samples were obtained from eight locations by deploying an Ekman SS grab sampler across the canal (see orange dots in Figure 3); a kayak was used to access these eight locations. Samples were sifted through a 1.8-mm sieve onshore. All biological specimens remaining in the sieve were visually identified to the lowest taxonomic level (mostly family or genus), and to species if possible, with a note on relative abundance. Empty mollusk shells were kept for identification, and most living specimens were then released back into the water.

Incidental observations of aquatic species observed from the edge of the canal were also recorded while conducting the fauna survey along Ala Wai Boulevard on October 2. Most of the species seen from shore were either free swimming or found along the walls of the canal. Any of these species could be expected to move through or also be present at the cable removal location.

4. RESULTS

The survey area does not encompass any designated or proposed critical habitat for threatened or endangered species. No federally listed threatened, endangered, or candidate animals were observed during the pedestrian survey. However, the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*)

may forage or roost (described in detail below), and the state threatened white tern (*Gygis alba*) may nest in the survey area.

4.1. Flora

No state or federally listed threatened, endangered, or candidate plant species, or rare native Hawaiian plant species were observed in the survey area. In all, 146 plant species were recorded in the survey area during the two surveys. Of these, only seven species—milo (*Thespesia populnea*), hala (*Pandanus tectorius*), kīpūkai (*Heliotropium curassavicum*), ʻaeʻae (*Bacopa monnieri*), *Cyperus polystachyos, Nephrolepis cordifolia*, and moa (*Psilotum nudum*)—are native to the Hawaiian Islands. These indigenous species are common throughout the Hawaiian Islands (Wagner et al. 1999). Appendix A provides a list of all plant species observed by SWCA biologists in the survey area during the October 2 survey. Please refer to Figures 1 and 2 for survey locations mentioned below.

Ala Wai Elementary School: Vegetation at the elementary school site is composed of ornamental plants and manicured grasses, as well as weedy non-native grasses and herbaceous plants that are common in disturbed coastal areas. Grassy areas between buildings consist mainly of Bermuda grass (*Cynodon dactylon*), pitted beardgrass (*Bothriochloa pertusa*), hilo grass (*Paspalum conjugatum*), and swollen fingergrass (*Chloris barbata*). Ornamental plantings at the school include a large monkeypod tree (*Samanea saman*), ti (*Cordyline fruticosa*), elephant's-ear plant (*Alocasia* sp.), red ginger (*Alpinia purpurata*), and red powderpuff (*Calliandra haematocephala*). Additional ornamental plants occur near the parking area toward Hīhīwai Street, and include kou haole (*Cordia sebestena*), lantana (*Lantana camara*), and *Pseuderanthemum carruthersii* var. *carruthersii*. No native plant species were observed in this area.

Hīhīwai Street (mauka side): The survey area along Hīhīwai Street across from the school is landscaped with narrow-leaved carpetgrass (*Axonopus fissifolius*) and a row of Alexandra palms (*Archontophoenix alexandrae*). Very few other plant species occur in this area.

University Avenue from Hīhīwai Street to Kapiʻolani Boulevard (Diamondhead side): Vegetation along University Avenue is mostly a manicured lawn of hilo grass (Figure 4). Scattered non-native herbaceous weeds occur in the area including nodeweed (*Synedrella nodiflora*) and ticktrefoil (*Desmodium triflorum*).

Ala Wai Neighborhood Park parking lot: Vegetation along the parking lot to the east (Diamondhead side) of Ala Wai Neighborhood Park consists primary of a mix of lawn grasses, including Bermuda grass (*Cynodon dactylon*) and St. Augustine grass (*Stenotaphrum secundatum*), as well as weedy grass species such as wiregrass (*Eleusine indica*) and Japanese lovegrass (*Eragrostis amabilis*). Other dominant species in the area include the herbaceous weeds *Modiola caroliniana* and khakiweed (*Alternanthera pungens*). Large trees planted in the parking lot area include several monkeypods (*Samanea saman*), some coconuts (*Cocos nucifera*), rainbow shower trees (*Cassia x nealiae*), and kou (*Cordia sebestena*).

Ala Wai Community Gardens: The vegetation at this site is dominated by edible crop plants and interspersed weedy plants. The most abundant weedy plants include dallisgrass (*Paspalum dilatatum*), pink woodsorrel (*Oxalis debilis*), morning glory (*Ipomoea obscura*), and Guinea grass (*Urochloa maxima*). Plants typical of community gardens were observed, including papaya (*Carica papaya*), basil (*Ocimum* sp.), rosemary (*Rosmarinus officinalis*), and corn (*Zea mays*). One native plant, ʻaeʻae, was observed at this location in the garden. The location between the garden and the access point to the canal was devoid of vegetation in October 2013 (Figure 5).

Kaiʻolu Street: The vegetation along Kaiʻolu Street to the substation is characterized by manicured grasses, mostly St. Augustine grass (*Stenotaphrum secundatum*), with landscaped plantings. The larger trees and

palms include coconut, Macarthur palm (*Ptychosperma macarthurii*), octopus tree (*Schefflera actinophylla*), and the native hala. Hedge plantings occurring around buildings include croton (*Codiaeum variegatum*) and natal-plum (*Carissa macrocarpa*).

Kalaimoku Street: The vegetation along Kalaimoku Street to the construction staging area is characterized by manicured grasses, mostly St. Augustine grass, with landscaped plantings (Figure 6). Larger trees in the area include coconut, fiddlewood (*Citharexylum spinosum*), Manila palm (*Adonidia merrillii*), and areca palm (*Dypsis lutescens*). Planted shrubs include hibiscus (*Hibiscus rosa-sinensis*) and bougainvillea (*Bouganvillea* sp.). Weedy roadside weeds, such as khakiweed, wood sorrel (*Oxalis corniculata),* and Asian pennywort (*Centella asiatica*) are also prevalent.

Ala Wai Boulevard from Kalaimoku Street to Kai'olu Street: The vegetation along the canal side of Ala Wai Boulevard consists primarily of a manicured lawn interspersed with weedy grasses and weedy herbaceous species. Coconut trees, ranging from 10 to 40 feet (3 to 12 m) tall, are planted at regular intervals in the area. The most common grasses in this location include smutgrass (*Sporobolus africanus*), dallisgrass, Carolina lovegrass (*Eragrostis pectinacea*), Henry's crabgrass (*Digitaria ciliaris*), Bermuda grass, and St. Augustine grass. Non-native weeds widely scattered throughout the area include tick trefoil, narrow-leaved plantain (*Plantago lanceolata*), creeping indigo (*Indigofera spicata*), and khaki weed (*Alternanthera pungens*). The vegetation on the makai side of the street consists of a lawn made up almost entirely of zoysia grass *(Zoysia tenuifolia*) as well as landscaped plantings with commonly grown ornamentals including croton, ti, and snowbush (*Breynia disticha* cv. 'Roseo-picta').



Figure 4. Right-of-way along University Avenue, landscaped with hilo grass lawn and lacking trees (October 2, 2013).



Figure 5. Area between Ala Wai Community Garden and Ala Wai Canal, showing lack of vegetation in October 2013.



Figure 6. Photograph of vegetation along Kalaimoku Street, showing cultivated palm species and lawn grass.

4.2. Fauna

4.2.1. Avifauna

The birds observed in the survey area are species commonly found in Hawai'i's urban areas, gardens, and waterways. Of the 18 bird species documented, six are protected under the Migratory Bird Treaty Act (MBTA) (Table 1). Although not observed, the black-crowned night heron (*Nycticorax nycticorax*) can also be expected to be found along the Ala Wai Canal.

Table 1. Birds Observed by SWCA In and Near the Survey Area

Common Name	Scientific Name	Status*	Protected by the MBTA	Year Observed
Cattle egret	*Bubulcus ibis*	NN	X	2013/2016
Common myna	*Acridotheres tristis*	NN		2013/2016
Common waxbill	*Estrilda astrild*	NN		2013/2016
Hawaiian duck-mallard hybrid*	*Anas* sp.	NN	X	2013/2016
House finch	*Haemorhous mexicanus*	NN	X	2013/2016
House sparrow	*Passer domesticus*	NN		2013/2016
Hwamei	*Garrulax canorus*	NN		2013
Japanese white-eye	*Zosterops japonicus*	NN		2013/2016
Java sparrow	*Radda oryzivora*	NN		2013
Northern cardinal	*Cardinalis cardinalis*	NN	X	2013
Pacific golden plover	*Pluvialis fulva*	N	X	2013/2016
Red-crested cardinal	*Paroaria coronata*	NN		2013/2016
Red-vented bulbul	*Pycnonotus cafer*	NN		2013
Red-whiskered bulbul	*Pycnonotus jocosus*	NN		2013/2016
Rock dove	*Columba livia*	NN		2013/2016
Spotted dove	*Streptopelia chinensis*	NN		2013/2016
Wandering tattler	*Tringa incana*	N	X	2013
Zebra dove	*Geopelia striata*	NN		2013/2016
Total		**18**	**6**	

N = Native, NN = Non-native permanent resident

*These were observations of ducks that are likely hybrids of the native Hawaiian duck (*Anas wyvilliana*) and the introduced mallard (*Anas platyrhynchos*).

4.2.1.1. WHITE TERN

The white tern was not observed during the survey. However, the Ala Wai Park, Kalanimoku Street, and Ala Wai Boulevard have tree species within the survey area—coconut, kou, fiddlewood, manila palms, monkeypod, pandanus, and rainbow shower tree—that could be used by the white tern for nesting and roosting.

4.2.2. Mammals

The survey area is bordered by residential areas where it is common to find people walking pet dogs (*Canis familiaris*). No other mammals were observed during the pedestrian surveys. Mammals that could be expected in the survey area include cat (*Felis catus*), mongoose (*Herpestes javanicus*), rat (*Rattus* spp.), and mouse (*Mus musculus*).

4.2.2.1. HAWAIIAN HOARY BAT

Although the Hawaiian haory bat was not observed during the survey, the Ala Wai Park, Kalanimoku Street, and Ala Wai Boulevard have tree species within the survey area—coconut, kou, fiddlewood, manila palms, monkeypod, pandanus, and rainbow shower tree—that could be used by Hawaiian hoary bats for roosting. In addition, the Hawaiian hoary bat could forage over the urban roadside vegetation type and Ala Wai Canal.

4.2.3. Reptiles and Amphibians

No reptiles or amphibians were seen during the survey. None of the terrestrial reptiles or amphibians in Hawai'i are native to the islands.

4.2.4. Invertebrates

All insects seen in the survey area during the survey are non-native to the Hawaiian Islands and include various ant species, American cockroach (*Periplaneta americana*), cabbage white butterfly (*Pieris rapae*), gulf fritillary (*Agraulis vanillae*), honey bee (*Apis mellifera*), house fly (*Musca domestica*), and monarch butterfly (*Danaus plexippus*).

4.3. Aquatic Community

Shoreside surveys of the Ala Wai Canal were conducted on October 2, 2013, while walking along Ala Wai Boulevard. Sampling of the benthic substrate from a kayak was conducted on October 26, 2013, between 0900 and 1200. A complete list of species observed can be found in Appendix B.

Schools of introduced tilapia (*Oreochromis/Sarotherodon* spp.) were often observed, and were by far the most abundant fish in the Ala Wai Canal. Other introduced species include mosquitofish (*Gambusia/Poecilia* spp.). Small numbers of native marine fishes were observed and include juvenile giant barracuda (*Sphyraena barracuda*), lai (*Scomberoides lysan*), and a small school of juvenile striped mullet (*Mugil cephalus*). Other native fish species that were not observed but have been previously documented in the Ala Wai Canal in the past two decades are papio (family Carangidae), Hawaiian flagtail or āholehole (*Kuhlia sandvicensis*), and bonefish or 'o'io (*Abula glossodonta*) (Miller 1975; Townscape and Dashiell 2003).

The blue claw crab (*Thalamita crenata*) was common along the walls of the canal, and several individuals of the introduced mangrove crab (*Scylla serrata*) were also spotted. Several moon jellies (*Aurelia aurita*) of various sizes were seen pulsating on the surface. The walls of the canal are extensively covered with barnacles (*Balanus/Chthamalus* spp.), also likely introduced species. Large clumps of the introduced bryozoan (*Zoobotryon verticillatum*) were seen growing along the canal, interspersed with scattered clumps of the introduced sponge *Suberites zeteki*. The fauna of the Ala Wai Canal is largely dominated by introduced vertebrate and invertebrate species.

Eight benthic samples were obtained from the location of the cable removal site. Four samples were collected along the walls of the canal, and four samples were obtained from the middle of the canal (see Figure 3). The depths measured from the kayak are similar to the bottom profile made for the area in 2003 (Figure 7).

All benthic samples smelled strongly of hydrogen sulfide, which is an indicator of anoxic conditions. The sediment was mostly mud intermixed with barnacle shells near the walls of the canal, and mud with leaf litter and twigs nearer the middle (Figure 8a). Trash such as aluminum cans also came up with the dredge samples. Few samples had any living benthic organisms. The most common animals were amphipods (order Amphipoda) and a few fireworms (family Amphinomidae). One speartail mudgoby (*Oxyurichthys lonchotus*, Figure 8b) was found in the dredge sample collected near the wall of the canal along Ala Wai Boulevard. This is a native indigenous brackish water goby that is common along muddy bottoms such as the Ala Wai and Honolulu Harbor (personal communication, Arnold Suzumoto, Collection Manager-Ichthyology, Bishop Museum, October 2013).

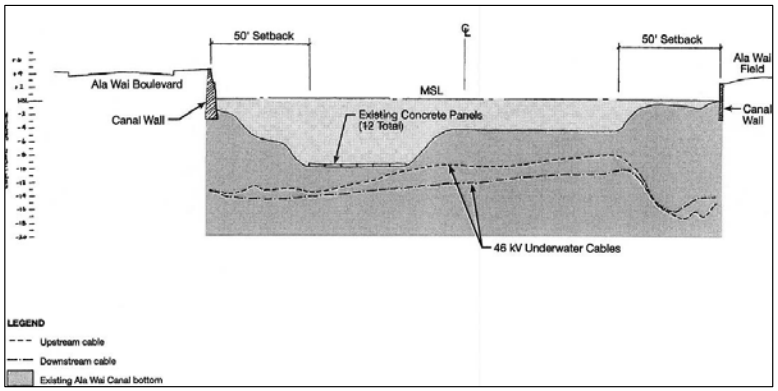


Figure 7. Bottom profile of the Ala Wai Canal as measured in 2003. Figure provided by Belt Collins.



a b

Figure 8. a: Benthic sample from the Ala Wai Canal before screening; b: the indigenous mud-dwelling speartail mudgoby.

5. DISCUSSION

5.1. Flora

Overall, the vegetation in the survey area is disturbed from previous and current land-use activities. The vegetation types and species identified are not considered unique. Over 95% of the plant species seen are not native. The seven native species observed are indigenous (found in Hawai'i and elsewhere) and are common throughout the Hawaiian Islands. No threatened or endangered plants were found during the reconnaissance, and no designated plant critical habitat occurs in the area. Therefore, the proposed project is not expected to have a significant, adverse impact on botanical resources.

If landscaping occurs as a result of the project, SWCA recommends that native Hawaiian plants be used to the maximum extent possible. Potential native species that may be appropriate for landscaping at the proposed project area include milo, kou (*Cordia subcordata*), pōhinahina (*Vitex rotundifolia*), 'uki'uki (*Dianella sandwicensis*), and 'ilie'e (*Plumbago zeylanica*). Additional information on selecting appropriate plants for landscaping can be obtained from the following websites:

- http://www.nativeplants.Hawaii.edu/
- http://www.plantpono.org/non-invasive-plants.php
- http://www.hear.org/oisc/oahuearlydetectionproject/pdfs/oedposterwhatnottoplant.pdf

5.2. Terrestrial Fauna

5.2.1. Migratory Bird Treaty Act

SWCA observed six bird species federally protected under the MBTA during this survey (Table 1). Construction at the site may temporarily displace some of these bird species, but long-term impacts are not expected. These birds (likely limited to a few individuals) are expected to find suitable foraging habitat in nearby areas. The temporary displacement of these individuals at the project site is not expected to affect individual survival or the overall species populations.

5.2.2. Federal and state listed

Hawaiian Hoary Bat

Hawaiian hoary bats are known to occur on O'ahu in native, non-native, agricultural, and developed landscapes (U.S. Department of Agriculture 2009; USFWS 1998). Hawaiian hoary bats forage in open, wooded, and linear habitats with a wide range of vegetation types. These animals are insectivores, and are regularly observed foraging over streams, reservoirs, and wetlands up to 300 feet (100 m) offshore (U.S. Department of Agriculture 2009). Hawaiian hoary bats typically roost in trees greater than 16 feet (5 m) with dense canopy foliage or in subcanopy when canopy is sparse, with open access for launching into flight (Gorresen et al 2013; U.S. Department of Agriculture 2009). Hawaiian hoary bats have been documented roosting in coconut, pandanus, and rainbow shower trees, and may roost in other trees at the site. However, direct impacts to bats would only occur if a juvenile bat that is too small to fly but too large to be carried by a parent were present in a tree that was cut down. Although the chances of adversely affecting Hawaiian hoary bats as a result of the proposed project are likely small, the following actions are recommended as a conservative impact avoidance measure:

- No fences containing barbed wire will be erected.
- No trees taller than 15 feet (4.6 m) should be trimmed or removed as a result of this project between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

Implementation of these guidelines are expected to avoid all direct impacts to Hawaiian hoary bats.

White Tern

Although the white tern was not observed during the field survey, it may occur within the survey area. The white tern is listed by the state as threatened for the Island of O'ahu. On O'ahu, white terns most commonly nest in banyans (*Ficus* spp.), monkeypod, mahogany (*Swietenia mahogany*), and kukui (*Aleurites moluccana*), although other tree species have also been documented for nesting and roosting (Vanderwerf 2003). The white tern lays eggs directly on branches; thus, eggs and flightless chicks are highly vulnerable to tree trimming and removal activities (Vanderwerf 2003).

Although white terns are tolerant of people and noise, the following action is recommended to avoid impacts to this species:

- Tree removal and trimming should be conducted during fall and early winter, when white tern breeding is at its lowest (Vanderwerf 2003).
- Trees should be inspected for white tern eggs or chicks prior to tree removal.

5.3. Aquatic Fauna

The speartail mudgoby is common in muddy habitats, and the removal of the cable in the small section of the Ala Wai Canal would temporarily displace the individuals in the area. However, the displacement is expected to be temporary, and no long-term impacts are expected. Other native fish species are free swimming and can be expected to return to the area when construction is completed.

Based on the benthic samples obtained from the dredge, the sediment found at the bottom of the canal is very fine (essentially mud, Figure 8a). The removal of the cables and associated concrete panels can be expected to suspend a great deal of sediment. Proper sedimentation-control measures such as silt curtains must be in place before the cable removal commences. Silt curtains must be deployed and maintained in the immediate area around the cable-removal work for the duration of the removal effort, and should cover the full depth of the water column. This will prevent the suspended sediment from impacting organisms further downstream or from reaching the ocean.

6. LITERATURE CITED

Evenhuis, N.L., and L.G. Eldredge. 2011. Taxonomic changes in Hawaiian ferns and lycophytes. Records of the Hawaii Biological Survey for 2009-2010. *Bishop Museum Occasional Papers* 110:11–16.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte. 2013. Online Rainfall Atlas of Hawai'i. *Bulletin of the American Meteorological Society* 94:313–316. Available at: http://rainfall.geography.hawaii.edu. Accessed October 22, 2013.

Gorressen M.P., Bonaccorso, F.J., Pinzari, C.A., Todd, C.M., Montoya-Aiona, and K. Brinck. 2013. *A Five-year Study of Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) Occupancy on the Island of Hawai'i (HSCU-041).* Hilo: Hawai'i Cooperative Studies Unit.

Miller J.N. 1975. *Ecological Studies of the Biota of the Ala Wai Canal*. Hawaii Institute of Marine Biology Technical Report No. 32. Honolulu: University of Hawai'i.

National Oceanic and Atmospheric Administration/National Weather Service, Weather Forecast Office Honolulu. 2013a. Hydrology in Hawai'i. Available at: http://www.prh.noaa.gov/hnl/hydro/pages/oahu_ytd_10.gifhttp://www.prh.noaa.gov/hnl/pages/hydrology.php. Accessed October 14, 2013.

———. 2013b. Endangered and Threatened Marine Species Website. Available at: http://www.nmfs.noaa.gov/pr/species/esa/. Accessed March 2013.

———.. 2016. Hydrology in Hawai'i. Available at: http://www.prh.noaa.gov/hnl/hydro/pages/oahu_12.gif. Accessed February 2, 2016.

Palmer, D.D. 2003. *Hawaii's Ferns and Fern Allies*. Honolulu: University of Hawai'i Press.

Staples, G.W. and D.R. Herbst. 2005. *Garden Flora. Plants Cultivated in the Hawaiian Islands and Other Tropical Places.* Honolulu: Bishop Museum Press.

Townscape, Inc. and Eugene P. Dashiell, AICP (in cooperation with Oceanit). 2003. *Ala Wai Watershed Analysis Final Report*. Prepared for Department of Land and Natural Resources and U.S. Army Corps of Engineers.

U.S. Department of Agriculture. 2009. *Bats of the U.S. Pacific Islands*. Biology Technical Note No. 20. Natural Resources Conservation Service, Pacific Islands Area.

U.S. Fish and Wildlife Service (USFWS). 1998. *Recovery Plan for the Hawaiian Hoary Bat (Lasiurus cinereus semotus).* Portland, Oregon: USFWS Region 1.

Vanderwerf, E. 2003. Distribution, Abundance, and Breeding Biology of White Terns on Oahu, Hawaii. *The Wilson Bulletin* 115(3):258–262.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999. *Manual of the Flowering Plants of Hawai'i.* Volumes I and II. Revised edition. Honolulu: University of Hawai'i Press.

Wagner, W.L., and D.R. Herbst. 2003. *Supplement to the Manual of the Flowering Plants of Hawai'i.* Version 3.1. Available at: http://persoon.si.edu/pacificislandbiodiversity/hawaiianflora/manualsupplement3.pdf. Accessed November 25, 2013.

Wagner, W.L., D.R. Herbst, N. Khan, and T. Flynn. 2012. Hawaiian Vascular Plant Updates: A Supplement to the Manual of the Flowering Plants of Hawai'i and Hawai'i's Ferns and Fern Allies. Version 1.3. Available at: http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/Hawaiian_vascular_plant_updates_1.3.pdf. Accessed November 25, 2013.

.

This page intentionally blank

Appendix A.

CHECKLIST OF PLANTS OBSERVED AT THE ALA WAI SURVEY AREA ON OCTOBER 2, 2013

The following checklist is an inventory of plant species observed by SWCA biologists on October 2, 2013, during the survey of the Ala Wai survey area. The plant names are arranged alphabetically by family and then by species into three groups: Ferns and Lycophytes, Monocots, and Dicots. The taxonomy and nomenclature of the ferns and lycophytes are in accordance with Palmer (2003) and Evenhuis and Eldredge (2011). The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

Status:

E = endemic = native only to the Hawaiian Islands
I = indigenous = native to the Hawaiian Islands and elsewhere
P = Polynesian = introduced by Polynesians
X = introduced/alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778)

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
FERNS AND LYCOPHYTES		
NEPHROLEPIDACEAE		
Nephrolepis cordifolia (L.) C.Presl	narrow sword fern	I
POLYPODIACEAE		
Phymatosorus grossus (Langsd. & Fisch.) Brownlie	laua'e, maile-scented fern	X
PSILOTACEAE		
Psilotum nudum (L.) P.Beauv.	moa, whisk fern	I
MONOCOTS		
AGAVACEAE		
Cordyline fruticosa (L.) A.Chev.	ti	P
Dracaena draco L.	dragon tree	X
Dracaena reflexa	Pride of India	X
ALOEACEAE		
Aloe vera (L.) Burm.f.	aloe	X
ARACEAE		
Alocasia sp.	elephant's-ear plant	X

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
Axonopus fissifolius (Raddi) Kuhlmann	narrow-leaved carpetgrass	X
Bothriochloa pertusa (L.) A.Camus	pitted beardgrass	X
Cenchrus ciliaris L.	buffelgrass	X
Cenchrus echinatus L.	common sandbur	X
Chloris barbata Sw.	swollen fingergrass	X
Chloris radiata (L.) *Sw.*	radiate fingergrass, plushgrass	X
Cynodon dactylon (L.) Pers.	Bermuda grass	X
Digitaria ciliaris (Retz.) Koeler	Henry's crabgrass, kūkaepua'a	X
Eleusine indica (L.) Gaertn.	wiregrass	X
Eragrostis amabilis	Japanese lovegrass	X
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	X
Paspalum conjugatum P.J.Bergius	Hilo grass	X
Paspalum dilatatum Poir.	Dallisgrass	X
Paspalum fimbriatum Kunth	Panama paspalum, fimbriate paspalum	X
Paspalum vaginatum Sw.	seashore paspalum	X
Sacciolepis indica (L.) Chase	Glenwood grass	X
Setaria verticillata (L.) P.Beauv.	bristly foxtail	X
Sporobolus africanus (Poir.) Robyns & Tournay	smutgrass, African dropseed	X
Sporobolus sp.	---	X
Stenotaphrum secundatum (Walter) Kuntze	St. Augustine grass, buffalo grass	X
Urochloa maxima (Jacq.) R.D. Webster	Guinea grass	X
Zea mays L.	corn	X
Zoysia matrella (Linnaeus) Merrill	zoysia grass	X
Zoysia tenuifolia Thiele	zoysia grass	X
ZINGIBERACEAE		
Alpinia purpurata (Vieill.) K.Schum.	red ginger, 'awapuhi 'ula'ula	X

Biological Resources Survey Report for Power Cable Relocation, Ala Wai Canal, O'ahu, Hawai'i

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
Colocasia esculenta (L.) Schott	taro, kalo	X
ARECACEAE		
Adonidia merrillii (Becc.) Becc.	Manila palm	X
Archontophoenix alexandrae (F. Mueller) H. Wendland & Drude	Alexandra palm, king palm	X
Cocos nucifera L.	niu, coconut	P
Dypsis lutescens (H. Wendland) Beentje & J. Dransfield	butterfly palm, golden cane palm	X
Ptychosperma macarthurii (Veitch) J. D. Hooker	Macarthur palm	X
Roystonea regia (Kunth) O.F. Cook	Cuban royal palm	X
COMMELINACEAE		
Commelina diffusa Burm.f.	honohono, mākolokolo, dayflower	X
CYPERACEAE		
Cyperus gracilis R.Br.	McCoy grass, mau'u hunehune	X
Cyperus polystachyos Rottb.	----	I
Cyperus rotundus L.	nut sedge	X
Kyllinga brevifolia Rottb.	kili'o'opu, kaluhā	X
Kyllinga nemoralis (J.R.Forst. & G.Forst.) Dandy ex Hutch. & Dalziel	kili'o'opu, mau'u mokae	X
LILIACEAE		
Agapanthus praecox Willdenow subsp. *Orientalis*	agapanthus	X
Allium fistulosum L.	green onion	X
Asparagus densiflorus (Kunth) Jessop	asparagus fern	X
Asparagus plumosus J.G.Baker	---	X
Crinum asiaticum	crinum lily	X
PANDANACEAE		
Pandanus tectorius Parkinson ex Z	hala, pū hala	I?
POACEAE		
Axonopus compressus (Sw.) Beauv.	carpetgrass	X

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
Eclipta prostrata (L.) L.	false daisy	X
Emilia fosbergii Nicolson	pualele	X
Lactuca sativa L.	lettuce, prickly lettuce	X
Pluchea carolinensis (Jacq.) G.Don	sourbush, marsh fleabane	X
Pluchea indica (L.) Less.	Indian fleabane, Indian pluchea, marsh fleabane	X
Pseudelephantopus spicatus (B.Juss. ex Aubl.) C.F.Baker	elephant's-foot	X
Sigesbeckia orientalis L.	small yellow crown-beard	X
Sphagneticola trilobata (L.) Pruski	wedelia	X
Synedrella nodiflora (L.) Gaertn.	nodeweed	X
Tridax procumbens L.	coat buttons	X
BORAGINACEAE		
Cordia sebestena L.	kou haole, Geiger tree	X
Heliotropium curassavicum L.	kīpūkai, nena, seaside heliotrope	I
BRASSICACEAE		
Coronopus didymus (L.) Sm.	swinecress	X
Lepidium oblongum Small	pepperwort, peppergrass	X
CACTACEAE		
Hylocereus undatus (Haw.) Britton & Rose	night-blooming cereus	X
CARICACEAE		
Carica papaya L.	papaya	X
CONVOLVULACEAE		
Ipomoea batatas (L.) Lam.	ʻuala, ʻuwala, sweet potato	X
Ipomoea obscura (L.) Ker Gawl.	morning glory	X
CRASSULACEAE		
Kalanchoe daigremontiana Raym.-Hamet & H.Perrier	---	X
CUCURBITACEAE		
Momordica charantia L.	balsam pear, bitter melon	X

Biological Resources Survey Report for Power Cable Relocation, Ala Wai Canal, O'ahu, Hawai'i

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
DICOTS		
ACANTHACEAE		
Asystasia gangetica (L.) T. Anders.	Chinese violet	X
Graptophyllum pictum (L.) Griff.	caricature-plant	X
Pseuderanthemum carruthersii (Seem.) Guillaumin var. *carruthersii*	---	X
Ruellia brevifolia (Pohl) C.Ezcurra	---	X
AIZOACEAE		
Aptenia cordifolia (L.) Brown	hearts and flowers	X
Carpobrotus sp.	ice plant	X
Trianthema portulacastrum L.	----	X
AMARANTHACEAE		
Alternanthera pungens Kunth	khaki weed	X
Alternanthera sessilis (L.) R.Br. ex DC.	sessile joyweed	X
Amaranthus viridis L.	slender amaranth, pakai	X
Amaranthus spinosus	spiny amaranth	X
ANACARDIACEAE		
Schinus terebinthifolius Raddi	Christmas berry	X
APIACEAE		
Centella asiatica (L.) Urb.	Asiatic pennywort, pohe kula	X
APOCYNACEAE		
Carissa macrocarpa (Ecklon) A. de Candolle	carissa, natal-plum	X
ARALIACEAE		
Schefflera actinophylla (Endl.) Harms	octopus tree	X
ASTERACEAE		
Calyptocarpus vialis Less.	----	X
Conyza bonariensis (L.) Cronq.	hairy horseweed	X

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
Plectranthus sp.	spur flower	X
Rosmarinus officinalis L.	rosemary	X
LYTHRACEAE		
Cuphea subuligera Koehne	----	X
MALVACEAE		
Hibiscus rosa-sinensis L.	hibiscus	X
Malva parviflora L.	cheeseweed	X
Malvastrum coromandelianum (L.) Garcke ssp. *coromandelianum*	----	X
Modiola caroliniana (L.) G.Don	----	X
Sida acuta Burm.f. ssp. *carpinifolia* (L.f.) Borss.Waalk.	----	X
Sida ciliaris L.	----	X
Thespesia populnea (L.) Sol. ex Corrêa	milo, portia tree	I
MYRTACEAE		
Melaleuca quinquenervia (Cav.) S.T.Blake	paperbark	X
NYCTAGINACEAE		
Boerhavia coccinea Mill.	---	X
Bougainvillea sp.	bougainvillea, pua kepalō	X
OXALIDACEAE		
Oxalis corniculata L.	wood sorrel	P
Oxalis debilis Kunth var. *corymbosa* (DC.) Lourteig	pink wood sorrel, ‘ihi pehu	X
PASSIFLORACEAE		
Passiflora suberosa L.	huehue haole	X
PLANTAGINACEAE		
Plantago lanceolata L.	narrow-leaved plantain	X
Plantago major L.	broad-leaved plantain, common plantain	X
PORTULACACEAE		
Portulaca oleracea L.	pigweed, ‘ākulikuli kula	X

Biological Resources Survey Report for Power Cable Relocation, Ala Wai Canal, O'ahu, Hawai'i

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
EUPHORBIACEAE		
Breynia disticha cv. ‘Roseo-picta’	snowbush, laukalakoa	X
Codiaeum variegatum (L.) Blume	croton, codiaeum	X
Euphorbia hirta L.	hairy spurge, garden spurge	X
Euphorbia hypericifolia L.	graceful spurge	X
Euphorbia hyssopifolia L.	----	X
Euphorbia lactea Haw.	----	X
Euphorbia prostrata Aiton	prostrate spurge	X
Euphorbia tirucalli L.	pencil tree, milkbush	X
Manihot esculenta Crantz	cassava, manioc, tapioca plant	X
Phyllanthus debilis Klein ex Willd.	niruri	X
FABACEAE		
Alysicarpus vaginalis (L.) DC.	alyce clover	X
Calliandra haematocephala Hasskarl	red powderpuff, lehua haole	X
Cassia x nealiae H. S. Irwin & Barneby	rainbow shower tree	X
Desmodium incanum DC.	Spanish clover	X
Desmodium triflorum (L.) DC.	tick trefoil, tick clover	X
Indigofera spicata Forssk.	creeping indigo	X
Leucaena leucocephala (Lam.) de Wit	koa haole	X
Mimosa pudica L.	sensitive plant	X
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe, algaroba, mesquite,	X
Pisum sativum L.	garden pea	X
Samanea saman (Jacq.) Merr.	monkeypod, rain tree	X
Trifolium campestre Schreb.	----	X
LAMIACEAE		
Ocimum sp.	basil	X
Perilla frutescens L. Britton	shiso	X

Biological Resources Survey Report for Power Cable Relocation, Ala Wai Canal, O'ahu, Hawai'i

Table A-1. Inventory of Plant Species Observed at the Ala Wai Survey Area on October 2, 2013

Scientific Name	Common and Hawaiian Name(s)	Status
PRIMULACACEAE		
Ludwigia octovalvis (Jacq.) P.H.Raven	primrose willow, kāmole, alohalua, kāmole lau li‘i, kāmole lau nui	P?
RUBIACEAE		
Gardenia taitensis de Candolle	Tahitian gardenia	X
Oldenlandia corymbosa L.	----	X
Spermacoce assurgens Ruiz & Pav.	coat buttons, buttonweed	X
RUTACEAE		
Citrus aurantiifolia (Christmann) Swingle	lime	X
SCROPHULARIACEAE		
Bacopa monnieri (L.) Wettst.	‘ae‘ae	I
SOLANACEAE		
Solanum lycopersicum L.	tomato	X
Solanum melongena L.	eggplant	X
STERCULIACEAE		
Waltheria indica L.	‘uhaloa	X
VERBENACEAE		
Citharexylum spinosum L.	fiddlewood	X
Lantana camara L.	lantana	X
Stachytarpheta cayennensis (Rich.) Vahl	blue rat’s-tail	X
VITACEAE		
Vitis sp.	grape	X

This page intentionally blank

Appendix B.

CHECKLIST OF AQUATIC ORGANISMS OBSERVED IN THE ALA WAI CANAL ON OCTOBER 2 AND 26, 2013

The following checklist is an inventory of algae, invertebrate and fish species observed by SWCA biologists on October 2 and 26, 2013 during the aquatic survey at Ala Wai Canal.

Table B-1. Checklist of Aquatic Organisms Observed in the Ala Wai Canal on October 2 and 26, 2013

FISH

Family	Species	Common Name	Habit	In Dredge Sample?
Carangidae (jacks)	*Scomberoides lysan*	lai	free swimming	
Gobbidae (gobies)	*Oxyurichthys lonchotus*	speartail mudgoby	soft bottom-dwelling	Y
Mullets (mugilidae)	*Mugil cephalus*	striped mullet ('ama'ama)	free swimming	
Sphyraeniae (barracudas)	*Sphyraena barracuda*	great barracuda	free swimming	
Cichlidae (cichlids)	*Oreochromis/Sarotherodon* spp.*	tilapia	free swimming	
Poeciliidae (live-bearers)	*Gambusia/Poecilia* spp.*	mosquitofish	free swimming	

MARINE INVERTEBRATES

Phylum	Class/Family/Order	Species	Common Name	Habit	In Dredge Sample?
Porifera (sponges)	Class: Demospongiae	*Suberites zeteki**	Lobate sponge	sessile (hard substrate)	Y
Cnidaria (cnidarians)	Class: Scyphozoa (jellyfish)	*Aurelia aurita**	moon jelly	free swimming	
Bryozoa (bryozoans)	Class: Gymnolaemata	*Zoobotryon verticillatum**		sessile (hard substrate)	Y
Mollusca (mollusks)	Family: Ostreidae	*Dendostrea sandvichensis?*	Hawaiian oyster	sessile (hard substrate)	Y
	Family: Mytilidae	*Brachidontes crebristriatus*	Hawaiian mussel	sessile (hard substrate)	Y
	Family: Trochidae (tops)	*Trochus intextus*	woven top	on/under rocks	Y

Table B-1. Checklist of Aquatic Organisms Observed in the Ala Wai Canal on October 2 and 26, 2013

	Family: Cerithiidae (horn snails)	*Cerithium* sp.		on/under rocks	Y
Arthropoda, Subphylum Crustacea (crustaceans)	Family: Amphinomidae	not identified	fireworm	on/under rocks	Y
	Class: Cirripedia (barnacles)	*Balanus/Chthmalus***	barnacles	sessile (hard substrate)	Y
	Family: Graspidae (rock crabs)	*Metopograpsus thukuhar*	rock crab	hard bottom dwelling	
	Family: Portunidae (swimming crabs)	*Thalamita crenata*	blue claw crab	hard bottom dwelling	
		*Scylla serrata**	mangrove crab	hard/soft bottom dwelling	
	Family Panaeidae (Panaeid shrimp)	not identified	–	hard/soft bottom dwelling	
	Order Amphipoda (Amphipods)	*Lucifer* sp.	–	hard/soft bottom dwelling	Y
		not identified	–	hard/soft bottom dwelling	Y

Algae

Division	**Species**	**Common Name**	**Habit**	**In Dredge Sample?**
Rhodophyta (red algae)	*Acanthophora spicifera**	–	sessile (hard substrate)	

* Introduced species

** Likely to be introduced species

APPENDIX E-1

PRECONSULTATION LETTERS

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

RECEIVED
2015 AUG 12 PM 12:42
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE MT-DK

August 7, 2015

Ms. Joanne E. Hiramatsu
Senior Associate and Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

This is in response to your letter of July 27 2015, requesting comments on the Environmental Assessment Pre-Consultation for the proposed Ala Wai 46k Underground Transmission Cable Relocation. This project involves University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street in Honolulu.

Based on the information provided, this project should have no significant impact on the service or operations of the Honolulu Police Department at this time.

If there are any questions, please call Major Lester Hite of District 7 (East Honolulu) regarding University Avenue and Hihiwai and Kamoku Streets at 723-3369 and Captain Richard Schaab of District 6 (Waikiki) regarding the Ala Wai Boulevard and Kalaimoku and Kailou Streets at 723-3345.

Thank you for the opportunity to review this project.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
MARK TSUYEMURA
Management Analyst VI
Office of the Chief

Serving and Protecting With Aloha

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-078

Chief Louis M. Kealoha
Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, HI 96813

Dear Chief Kealoha:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

Thank you for your August 7, 2015 response stating that the proposed Ala Wai 46kV Underground Transmission Cable Relocation will not have any significant impacts on the service or operations of the Honolulu Police Department.

If you have any questions, please feel free to call me at 521-5361, ext. 309 or by email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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 25, 2015

Belt Collins Hawaii LLC
Attention: Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu,

SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation

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 (1) Division of Forestry & Wildlife; and (2) Division of Boating & Ocean Recreation. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2015

MEMORANDUM

RECEIVED
LAND DIVISION
2015 AUG 11 PM 1:30
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: for DS
Print Name: Aaron Lowe
Date: 8-6-15

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2015

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: Edward R. Underwood
Date: 8/4/15

RECEIVED
LAND DIVISION
2015 AUG -5 A11:10
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

AUG 3'15AM11:05BOR ADM

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-079

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your August 25, 2015 response stating that the Department of Land and Natural Resources, Division of Forestry & Wildlife does not have any objections on the proposed Ala Wai 46kV Underground Transmission Cable Relocation project.

If you have any questions, please feel free to call me at 521-5361, ext. 309 or by email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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 25, 2015

Belt Collins Hawaii LLC
Attention: Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu,

SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation

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 (1) Division of Forestry & Wildlife; and (2) Division of Boating & Ocean Recreation. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2015

RECEIVED
LAND DIVISION
2015 AUG -5 A11:10
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed:
Print Name: Edward R. Underwood
Date: 8/4/15

AUG 3'15AM11:05BOR ADM

November 18, 2015
2013-33-3200 / 13P-080

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your August 25, 2015 response stating that the Department of Land and Natural Resources, Division of Boating & Ocean Recreation does not have any comments to offer on the proposed Ala Wai 46kV Underground Transmission Cable Relocation project.

If you have any questions, please feel free to call me at 521-5361, ext. 309 or by email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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 2, 2015

Belt Collins Hawaii LLC
Attention: Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu,

SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments sent to you dated August 25, 2015, enclosed are additional comments from (1) Engineering Division; and (2) the Division of Aquatic Resources. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION
2015 AUG 31 AM 10:52
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
AUG 03 2015
AQUATIC RESOURCES

DAR # 5162

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2015

MEMORANDUM

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

JK✓
GH✓

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: for A. Miyasaka
Print Name: Alton Miyasaka, Acting Administrator
Date: 8/28/15

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-081

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your September 2, 2015 response via email stating that the Department of Land and Natural Resources, Division of Aquatic Resources does not have any comments to offer on the proposed Ala Wai 46kV Underground Transmission Cable Relocation project.

If you have any questions, please feel free to call me at 521-5361, ext. 309 or by email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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 2, 2015

Belt Collins Hawaii LLC
Attention: Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu,

SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments sent to you dated August 25, 2015, enclosed are additional comments from (1) Engineering Division; and (2) the Division of Aquatic Resources. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

RECEIVED
2015 AUG 28 A11:30
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

'15 AUG 03 PM01:49 ENGINEERING

July 30, 2015

MEMORANDUM

TO: FR: TD:

DLNR Agencies:
X Div. of Aquatic Resources
X 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 – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: _____
Print Name: Carty S. Chang, Chief Engineer
Date: _____

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
REF: EA Preconsultation for Proposed Ala Wai 46kV Underground Transmission Cable Relocation Oahu.056

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 the project site according to the Flood Insurance Rate Map (FIRM), is located in Zones A and AO. The National Flood Insurance Program regulates developments within Zones A and AO 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:

(X) Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

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

( ) Mr. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.

( ) Mr. Stanford Iwamoto at (808) 241-4896 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.

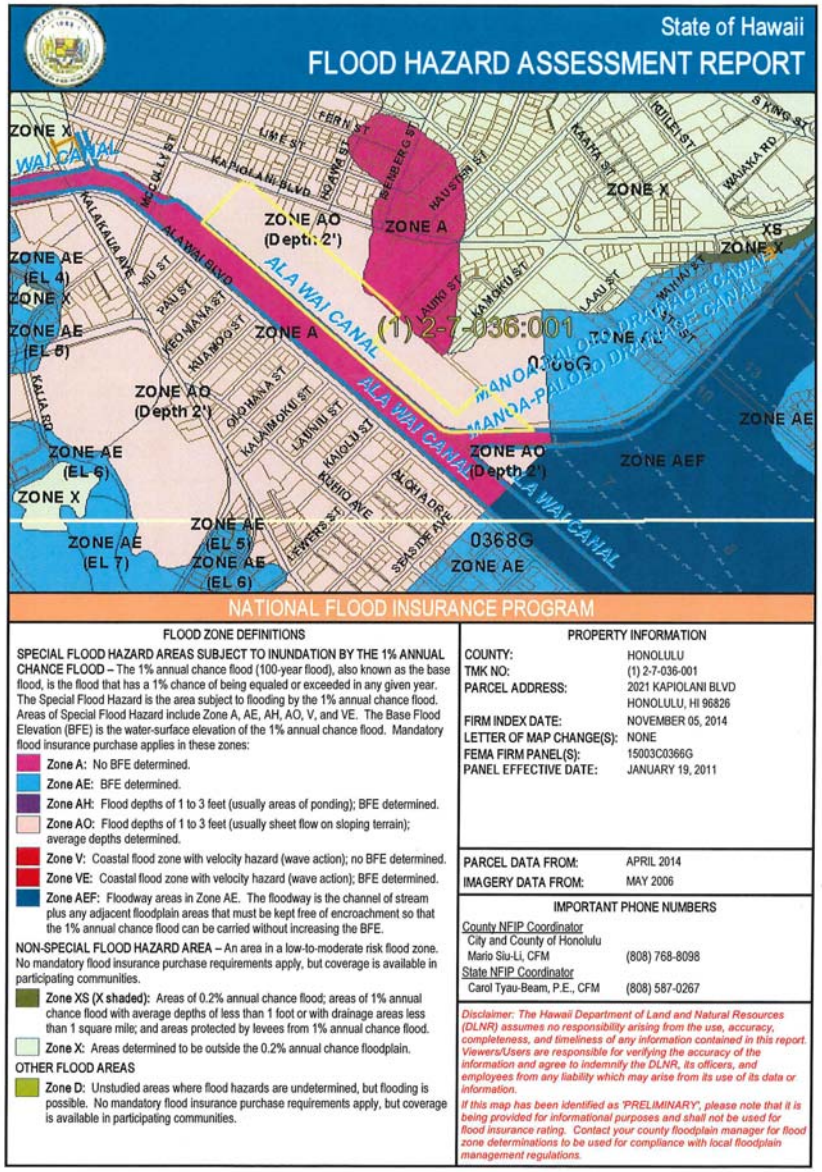
(X) Additional Comments: The Department of Land and Natural Resources, Engineering Division has the Ala Wai Canal Dredging project which is scheduled to start construction in March 2018.

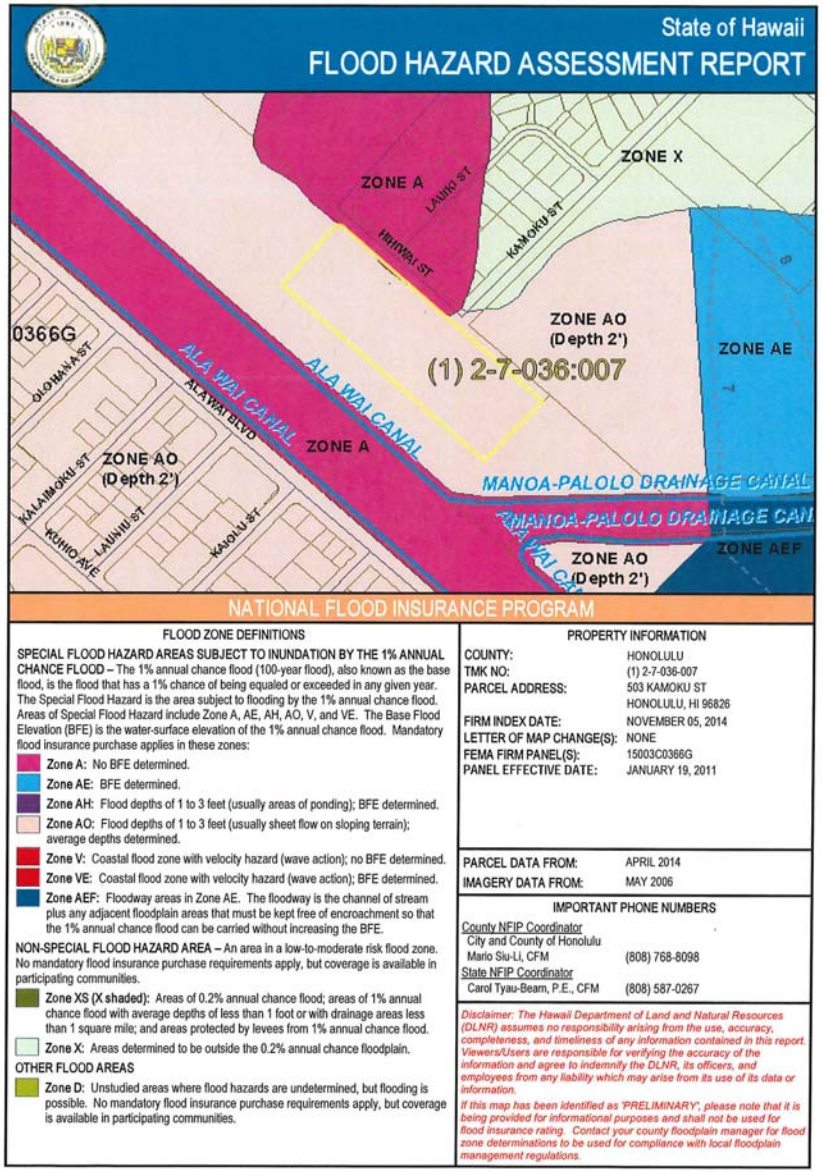
( ) Other: _____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 6/27/15





BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-082

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

Dear Mr. Tsuji:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

Thank you for your September 2, 2015 response via email and the Engineering Division's input on the preparation of the Draft Environmental Assessment (EA) for the proposed utility improvements at the Ala Wai Canal.

We concur that the project site is located within Zones A and AO on the Flood Insurance Rate Map (FIRM). Compliance with the rules and regulations of the National Flood Insurance Program (NFIP) in 44 CFR will be discussed in the Draft EA.

We appreciate you notifying us that the Ala Wai Dredging project will start construction in March 2018.

If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
2015 SEP 16 PM 12:40
BELT COLLINS HAWAII

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

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

ENGINEERING DIVISION
POST OFFICE BOX 373
HONOLULU, HAWAII 96809

SEP 14 2015

Ms. Joanne E. Hiramatsu, Director of Planning
Belt Collins Hawai'i LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Services Relocation
Tax Map Key: (1)2-7-036: 001 and 007, and
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street and Kai'olu Street
Honolulu, Oahu, Hawaii

Thank you for allowing us the opportunity to provide preliminary input on the subject project. We have previously provided input to this project through our department coordinator (Land Division). A copy of our response is attached.

Also, please be aware that we have an upcoming "Ala Wai Canal Dredging and Wall Repair" project in the area, which is scheduled to start construction in March 2018. We request that HECO complete the removal of their existing line within the Ala Wai Canal prior to the start of dredging. We would like to continue coordinating efforts with HECO during our planning, design and construction phases to ensure both projects can be executed in an efficient and timely manner.

Should you have any questions, please call Mr. Dennis Imada at 587-0257, or email at dennis.t.imada@hawaii.gov.

Sincerely,

CARTY S. CHANG
Chief Engineer

Enclosure

DAVID Y. IGE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2015

MEMORANDUM

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

FROM: ~~Russell~~ Y. Tsuji, Land Administrator
SUBJECT: Environmental Assessment Preconsultation, Proposed Ala Wai 46kV Underground Transmission Cable Relocation
LOCATION: Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street and Kai`olu Street, Honolulu, O`ahu, Hawai`i
APPLICANT: Hawaiian Electric Company by its consultant Belt Collins Hawaii LLC

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by August 24, 2015. 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 Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: _____
Print Name: ~~Carty S. Chang, Chief Engineer~~
Date: _____

'15 AUG 03 P 04:49 RECEIVED

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Russell Y. Tsuji
REF: EA Preconsultation for Proposed Ala Wai 46kV Underground Transmission Cable Relocation Oahu.056

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 the project site according to the Flood Insurance Rate Map (FIRM), is located in Zones A and AO. The National Flood Insurance Program regulates developments within Zones A and AO 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:

(X) Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

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

( ) Mr. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.

( ) Mr. Stanford Iwamoto at (808) 241-4896 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.

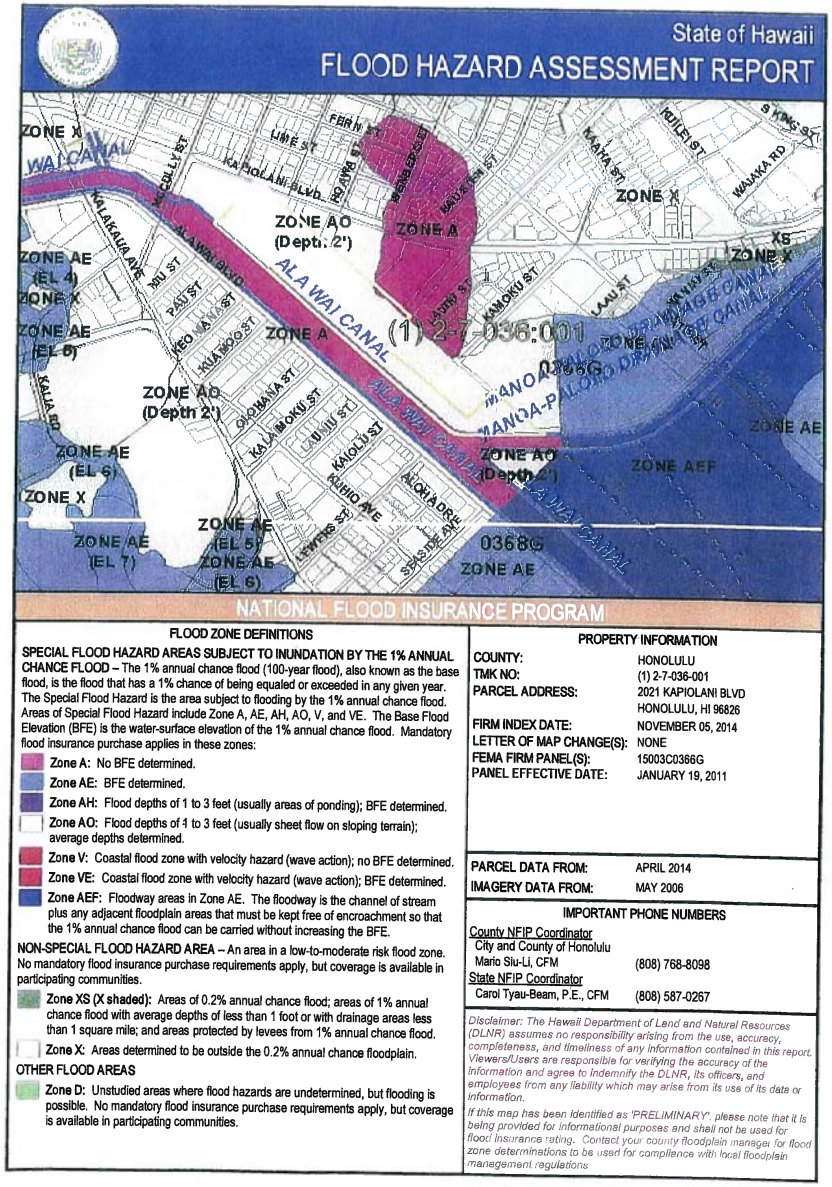
(X) Additional Comments: The Department of Land and Natural Resources, Engineering Division has the Ala Wai Canal Dredging project which is scheduled to start construction in March 2018.

( ) Other: _____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 6/21/18



FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

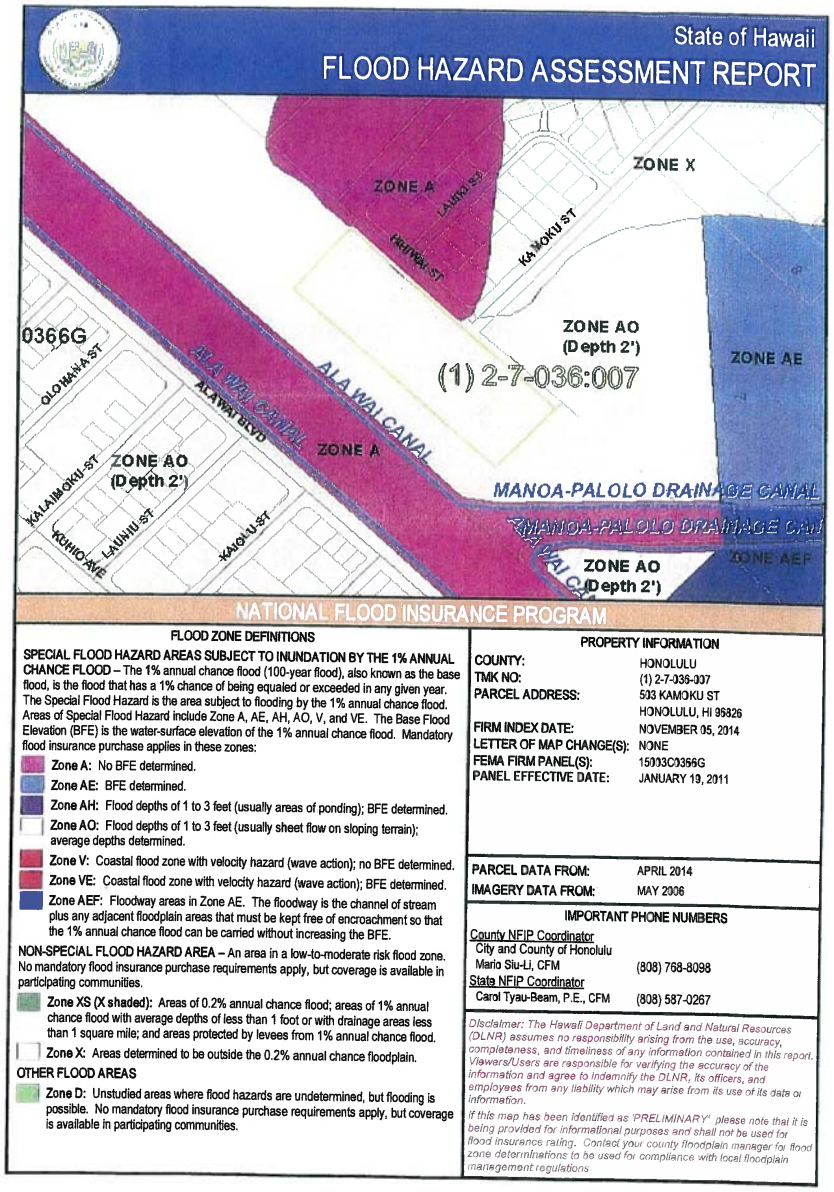
COUNTY:	HONOLULU
TMK NO:	(1) 2-7-036-001
PARCEL ADDRESS:	2021 KAPIOLANI BLVD HONOLULU, HI 96826
FIRM INDEX DATE:	NOVEMBER 05, 2014
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	15003C0366G
PANEL EFFECTIVE DATE:	JANUARY 19, 2011
PARCEL DATA FROM:	APRIL 2014
IMAGERY DATA FROM:	MAY 2006

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
City and County of Honolulu	
Mario Siu-Li, CFM	(808) 768-8098
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and shall not be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.



BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-083

Mr. Carty S. Chang
Chief Engineer
Engineering Division
Department of Land and Natural Resources
State of Hawaii
P.O. Box 373
Honolulu, HI 96809

Dear Mr. Chang:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your September 14, 2015 response and the Engineering Division's input on the preparation of the Draft Environmental Assessment (EA) for the proposed utility improvements for the Ala Wai Canal.

We are aware of the upcoming Ala Wai Canal Dredging and Wall Repair project, scheduled to start construction in March 2018. We have begun coordinating with the Department of Land and Natural Resources (DLNR) in regards to the timing of the dredging and wall repair for Ala Wai Canal. We will continue to coordinate with and include DLNR in the review of the Hawaiian Electric Company's plans as the EA process moves forward.

We concur that the project site is located within Zones A and AO in the Flood Insurance Rate Map (FIRM). The compliance with the rules and regulations of the National Flood Insurance Program (NFIP) in 44 CFR will be discussed in the EA.

If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROBERT J. KRONING, P.E.
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

RECEIVED
2015 AUG 17 PM 12:56
BELT COLLINS HAWAII

August 11, 2015

Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Attn: Joanne Hiramatsu

Dear Ms. Hiramatsu:

Subject: Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Key: (1) 2-7-36:1 and 7, and
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiolu Street
Honolulu, Oahu, Hawaii

The Department of Design and Construction has the following comment to offer on the environmental assessment preconsultation:

The proposed route and construction area appears to be in the Ala Wai Park. The Hawaiian Electric Company needs to provide information on what would be the impacts to the park.

Thank you for the opportunity to review and comment. Should there be any questions, please Clifford Lau, Chief, Facilities Division at 768-8483.

Sincerely,

Robert J. Kroning, P.E.
Director

RJK: cf (618627)

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-084

Mr. Robert J. Kroning, P.E.
Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, HI 96813

Dear Mr. Kroning:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

Thank you for your August 11, 2015 response and your request for the Hawaiian Electric Company to provide information on what the impacts to Ala Wai Park would be. Anticipated impacts to the park will be addressed in the Draft Environmental Assessment (EA). As part of the EA process, we have contracted D.L. Adams, acoustical consultant, to determine noise impacts from construction and noise mitigation measures. Best management practices (BMPs) will be in place to reduce any impacts caused by construction of the Ala Wai 46kV Underground Transmission Cable project. BMPs and mitigation measures will also be addressed in the Draft EA.

Hawaiian Electric has contacted the Department of Parks and Recreation Department to discuss the 46kV underground transmission cable relocation project.

If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

RECEIVED
2015 AUG 17 PM 12:56
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR
DEPUTY FIRE CHIEF

August 14, 2015

Ms. Joanne Hiramatsu
Senior Associate
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: 2-7-036: 001 and 007

In response to your letter dated July 27, 2015, regarding the above-mentioned subject, the Honolulu Fire Department determined that there will be no significant impact to fire department services.

Should you have questions, please contact Acting Battalion Chief Brett Lomont of our Fire Prevention Bureau at 723-7155 or blomont@honolulu.gov.

Sincerely,

Terry Seelig

TERRY SEELIG
Acting Assistant Chief

TS/KT:bh

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-085

Mr. Terry Seelig
Acting Assistant Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, HI 96813-5007

Dear Mr. Seelig:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your August 14, 2015 response stating that the proposed Ala Wai 46kV Underground Transmission Cable Relocation project will not have any significant impacts to Honolulu Fire Department services.

If you have any questions, please feel free to call me at 521-5361, ext. 309 or by email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
ACTING DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

RECEIVED
2015 AUG 24 AM 10:32
BELT COLLINS HAWAII

Ref. No. P-14875

August 19, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii, LLC
2153 N. King Street
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

Subject: Pre-consultation for the Proposed Ala Wai 46kV Underground Transmission Cable Relocation; TMK: (1) 2-7-036:001 and 007

Thank you for the opportunity to provide comments on the pre-consultation request for a Draft Environmental Assessment (Draft EA) for an underground transmission cable relocation project under the Ala Wai Canal. The Draft EA was submitted on behalf of the Hawaiian Electric Company (HECO). The pre-consultation review material was transmitted to our office by letter dated July 27, 2015.

It is our understanding that HECO is proposing to relocate its existing underground transmission line system connecting to the Waikiki Substation located on Kaiolu Street. The new route will shift the alignment of the transmission line system to the west of the current route, and utilize directional drilling to cross under the Ala Wai Canal. The directional drilling is a trenchless method of installing cables beneath water bodies such as the Ala Wai Canal and purportedly will have minimal impact on the surrounding areas. The existing transmission line is being relocated to allow routine maintenance dredging of the Ala Wai by the Department of Land and Natural Resources.

The project will install two 46-kilowatt power lines. One power line will be installed between the Waikiki Substation and an existing pole near University Avenue. The other line will connect the Waikiki substation to a utility pole at the corner of Kamoku and Hihiwai Street. Both routes are 2,800 feet in length.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. Pursuant to the Hawaii Administrative Rules § 11-200-17(h) – land use plans, policies, and controls – this underground electrical cable routing project must

demonstrate that it is consistent with a number of state environmental, social, and economic goals and policies for land-use and housing development. OP provides technical assistance to state and county agencies in administering the statewide planning system in Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Plan. The Hawaii State Plan provides goals, objectives, policies, and priority guidelines for growth, development, and the allocation of resources throughout the State. The Hawaii State Plan includes diverse objectives and policies of state interest including but not limited to the economy, agriculture, the visitor industry, federal expenditure, the physical environment, facility systems, socio-cultural advancement, climate change adaptation, and sustainability.

The Draft EA should include an analysis that addresses whether the proposed project conforms or is in conflict with the goals, objectives, policies, and priority guidelines listed in the Hawaii State Plan.

2. The coastal zone management area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" see HRS § 205A-1 (definition of "coastal zone management area").

   HRS Chapter 205A requires all State and county agencies to enforce the coastal zone management (CZM) objectives and policies. The Draft EA should include an assessment as to how the proposed project conforms to the CZM objectives and its supporting policies set forth in HRS § 205A-2. The assessment on compliance with HRS Chapter 205A is an important component for satisfying the requirements of HRS Chapter 343. These objectives and policies include: recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources.

3. The Draft EA should provide a list of any federal, state, or county permits required for this project. A listing of required permits will allow OP to verify the necessity of conducting a Coastal Zone Management Federal Consistency evaluation.

   The national Coastal Zone Management Act requires activities that need federal permits to be consistent with approved state coastal programs to the maximum extent practicable. The project site and drilling activity may impact the waters of the Ala Wai Canal. If so, a United States Army Corps of Engineers Clean Water Act (CWA) approval will be needed. If a CWA permit is necessary, this project may also need to be evaluated against Federal Consistency requirements. OP is the lead state agency to

conduct this evaluation.

4. The project site is adjacent to the Ala Wai Canal's riverine wetlands and the perennial stream that feed into the canal system. In order to ensure the coastal waters and marine environment of the south shore of Oahu remain protected, the negative effects of stormwater runoff should be considered and mitigated. The Draft EA should summarize the area's classification in the State Land Use Districts, City and County of Honolulu zoning as they relate to density and erosion controls, and this project's relation to wetlands, perennial streams, tsunami evacuation zone, and flood zone. These items, as well as the nearshore water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem.

   OP has a number of resources available to assist in the development of projects which ensure sediment and stormwater control on land, thus protecting the nearshore environment. OP recommends consulting these guidance documents and stormwater evaluative tools when developing strategies to address polluted runoff. They offer useful techniques to keep soil and sediment in place and prevent contaminating nearshore waters, while considering the practices best suited for each project. These three evaluative tools that should be used during the design process include:

   - Hawaii Watershed Guidance provides direction on site-appropriate methods to safeguard Hawaii's watersheds and implement watershed plans http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed Guidance Final.pdf

   - Stormwater Impact Assessments can be used to identify and evaluate information on hydrology, stressors, sensitivity of aquatic and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_storm water_impact_assessments_guidance.pdf

   - Low Impact Development (LID), A Practitioners Guide covers a range of structural best management practices (BMP's) for stormwater control management, roadway development, and urban layout that minimizes negative environmental impacts http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Josh Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion
Acting Director

November 18, 2015
2013-33-3200 / 13P-086

Mr. Leo R. Asuncion
Acting Director
Office of Planning
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Asuncion:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

Thank you for your August 19, 2015 response and the Office of Planning's input on the preparation of the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility improvements at the Ala Wai Canal. We understand that the project must demonstrate consistency with state environmental, social, and economic goals and polices for land-use and housing development. In addition to describing the project area's land use classifications, the Draft EA will address how the proposed project conforms to the Hawaiʻi Administrative Rules §11-200-17(h) – land use plans, policies, and controls. The Draft EA will also include a thorough analysis that addresses whether the proposed project conforms or conflicts with the objectives, goals, policies, and priority guidelines listed in the Hawaiʻi State Plan and the Coastal Zone Management Program, HRS Chapter 205A.

We will consult with the United States Army Corps of Engineers (USACE) if permits are required. The Draft EA will list anticipated permits required for the proposed utility line project.

Research will be conducted on riverine wetlands and streams to identify if there are any impacts to these systems using the references provided. The research results will be included in the EA if there are possible impacts to these resources.

Best Management Practices (BMPs) will be implemented during construction of the Ala Wai 46kV underground transmission cable project.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

'Iolani School

RECEIVED
2015 AUG 26 PM 12:56
BELT COLLINS HAWAII

August 24, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

Dear Ms. Joanne E. Hiramatsu,

Thank you for your letter asking for comments and questions regarding the Environmental Assessment Pre-consultation on the proposed Ala Wai Cable Relocation Project. We appreciate your reaching out to us at 'Iolani School and the opportunity to serve as a consulted party as the EA is being prepared.

With the families of more than 1,900 students in grades k – 12 requiring constant access to our campus, as well as visitors from other schools and the community, we ask that the issues of traffic, noise, and parking be considered in order to maintain the safety, security and accessibility of the area. Here are the questions and comments we would like to be considered:

- Please include 'Iolani School as a consulted party during all phases of the project.
- What are the approximate dates when Hihiwai Street will be closed due to trenching and when it is closed how many lanes will be affected? One lane should remain open so there is access from Kamoku Street to University Avenue. Knowing this in advance could enable us to plan our school calendar accordingly.
- Will the sidewalks along Hihiwai and Kamoku Streets also be affected or closed?
- When construction is taking place on Hihiwai Street – please have this occur only from 8 am – 2 pm so that this main exit road for 'Iolani School families (and entrance and exit for Ala Wai Elementary) may remain open during the heavy traffic caused by morning drop off and afternoon pick up times?
- Please have construction work on Hihiwai Street not occur on certain school days that expect heavy traffic. These would include the first day of regular school and summer school, 'Iolani Fair days, and Graduation day.

563 Kamoku Street • Honolulu, Hawai'i 96826 • Phone: (808) 949-5355 • FAX: (808) 943-2297 • www.iolani.org

'Iolani School

- Ideally, construction should be done on days when there is no school in session, specifically spring break, winter break, or in early August.
- Could the appropriate number of special duty officers be assigned to assist with traffic flow on Hihiwai Street, Kamoku Street and University Avenue during construction to ensure traffic flow for vehicles and safety of pedestrians?
- Is it possible to include in the traffic management plan that a No Loading, Tow Away Zone be enforced from 6 a.m. – 8 a.m. and from 2:30 p.m. – 4:30 p.m. on Kamoku Street. This would allow Kamoku Street to have two-lanes in the mauka bound direction during the school's heavy morning drop off and pick up days.
- How will the dredging and cable replacement affect use of the canal by paddlers, kayakers and others who access the water for recreation and sports? We request that a specific schedule be provided so that our student teams will be prepared.

If you would like to discuss any of the above questions or comments, please call me at (808) 943-2252. On behalf of 'Iolani School, I greatly appreciate your keeping us informed with this project and the processes that lay ahead. I look forward to continued correspondence in the future.

Mahalo,

Cathy Lee Chong

Cathy Lee Chong
Director of Communications
'Iolani School

cc: Timothy Cottrell, Head of School
Reid Gushiken, Chief Financial Officer

563 Kamoku Street • Honolulu, Hawai'i 96826 • Phone: (808) 949-5355 • FAX: (808) 943-2297 • www.iolani.org

November 18, 2015
2013-33-3200 / 13P-087

Ms. Cathy Lee Chong
Director of Communications
'Iolani School
563 Kamoku Street
Honolulu, HI 96826

Dear Ms. Lee Chong:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your letter, dated August 24, 2015, regarding the Proposed Ala Wai 46kV Underground Transmission Cable Relocation project. 'Iolani School will continue to be consulted for this project through construction to inform the school of the anticipated dates of construction that will affect the school.

'Iolani's concerns of traffic management, lane/sidewalk closures, and the timing of construction, as described in your letter, will be addressed in the project's Traffic Control Plan (TCP) for construction activities. Work affecting city streets may only be performed between the hours of 8:30am and 3:30pm, Monday through Friday, unless otherwise permitted by the Department of Transportation Services (DTS). Where pedestrian walkways and crosswalks exist, they shall be maintained in passable condition or other options provided to allow for pedestrian movements, per the TCP. Driveways shall be kept open unless the property owners using these rights-of-way are otherwise provided for satisfactorily. Also, as required by DTS, the project contractor shall provide off-duty police officers to control the flow of traffic.

In preparation of the TCP, Hawaiian Electric will give consideration to school hours of operation and will address egress and ingress during school drop-off and pick-up times. Hawaiian Electric will do their best to address 'Iolani's safety, traffic, noise, and inconvenience concerns and intends to share this traffic information with 'Iolani as early in the process as possible.

The Proposed Ala Wai 46kV Underground Transmission Cable Relocation will temporarily impact canal users during project construction (staging, trenching, and directional drilling). Consideration will be given to performing construction during the off peak school season. Hawaiian Electric will share schedule information with 'Iolani as soon as possible.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We look forward to your continued participation in this EA review process. If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID IGE
GOVERNOR

RECEIVED
2015 SEP 10 PM 12:52
BELT COLLINS HAWAII

KATHRYN S. MATAYOSHI
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
ALA WAI ELEMENTARY SCHOOL
503 KAMOKU STREET
HONOLULU, HAWAII 96826

September 4, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

SUBJECT: Proposed Ala Wai 46kV Underground Transmission Cable Relocation

Dear Ms. Hiramatsu:

Thank you for allowing us to have input on the Proposed Ala Wai 46kV Underground Transmission Cable Relocation Project. I am the new Principal at Ala Wai Elementatry School. I apologize for the delay in providing you with a response.

Ala Wai Elementary provides a learning environment to more than four hundred students and a workplace to more than one hundred employees and volunteers. The safety and security of our campus and, more importantly, of our school community are of utmost importance. Additionally, we feel that preservation of an environment conducive to learning with minimal disruptions provides our students with the opportunity for optimal learning to occur.

Here are our comments and questions we have regarding the project.

1. SAFETY DURING ACTIVE WORK PERIODS

    a. The safety plan should include special consideration during active work periods as crews work on the installation of power lines at intersections near University Avenue and Kapiolani Boulevard and Hihiwai and Kamoku Streets. Our students and families access our school campus on these major thoroughfares. Additionally, our students are naturally curious and may have limited abilities to provide for their personal safety as pedestrians and bike riders. Therefore, **a heightened level of supervision of pedestrian traffic should be provided during peak traffic times near our school**, between the hours of 7:15 and 8:30 am and 2:00 and 3:00 pm, daily except Wednesday afternoons when the hours would be 12:20 to 1:20 pm.

Letter to T. Hiramatsu
September 4, 2015

2. TRAFFIC MANAGEMENT PLAN

    a. The traffic management plan should include **avoiding and or minimizing disruptions for access to our school** on school days especially when students and staff enter the school grounds between 7:15 am to 8:30 am and exit from 2:00 pm to 3 pm , daily except Wednesday when the hours would be from 12:20 pm to 1:20 pm .

    b. The traffic management plan should include **consideration of our after school activities** which are provided by our school from 2:15 pm to 4:00 pm, daily except for Wednesdays when the hours would be from 12:35 pm to 2:30 pm, and Kama'aina Kids, a private provider, from 2:15 pm to 5:30 pm, daily except for Wednesdays when the hours would be from 12:35 pm to 5:30 pm.
    c. The traffic management plan also needs to provide **at least one lane for ingress and egress** of delivery trucks and maintenance personnel between 7 am and 4:00 pm.

3. ASSOCIATED NOISE/DISRUPTION

    a. We understand that the nature of construction projects include noise and disruptive activities. We ask that **consideration be given to minimize noise disruptions on our campus especially during school-wide events, activities and testing periods.** Sharing of work schedules and school calendars are vital to ensure this coordination.

4. ALA WAI COMMUNITY PARK

    a. We understand that Ala Wai Community Park will be used as a major staging area for this construction project. Be aware that many of our students and families access our campus through a pedestrian gate which connects the park's parking lot to our lower grades campus. Additionally, many of our students and families use the park during the afterschool hours. Given the limitations of children to provide for their personal safety, **consideration should be given to the safety issues associated with children being in a parking lot, when they are accessing vehicles and/or walking in the parking lot, as well as their activities near heavy trucks and equipment.**

Based on a meeting held in May, it is our understanding that the first phase of this project will begin in April 2017. **As we get closer to the actual site work, we respectfully request to have the opportunity to meet with HECO and its contractors to discuss the project, share schedules, and discuss potential areas of concerns.** If there are any questions or you need more information, please call me at 973-0070.

Thank you for your time and attention. We look forward to working with you.

Sincerely,

Michelle DeBusca
Principal

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

November 18, 2015
2013-33-3200 / 13P-088

Ms. Michelle DeBusca
Principal
Ala Wai Elementary School
Department of Education
503 Kamoku Street
Honolulu, HI 96826

Dear Ms. DeBusca:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for your letter, dated September 4, 2015, regarding the Proposed Ala Wai 46kV Underground Transmission Cable Relocation project. We agree that the safety of students, faculty, staff, pedestrians, and vehicles are concerns especially around construction sites. Consideration will be given to perform construction during the off peak school season to minimize disruptions to the school. Construction Best Management Practices (BMP) will be incorporated into the overall construction schedule. We have contracted with a noise consultant as part of the Draft Environmental Assessment (EA) and mitigation measures will be identified and implemented as required.

Work affecting city streets may only be performed between the hours of 8:30am and 3:30pm, Monday through Friday, unless otherwise permitted by the Department of Transportation Services (DTS). Where pedestrian walkways and crosswalks exist, they shall be maintained in passable condition or other options provided to allow for pedestrian movements. Driveways shall be kept open unless the property owners using these rights-of-way are otherwise provided for satisfactorily. Also, as required by DTS, the project contractor shall provide off-duty police officers to control the flow of traffic. The Traffic Control Plans (TCP) for construction activities will outline the construction hours and the traffic-related protocol surrounding construction activities, which will be addressed in the EA.

In preparation of the TCP, Hawaiian Electric will give consideration to school hours of operation and will address egress and ingress during school drop-off and pick-up times. Hawaiian Electric will do their best to address Ala Wai Elementary's safety, traffic, noise, and inconvenience concerns and intends to share this traffic information with Ala Wai Elementary as early in the process as possible.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We look forward to your continued participation in this EA review process. If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

RECEIVED
2015 AUG 27 PM 1:50
BELT COLLINS HAWAII

TP7/15-618637R

August 24, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Pre-Consultation for Draft Environmental Assessment (DEA)
Ala Wai 46kV Underground Transmission Cable Relocation; Tax Map Key: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street, Honolulu, Oahu, Hawaii

In response to your letter dated July 27, 2015, we have the following comments:

1. The City would appreciate Hawaiian Electric Company studying the feasibility of a pedestrian/bicycle bridge across the Ala Wai Canal, a structure which could accommodate a transmission line.

2. Depending on the scope of work, the DEA should contain an analysis of traffic impacts on the surrounding City streets as a result of the project, including the short-term impacts during construction. It should also develop a traffic management plan that addresses short- and long-term transportation mitigating measures.

3. The McCully/Moiliili Neighborhood Board No. 9, and the Waikiki Neighborhood Board No. 10, as well as the area residents, businesses, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.

4. As you discussed with our staff, trenching will be done in the roadways and will not involve sidewalks and driveways or otherwise affect pedestrian traffic. A street usage permit from the City's Department of Transportation Services shall be obtained for any construction-related work that may require the temporary closure of any traffic lane on a City street.

5. Any construction materials and equipment should be transferred to and from the project site during off-peak commuter traffic hours (8:30 a.m. to 3:30 p.m.) to minimize any possible disruption to traffic on the local streets, and during the Ala Wai Elementary School-related traffic peak hours (2:15 p.m. to 3:00 p.m.) to assure the safety of students and other pedestrians.

We reserve further comment pending submission of the DEA.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

Michael D. Formby
Director

November 18, 2015
2013-33-3200 / 13P-089

Mr. Michael D. Formby
Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, HI 96813

Dear Mr. Formby:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

Thank you for your August 24, 2015 response on the preparation of the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's (Hawaiian Electric's) proposed utility improvements at the Ala Wai Canal.

In response to your comments, the Draft EA will address the alternative of constructing a pedestrian/bicycle bridge across the Ala Wai Canal to also accommodate a transmission line. This concept of building a pedestrian/bicycle bridge across the Ala Wai Canal was previously presented to the community, but there was no consensus within the community for or against a bridge. Furthermore, Hawaiian Electric does not have the authority to design transportation facilities for its electric cables. As the electric utility provider, Hawaiian Electric has the duty to not burden its customers with unrelated or additional costs.

The project's Traffic Control Plan (TCP) for construction activities will discuss the project's anticipated traffic impacts on the project site and the adjoining local street area network. If applicable, the TCP will also address obstructions to pedestrian traffic. Because the project will not increase traffic as a result of replacing existing transmission cables, a Traffic Impact Analysis Report (TIAR) or Traffic Management Plan (TMP) will not be prepared.[1] The project is a short-term construction activity that will improve electrical service to customers. We acknowledge your request for any construction equipment and materials to be transferred to and from the project site during off-peak commuter traffic hours (between 8:30a.m. and 3:30p.m.) to minimize any possible

[1] Confirmed via phone conversations with Michael Murphy and Rika Uechi, Department of Transportation Services, November 9, 2015.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

disruption to traffic on the local streets. The TCP will include mitigation measures to minimize these disruptions as well as others and to assure the safety of students and other pedestrians.

In response to Item 4, Hawaiian Electric intends to keep all trenching work within roadways. However, this cannot be confirmed until the design is complete. As required by the Department of Transportation Services (DTS), where pedestrian walkways and crosswalks exist, they shall be maintained in passable condition or other options provided for pedestrian movements.

We acknowledge that a street usage permit from the City of Honolulu's (City's) DTS needs to be obtained for all construction-related work that may require temporary closure of any traffic lane on a City street.

Hawaiian Electric has and will continue to engage in public outreach efforts, particularly with the McCully/Mōʻiliʻili Neighborhood Board No. 9, the Waikīkī Neighborhood Board No. 10, and area residents and businesses. Hawaiian Electric aims to keep these affected parties informed of the proposed project details, construction schedule, and expected impacts during construction activities.

If you have any questions or additional comments, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAI

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

RECEIVED
2015 AUG 14 AM 11:25
BELT COLLINS HAWAII

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

In reply, please refer to:
File:
EPO 15-188

August 10, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

SUBJECT: **Environmental Assessment (EA) for Proposed Ala Wai 46kV Underground Transmission Cable Relocation**
TMK: (1) 2-7-36:1 and 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street, Oahu

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EA to our office on July 30, 2015. Thank you for allowing us to review and comment on the proposed project. The EA was routed to the Clean Water and Hazard Evaluation and Emergency Response Branches. They will provide specific comments to you if necessary. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/home/landuse-planning-review-program. Projects are required to adhere to all applicable standard comments.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

c: CWB, HEER {via email only}

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-090

Ms. Laura Leialoha Phillips MacIntyre, AICP
Program Manager
Environmental Planning Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Ms. Phillips McIntyre:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter, dated August 10, 2015 regarding the Proposed Ala Wai 46kV Underground Transmission Cable Relocation project. We will review the standard comments and available strategies for healthy and sustainable design as provided by the Hawai'i State Department of Health and provide a discussion in the Draft Environmental Assessment (EA) where appropriate.

We look forward to your continued participation in this EA review process. If you have any questions or additional comments, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

RECEIVED
2015 AUG 27 PM 1:50
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2015/ELOG-1544(WA)

August 25, 2015

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Pre-Assessment Consultation
Chapter 343, HRS, Environmental Assessment
Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Key 2-7-36: 1 and 7

This is in response to your letter (received July 29, 2015) requesting comments regarding the preparation of a Draft Environmental Assessment for the above-mentioned project. The site is located within the P-2 General Preservation District of the Diamond Head Special District and the Apartment Precinct of the Waikiki Special District.

1. The proposed underground transmission lines will not require a Special District Permit.

2. Describe what will be contained within the two designated construction staging areas.

3. Describe how the project will comply with the Land Use Ordinance, and how it will meet the objectives and design guidelines of the Diamond Head and Waikiki Special Districts.

4. According to our records, the project is located in the Beachwalk Buffer Zone: Beachwalk Pump Station Force Main Impact Zone. Submit a copy of the Draft Environmental Assessment to the Department of Planning and Permitting Wastewater Branch for their review and approval

Please contact William Ammons of our Urban Design Branch at 768-8025 or by email at wammons@honolulu.gov, if you have any questions.

Very truly yours,

FOR George I. Atta, FAICP
Director

Doc 1274454

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-091

George I. Atta, FAICP
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Dear Mr. Atta:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter, dated August 25, 2015, regarding the project. We appreciate your confirmation that the underground transmission lines will not require a Special District permit.

The construction staging is mainly the locations of the directional drilling operations. Other areas within the park might be needed to store materials or equipment for the drilling operations. These areas will be better defined as the project moves closer to design completion and construction.

The Draft Environmental Assessment (EA) will address how the project will comply with the Land Use Ordinance and how it will meet the objectives and design guidelines of the Diamond Head and Waikīkī Special Districts. We understand that the DPP Wastewater Branch will be the approving agency for the EA and will issue the Finding of No Significant Impact (FONSI). A copy of the Draft EA will be submitted to the Department of Planning and Permitting (DPP) Wastewater Branch for review and approval.

We look forward to your continued participation in this EA review process. If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
2015 AUG -7 PM 2:21
BELT COLLINS HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

08002PGH.15

August 4, 2015

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mrs. Hiramatsu:

SUBJECT: Comments on Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Key (1) 2-7-36:1 and 7 and
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street
Honolulu, Island of Oahu

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated July 27, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

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

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

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

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

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects

natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g. minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

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

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

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

GH:ay

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-092

Mr. Alec Wong, P.E.
Chief
Clean Water Branch
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Wong:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter, dated August 4, 2015, and the Clean Water Branch's input on the preparation of a Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility improvements at the Ala Wai Canal. Public review of the Draft EA will be available upon completion of the study.

We look forward to your continued participation in this EA review process. If you have any questions or additional comments, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHELE K. NEKOTA
DIRECTOR

JEANNE C. ISHIKAWA
DEPUTY DIRECTOR

September 18, 2015

SENT VIA EMAIL

Ms. Joanne E. Hiramatsu
Senior Associate, Director of Planning
Belt Collins Hawaii LLC
jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu:

Thank you for your letter dated July 27, 2015, regarding Hawaiian Electric Company's proposal for the relocation of their underground transmission line system.

The enclosed map that was shared for the proposed improvements indicates that there will be impacts to both the Ala Wai Neighborhood Park and the Ala Wai Community Park. We would like to request a meeting with your project coordinators for the purpose of updating us on the project. We would include our district staff in this meeting for any updated project details in regards to the timing and impact to the parks and possibly to district operations.

Please contact my secretary, Carolyn Ikehara at 768-3001, to set up a date and time for our meeting.

Sincerely,

Michele K. Nekota
Director

MKN:as
(618640)

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-093

Michele K. Nekota
Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, HI 96707

Dear Ms. Nekota:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your email, dated September 18, 2015, regarding the Proposed Ala Wai 46kV Underground Transmission Cable Relocation project. Belt Collins Hawaii and the Hawaiian Electric Company are currently in the process of coordinating a meeting with the Department of Parks and Recreation to discuss in greater detail, the project and its impacts to Ala Wai Neighborhood Park and the Ala Wai Community Park.

We look forward to your continued participation in this Environmental Assessment review process. If you have any questions, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

2015 OCT 16 AM 11:46

October 13, 2015

KIRK CALDWELL, MAYOR

DUANE R. MIYASHIRO, Chair
ADAM C. WONG, Vice Chair
DAVID C. HULIHEE
KAPUA SPROAT
BRYAN P. ANDAYA

ROSS S. SASAMURA, Ex-Officio
FORD N. FUCHIGAMI, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

Subject: Your Letter Dated July 27, 2015 Requesting Comments on the Environmental Assessment Preconsultation for the Proposed Ala Wai 46kv Underground Transmission Cable Relocation – Tax Map Key: 2-7-36: 001, 007

Thank you for the opportunity to comment on the proposed transmission cable relocation project.

Based on our experience on recent construction projects, we request Hawaiian Electric Company (Hawaiian Electric) address the following concerns during and after the execution of this and future construction projects:

1. Whenever fluidized thermal backfill (FTB) is utilized, include clear physical demarcations within the FTB that indicate proximity to the Hawaiian Electric cable. We understand other electric utilities use colored (red) FTB directly surrounding the power cable installation to differentiate from trench backfill.

2. Maintain and make available, upon request, accurate as-built information in three dimensions to clearly record the location of Hawaiian Electric underground facilities, particularly transmission cables.

Improving clarity on the location of installed facilities will increase worker safety and protection of Hawaiian Electric assets, while reducing location uncertainty that can slow or delay construction and increase unexpected costs.

The construction drawings should be submitted for our review.

The construction schedule should be coordinated to minimize impact to the water system.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Water for Life . . . Ka Wai Ola

BELT COLLINS

November 18, 2015
2013-33-3200 / 13P-094

Ernest Y. W. Lau, P.E.,
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Dear Mr. Lau:

Environmental Assessment Preconsultation
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter, dated October 13, 2015, and the Board of Water Supply's input on the preparation of an Environmental Assessment (EA) for the Hawaiian Electric Company's (Hawaiian Electric) proposed utility improvements at the Ala Wai Canal. Public review of the Draft EA will be available upon completion of the study.

Hawaiian Electric intends to coordinate its construction schedule with affected parties and will include the Board of Water Supply (BWS) in this discussion. Construction drawings will also be submitted to the BWS for your review. We look forward to your continued participation in this EA review process. If you have any questions or additional comments, please feel free to call me at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Hawaiian Electric, Jayson Shibata, and Rouen Liu

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

APPENDIX E-2

COMMUNITY COMMENTS AND BELT COLLINS HAWAII RESPONSES

December 22, 2016
2013-33-3200 / 16P-106

SAMPLE LETTER TO STAKEHOLDERS

Dear Sir or Madam:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Cable Relocation
Tax Map Key: (1) 2-7-36:1 and 7, and
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

On behalf of the Hawaiian Electric Company (Hawaiian Electric), we wish to inform you that Hawaiian Electric is proposing to relocate its existing underground transmission line system that connects to the Waikiki Substation located on Kaiʻolu Street (see attached figure). The purpose for the proposed action is to support the Department of Land and Natural Resources' efforts to provide continuous dredging maintenance of the Ala Wai Canal.

Pursuant to Chapter 343, Hawaii Revised Statutes, a Draft Environmental Assessment (DEA) has been prepared for this project and made available for public review. A flora, fauna, and biological survey, a cultural impact assessment, and an archaeological inventory survey were conducted for the DEA and are included in the Appendices of the DEA in their entirety.

The DEA is provided herein on a compact disc (CD) for your review. Please let us know if there are any issues related to this project that will need to be addressed in the Final Environmental Assessment that will be prepared.

Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

Attention: Joanne E. Hiramatsu

Department of Planning and Permitting, Urban Design Branch
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Attention: William Ammons

We thank you for your interest and participation in this project. If you have any questions, please contact the undersigned at 521-5361, extension 309, or at jhiramatsu@bchdesign.com.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Director of Planning

Enclosure: CD

cc: Mr. Jayson Shibata, Hawaiian Electric

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

In Reply Refer To:
01EPIF00-2017-TA-0085

Ms. Joanne E. Hiramatsu
Belt Collins Hawai'i, LLC
2153 North King Street, Suite 200
Honolulu, Hawai'i 96819

Subject: Technical Assistance for the Draft Environmental Assessment for the Proposed Ala Wai 46kV Underground Cable Relocation Project, Waikīkī, O'ahu

Dear Ms. Hiramatsu:

The U.S. Fish and Wildlife Service (Service) received your letter on December 27, 2017, requesting our review of your Draft Environmental Assessment for the proposed Ala Wai 46kV Underground Cable Relocation Project, located in Waikīkī, [TMK: (1) 2-6-017:064 (Hawaiian Electric's Waikīkī substation), (1) 2-7-036:001 (Ala Wai Neighborhood and Community Park), (1) 2-7-036:007 (Ala Wai Elementary School, Ala Wai Canal, University Avenue, Hīhīwai Street, Kāmoku Street, Ala Wai Boulevard, Kālaimoku Street, and Kai'olu Street], on the island of O'ahu.

This project consists of installing two new underground sub-transmission cables and removing a total of four cables, consisting of the two 46 kilovolt (kV) cables currently in use, and two inactive 46kV cables. The cables were originally installed in 1956. The two inactive cables were abandoned in place following installation of the cables currently being used. In 2002, the Department of Land and Natural Resource (DLNR) encountered Hawaiian Electric's cables during routine maintenance dredging of the Ala Wai Canal. As a temporary solution, sections of the active cables on the makai side of the canal were covered with twelve 20-foot by 8-foot pre-cast concrete panels. The panels provided protection and allowed the dredging operations to continue in areas upstream of the cables. The panels were placed approximately 50 feet from the makai canal wall. During this time, portions of the inactive cables within the canal were cut, sealed, and removed. The inactive cables were not removed in its entirety because there was concern this action could impact the active cables. The four existing cables and the twelve concrete panels will be removed after the new cables are installed and energized. The new cables will be installed in six segment phases that will connect to Hawaiian Electric's Waikīkī Substation located on Kai'olu Street. These cables will replace the existing cables that pass beneath Ala Wai Elementary School property and the Ala Wai Canal. The new route will move the alignment approximately 500 feet northwest of the existing alignment.

The project provides Hawaiian Electric the opportunity to address its existing cables that currently cross under the Ala Wai Elementary School property and a small section of the Ala Wai Community Garden. Hawaiian Electric will remove the deactivated cables once it installs

the new cables. Then Hawaiian Electric will either fill the conduit with concrete and leave it in place with the existing concrete jacket, or it will remove the conduits, and fill the voided space with grout, leaving only the concrete jacket in place. No trees are expected to be trimmed or cut down for this project. Construction is expected to begin in late 2017 and be completed in early 2019.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawai'i Biodiversity and Mapping Program as it pertains to listed species and designated critical habitat in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). Our data indicate the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) may occur within the vicinity of your proposed project. We offer the following comments to assist you in avoidance and minimization of impacts to the Hawaiian hoary bat.

Hawaiian hoary bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to Hawaiian hoary bats in the project area.

We appreciate your efforts to conserve Hawai'i's native species. If you have any questions or concerns regarding this consultation, please contact Jiny Kim, Fish and Wildlife Biologist (phone: 808-792-9400, email: Jiny_Kim@fws.gov).

Sincerely,

Aaron Nadig
Island Team Manager
O'ahu, Kaua'i, Northwestern Hawaiian Islands, and American Samoa

cc: Department of Planning and Permitting – Urban Design Branch, City and County of Honolulu

February 23, 2017
2013-33-3200 / 17P-017

Mr. Aaron Nadig
Island Team Manager
Fish and Wildlife Service
United States Department of the Interior
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850

Dear Mr. Nadig:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter received on January 26, 2017, and the Fish and Wildlife Service's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

Thank you for the additional information intended to help avoid disturbance to the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*). The project is aware of the Hawaiian hoary bat's roosting season (June 1 through September 15). As mentioned in the Draft EA, we do not foresee the need to trim or remove trees during construction. However, if work is to proceed around the roosting season, crew members will be advised to avoid contact with woody plants greater than 15 feet tall.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
2017 JAN 30 PM 12: 24
BELT COLLINS HAWAII

SUZANNE D. CASE
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

January 26, 2017

Belt Collins Hawaii LLC
Attention: Ms. Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on January 20, 2017, enclosed are comments from the Division of Aquatic Resources on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
DEC 27 2016
Division of Aquatic Resources
DAR#5457

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2017 JAN 25 AM 10:43
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

December 23, 2016

MEMORANDUM

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

JK
GH

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement
LOCATION: Honolulu, Island of Oahu; TMK No. (1) 2-6-017:064; 2-7-036:001,007.
APPLICANT: Hawaiian Electric Company, Inc.

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **January 19, 2017.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

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

Attachments

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

Signed: Bruce Anderson

Print Name: Bruce S. Anderson, DAR Administrator
Date: 1/23/17

cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

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

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

January 18, 2017

Date: 1/18/17
DAR # 5457

MEMORANDUM
TO: Bruce Anderson, Administrator
DATE: 1/23/17
FROM: Glenn Higashi, Aquatic Biologist GH

SUBJECT: Comments on Ala Wai 46kV Underground Cable Relocation and Replacement

Comment	Date Request	Receipt	Referral	Due Date
	12/23/16	12/27/16	12/28/16	1/19/17

Requested by: Russell Tsuji, Land Administrator

Summary of Proposed Project

Brief Description:

Hawaiian Electric is proposing to relocate the route of two existing underground sub transmission cables feeding the Waikiki Substation. The existing underground cables pass beneath Ala Wai Elementary School grounds and within the Ala Wai Canal's accumulated sediment layer. The Proposed Action will relocate the existing underground sub-transmission route to the west by installing new cables deep beneath the Ala Wai Canal using horizontal directional drilling. The Proposed Action also includes removal of the cables currently installed in the Canal. The relocation of the cables will allow for efficient dredging of the Ala Wai Canal for maintenance purposes by the State of Hawai'i (State) Department of Land and Natural Resources (DLNR) who has jurisdiction over the Ala Wai Canal. Located in the McCully/Mō'ili'ili and Waikīkī districts, the project area is identified by Tax Map Key (TMK) as (1) 2-7-036:001 (Ala Wai Neighborhood and Community Park), (1) 2-7-036:007 (Ala Wai Elementary School), (1) 2-6-017:064 (Waikīkī Substation), along with University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street (rights-of-ways).

This project consists of installing two new underground sub-transmission cables and removing a total of four cables, consisting of the two 46 kilovolt (kV) cables currently in use, and two inactive 46kV cables. The cables were originally installed in 1956 and the two inactive cables were abandoned in place following installation of the cables currently being used. In 2002, DLNR encountered Hawaiian Electric's cables during routine maintenance dredging of the Ala Wai Canal. As a temporary solution, sections of the active cables on the makai

casing containing the cables is pulled through the bore hole completing the necessary ductline for the cables. The conduits are tied in at each entry and exit site of the borings by open trenching.

Comments:

The proposed project is not expected to have any significant impacts on the aquatic environment. The Horizontal Directional Drilling (HDD) process will help to minimize impacts on the water in the Ala Wai Canal by occurring at a depth of approximately 50 feet below msl under the canal bottom. This process is not expected to disturb sediments on the bottom of the canal exposing them to suspension in the water column.

Best Management Practices (BMPs) should be incorporated for the two methods of installation (trenching and HDD) for this project to minimize the potential for erosion, siltation and pollution of the aquatic environment.
1) scheduling site work (particularly the open trenching, conduit installation, and HDD bore hole excavation) during periods of minimal rainfall;
2) prevent construction materials, petroleum products, debris, and drilling slurry from the HDD process from falling, blowing or leaching into the aquatic environment.

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plans, DAR requests the opportunity to review and comment on those changes.

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-008

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your comment transmittal dated January 26, 2017, and the Department of Land and Natural Resources, Division of Aquatic Resources' input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

Hawaiian Electric will ensure that Best Management Practices are utilized during the two methods of cable installation to minimize impacts to the surrounding aquatic environment. The Horizontal Directional Drilling process is meant to have the least amount of disturbance to the Canal during installation. Any material from the work around the Canal will be contained.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

February 8, 2017

Belt Collins Hawaii LLC
Attention: Ms. Joanne E. Hiramatsu via email: jhiramastu@bchdesigns.com
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on January 20 and 26, 2017, enclosed are comments from the Engineering Division on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

RECEIVED
LAND DIVISION
2017 FEB -6 AM 10: 39
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

December 23, 2016

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement
LOCATION: Honolulu, Island of Oahu; TMK No. (1) 2-6-017:064; 2-7-036:001,007.
APPLICANT: Hawaiian Electric Company, Inc.

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **January 19, 2017.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

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

Attachments

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

Signed:

Print Name: Carty S. Chang, Chief Engineer
Date: 2/3/17

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Tsuji
Ref: Ala Wai 46kV Underground Cable Relocation and Replacement

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a designated Flood Hazard.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zone designations can be found using the Flood Insurance Rate Map (FIRM), which can be accessed through the Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may take precedence over the NFIP standards as local designations prove to be more restrictive. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 2/23/17

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-009

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated February 8, 2017, and the Department of Land and Natural Resources, Engineering Division's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

The project site is located within Zones A and AO in the Flood Insurance Rate Map. The compliance with the rules and regulations of the National Flood Insurance Program in 44 CFR has been discussed in the EA.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
2017 JAN 23 PM 2:53
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 20, 2017

Belt Collins Hawaii LLC
Attention: Ms. Joanne E. Hiramatsu
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: jhiramatsu@beltcollins.com

Dear Ms. Hiramatsu:

SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement

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

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

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

December 23, 2016

RECEIVED
2016 DEC 29 AM 11:00
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: TO

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement
LOCATION: Honolulu, Island of Oahu; TMK No. (1) 2-6-017:064; 2-7-036:001,007.
APPLICANT: Hawaiian Electric Company, Inc.

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **January 19, 2017.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

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

Attachments

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

Signed:
Print Name: Edward R. Underwood
Date: 12/27/16

cc: Central Files

DEC27'16PM 2:39BOR ADM

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

RECEIVED
LAND DIVISION
2017 JAN -9 AM 7:02
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

December 23, 2016

MEMORANDUM

TO:

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Ala Wai 46kV Underground Cable Relocation and Replacement
LOCATION: Honolulu, Island of Oahu; TMK No. (1) 2-6-017:064; 2-7-036:001,007.
APPLICANT: Hawaiian Electric Company, Inc.

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **January 19, 2017.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

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

Attachments

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

Signed:
Print Name: BARRY CHEUNG
Date: 1/6/17

cc: Central Files

Extinguishment of the existing easement and relocation to the new alignment require Board approval.

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-011

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your transmittal dated December 27, 2016, stating that the Department of Land and Natural Resources, Division of Boating and Ocean Recreation has no comment on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

February 23, 2017
2013-33-3200 / 17P-010

Mr. Russell Y. Tsuji
Land Administrator
Land Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your comment transmittal dated January 6, 2017, and the Department of Land and Natural Resources, Land Division's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

We concur that the existing utility easement will need to be cancelled and an easement for the new location will need to be obtained, and acknowledge that it is subject to approval by the Board of Land and Natural Resources.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

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

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

February 21, 2017

IN REPLY REFER TO:
Log No. 2017.00035
Doc No. 1702GC14
Archaeology

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

Dear Mr. Tsuji:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Draft Environmental Assessment (DEA) – Hawaiian Electric Company Inc. (HECO)
Ala Wai 46kV Underground Cable Relocation and Replacement
Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu
TMK: (1) 2-6-017; 2-7-013, 014, 036

Thank you for the opportunity to review and comment on the *Draft Environmental Assessment, Ala Wai 46kV Underground Cable Relocation, Waikīkī, TMK: (1)2-6-017:064 [Hawaiian Electric's Waikīkī substation], (1) 2-7-036:001 [Ala Wai Neighborhood and Community Park], (1) 2-7-036:007 Ala Wai Elementary School), Ala Wai Canal, University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street* (Belt Collins Hawaii, LLC, December 2016). SHPD received two submittals for review of the DEA, one on December 15, 2016 (Log No. 2016.02921) and the second on January 5, 2017 (Log No. 2017.00035).

The DEA provides a comprehensive overview of the proposed project and presents a determination of *Anticipated Finding of No Significant Impact* (AFONSI). According to the DEA, HECO proposes to relocate and reroute two existing underground 46kV sub-transmission cables feeding the Waikiki Substation to approximately 500 feet to the northwest; install two new underground sub-transmission cables; remove four existing cables, consisting of two active and two inactive 46kV cables; and remove 20-ft by 8-ft pre-cast concrete panels which serve as protective housings for the cables.

The purpose of the proposed project is to remove interferences caused by HECO's power cables that impact the DLNR's efforts to efficiently and routinely dredge the Ala Wai Canal. The existing HECO power cables are currently located within the accumulated sediment of the canal at depths that are, in some locations, too shallow for DLNR to conduct its maintenance dredging, planned to begin in 2018.

The DEA includes a summary from the archaeological inventory survey (AIS) conducted by Cultural Surveys Hawaii (2016) for the proposed project. The SHPD reviewed and accepted the AIS (Martel III and Hammatt, May 2016) on February 10, 2017 (Log No. 2016.01343, Doc No.1702KM06). The AIS indicates that the project area includes 10 acres of roadway along University Avenue, Hīhīwai Street, Ala Wai Boulevard, Kālaimoku Street, and Kai'olu Street, along with areas of Ala Wai Neighborhood Park and Ala Wai Elementary School. Several methods will be utilized to complete the project, horizonatal drilling will be done to cross under the Ala Wai Canal; open trenching will be used to install a ductbank/cable system from Kālaimoku Street along Ala Wai Boulevard to Kai'olu Street; cables will be brought through an existing ductbank system from the park to a utility pole located on University Avenue; existing cables will be removed from Ala Wai Elementary School and Ala Wai Canal; and pole replacement will occur near the intersections of University Avenue and Kapiolani Boulevard and Hīhīwai Street and Kamoku Street. Additionally, staging areas will be created on Kālaimoku Street, University Avenue, and in the Ala Wai Neighborhood Park. The AIS further documented two previously identified historic properties: the Ala Wai Canal (Site 50-80-14-9757) and a culturally modified wetland (Site 50-80-14-5796).

Pursuant to Hawaii Administrative Rules (HAR) §13-284-6, Site 5796 is assessed significant under Criterion "d," and the Ala Wai Canal (Site 9757) is assessed as significant under Criterion "a" and "d." Additionally the Ala Wai Canal is listed on the Hawaii Register of Historic Places (HRHP) and is evaluated as eligible for listing on the National Register of Historic Places (NRHP) under Criterion A. The AIS report provides a HAR §13-284-7 project effect determination of "*effect, with agreed upon mitigation commitments*." No further archaeological work is recommended for the Ala Wai Canal (Site 9757), but archaeological monitoring is recommended for the remainder of the project area. **SHPD concurred** with the site significance assessments, eligibility recommendation for the Ala Wai Canal (Site 9757), **project effect determination of "effect, with agreed upon mitigation commitments,"** the mitigation recommendation of archaeological monitoring, and accepted the AIS report on February 10, 2017 (Log No. 2016.01343, Doc. No. 1702KM06).

As stipulated, when the SHPD comments that a project will result in "effect, with agreed upon mitigation commitments" pursuant to HAR §13-284-7, then detailed mitigation plans shall be prepared. The agreed upon mitigation commitment for this project is data recovery in the form of archaeological monitoring.

SHPD looks forward to receiving an archaeological monitoring plan meeting the requirements of HAR §13-279-4 for review and acceptance **prior to issuance of the permit**.

SHPD will notify you when the plan has been accepted and permitting process may proceed.

Please contact me at Susan.A.Lebo@hawaii.gov or at (808) 692-8019 for any questions regarding this letter.

Aloha,

Susan A. Lebo

Susan A. Lebo, PhD
Archaeology Branch Chief

cc: Lydia Morikawa, DLNR Land (Lydia.M.Morikawa@hawaii.gov)
William Ammon, C&C DDC, (wammons@honolulu.gov)
Joanne Hiramatsu, Belt Collins Hawaii, LLC (jhiramatsu@bchdesign.com)

BELT COLLINS

February 26, 2017
2013-33-3200 / 17P-026

Dr. Susan Lebo
Archaeology Branch Chief
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawai'i
Kākuhihewa Building
601 Kamokila Blvd, Ste 555
Kapolei, HI 96707

Dear Dr. Lebo:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated February 21, 2017, and the Department of Land and Natural Resources, State Historic Preservation Division's (SHPD) input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

We are in receipt of your acceptance letter for the Archaeological Inventory Survey (AIS) report dated February 10, 2017 (Log No. 2016.01343, Doc. No. 1702KM06). The Final AIS report and the acceptance letter will be included in the Final EA. We understand SHPD's concurrence with the AIS report project effect determination, significant assessments, eligibility recommendation for the Ala Wai Canal (Site 9757), and mitigation recommendation for archaeological monitoring. We will update the mitigation section for the Final EA in Chapter 3, Section 3.4, Archaeological and Cultural Resources accordingly with "effect, with agreed upon mitigation commitments" and look forward to the acceptance of the Archaeological Monitoring Plan.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch
Russell Y. Tsuji, Department of Land and Natural Resources, Land Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com

Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF SCHOOL FACILITIES AND SUPPORT SERVICES

RECEIVED
2017 JAN 30 PM 12:24
BELT COLLINS HAWAII

January 26, 2017

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Re: Draft Environmental Assessment for the Proposed Ala Wai Underground Cable Relocation

Dear Ms. Hiramatsu:

The Department of Education (DOE) has reviewed the Draft Environmental Assessment (DEA) for the relocation of an underground cable that passes under Ala Wai Elementary School.

The DEA states that Hawaiian Electric has had contact with the DOE and Ala Wai Elementary. However there is a new principal at Ala Wai Elementary, Michelle DeBusca.

The DOE requests that a series of meetings be held with Principal DeBusca. The first meeting should be held as soon as possible to describe all possible impacts of the project on Ala Wai Elementary. The Principal should be supplied with a point of contact at Hawaiian Electric for all concerns related to the project. Issues to be discussed with the Principal should include the traffic rerouting; the school's traffic safety requirements; noise, dust and other construction impacts; and any other considerations important to the school.

The DOE appreciates the opportunity to offer comments on the DEA. If you have any questions, please call Heidi Meeker with the Planning Section of the Facilities Development Branch, at 784-5095.

Respectfully,

Kenneth G. Masden II
Public Works Manager
Planning Section

KGM:jmb

c: Michelle DeBusca, Principal, Ala Wai Elementary
William Ammons, Department of Planning and Permitting
Office of School Facilities and Support Services

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-012

Mr. Kenneth G. Masden II
Public Works Manager
Office of School Facilities and Support Services
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, HI 96804

Dear Mr. Masden:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 26, 2017, and the Department of Education's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

Hawaiian Electric has been in consultation with the Ala Wai Elementary School and Principal Michelle DeBusca. Outreach efforts will continue with Ala Wai Elementary and to those individuals who may be affected by the cable relocation along University Avenue and Hihiwai Street. Discussions regarding scheduling with all parties involved are ongoing, however, the intention is to minimize the impacts in the safest possible way. Access to certain sections of the roads near the school may be temporarily closed during off-peak commuting hours. Hawaiian Electric will continue to work closely with Principal DeBusca with regards to any concerns and potential impacts to the Ala Wai Elementary School.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD/CWB

12023PGH.16

December 23, 2016

Ms. Joanne Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

SUBJECT: Comments on DRAFT Environmental Assessment for Ala Wai 46kV Underground Cable Relocation and Replacement TMK No. 2-6-17: 64; 2-7-36: 1; and 2-7-36: 7

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated December 12, 2016, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

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

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

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

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

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow

designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g. minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

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

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

Sincerely,

Scott Takamoto
for
ALEC WONG, P.E., CHIEF
Clean Water Branch

GH

RECEIVED
2016 DEC 27 PM 2:22
BELT COLLINS HAWAII

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-013

Mr. Alec Wong, P.E.
Chief
Clean Water Branch
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Wong:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter, dated December 23, 2016, and the Department of Health Clean Water Branch's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. We have briefed ourselves with your standard comments as provided on the website: http://health.hawaii.gov/epo/files/2013/05/CWB-standardcomment.pdf. Further, we acknowledge the provisions of Hawaiʻi Administrative Rules (HAR), Chapters 11-54 and 11-55 and will comply with the Antidegradation Policy of HAR, Section 11-54-1.1, Designated Uses of HAR, Section 11-54-3, and Water Quality Criteria of HAR, Sections 11-54-4 through 11-54-8. As the project will involve work in the canal waters due to the removal of the cables, a U.S. Department of the Army Permit from the U.S. Army Corps of Engineers (USACE) will be sought. Preliminarily a Nationwide Permit #12, Utility Line Activities, has been determined by the USACE. A Blanket Section 401 Water Quality Certification (WQC) from the Hawaiʻi Department of Health (DOH), Clean Water Branch (CWB) will be considered if applicable.

2. The construction area of the proposed project is larger than one acre. A National Pollutant Discharge Elimination System permit will be obtained from the Department of Health before construction commences. All rules of application filing will be followed.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

3. As indicated above, a Nationwide Permit #12 will be obtained from the USACE and a Blanket Section 401 WQC from the DOH, CWB, if applicable, for work in the waters of the United States, which includes the Ala Wai Canal waters.

4. It is acknowledged that all projects must comply with the State's Water Quality Standards and that noncompliance with the water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties.

5. It is acknowledged that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Considerations will be made to conserve natural resources by implementing Best Management Practices.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:
EPO 16-427

January 6, 2017

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819
Email: jhiramatsu@bchdesign.com

Dear Ms. Hiramatsu:

SUBJECT: Draft Environmental Assessment (DEA) for Proposed Ala Wai 46kV Underground Cable Relocation, Honolulu, Oahu
TMK: (1) 2-7-36:1, 7, and University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:
http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2016-12-23-OA-5E-DEA-Ala-Wai-46kV-Cable-Relocation.pdf

We understand from the OEQC publication form project summary that *"The Hawaiian Electric Company, Inc. (HECO), is proposing to relocate underground sub-transmission line cables that connect to HECO's Waikiki Substation located on Kai'olu Street. The proposed action would shift the alignment of the cable to the west of the existing route that passes beneath the Ala Wai Elementary School grounds, the Community Gardens, and within the Ala Wai Canal. The Project will install the new cables using horizontal directional drilling to cross under the Ala Wai Canal and open trenching within the roadways. The existing cables will be removed from the Ala Wai Canal and under the Ala Wai Elementary School and Community Gardens. Other actions will include two utility pole replacements.*

The purpose for the proposed action is to support the Department of Land and Natural Resources' efforts to provide continuous maintenance dredging of the Ala Wai Canal. The Ala Wai Canal is listed on the State Register of Historic Places that requires site preservation efforts. The replacement cables will also maintain the reliability of the electrical distribution system

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments and available strategies to support sustainable and healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page is continually updated so please visit it regularly at: http://health.hawaii.gov/epo/egis.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

We suggest you review the requirements of the Clean Water Branch (HAR, Section 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch, Engineering Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

In order to better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

Mahalo nui loa,

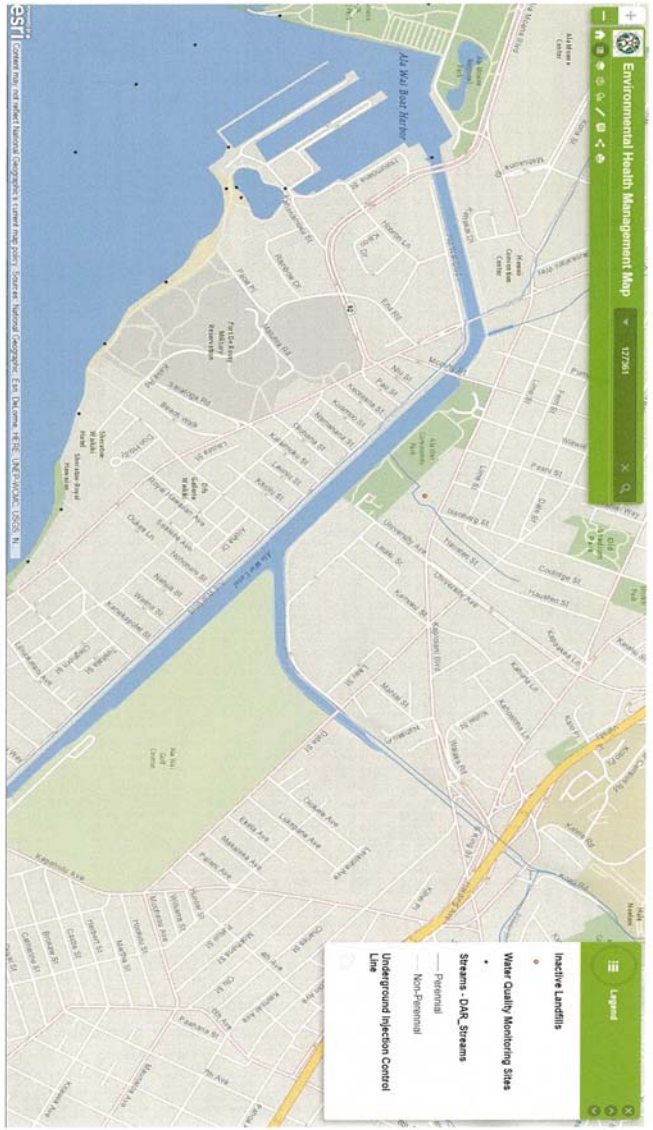
Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

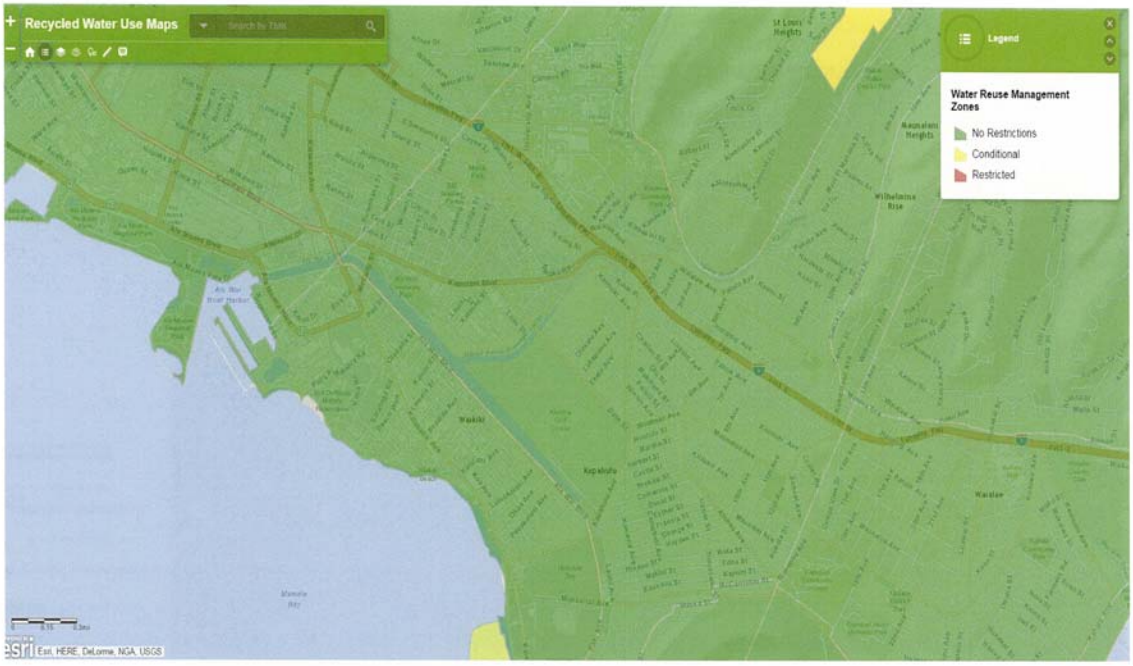
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis
Attachment 2: Clean Water Branch: Water Quality Standards Map
Attachment 3: Wastewater Branch: Recycled Water Use Map of Project Area
Attachment 4: OEQC viewer (of past EA's, EIS's in area)
Attachment 5: U.S. EPA EJSCREEN Report for Project Area

c: Kerstan Wong, Manager, HECO (via email: kerstan.wong@hawaiielectric.com)
William Ammons, C&C Dept. of Planning and Permitting (via email: wammons@honolulu.gov)
DOH: DDEH, CWB {via email only}

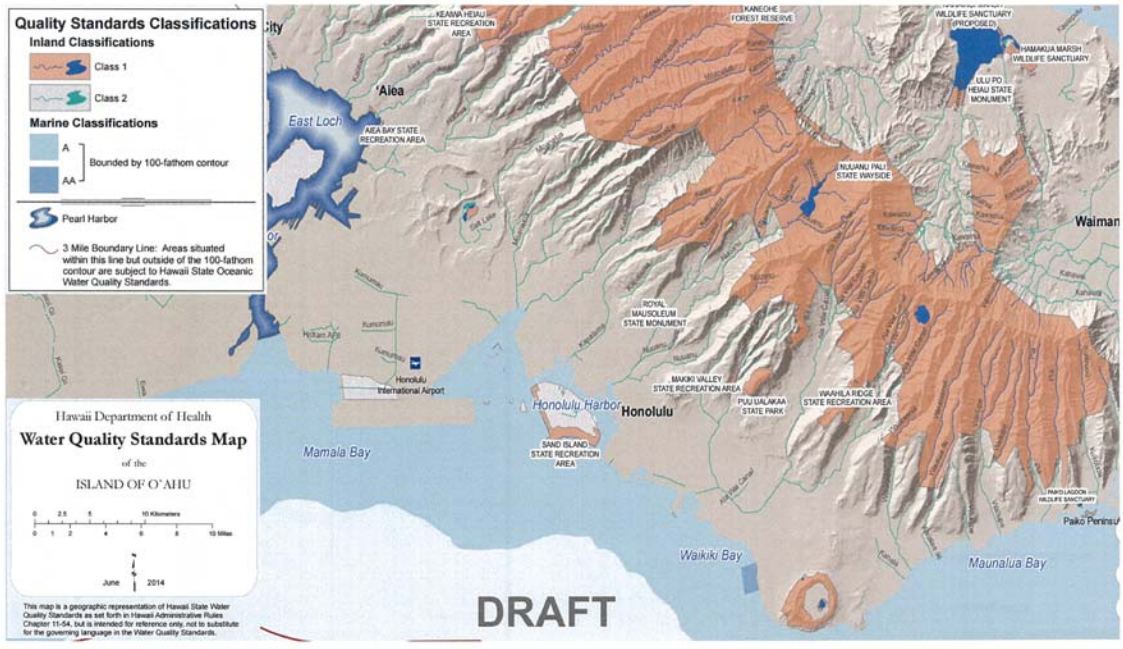
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis



Attachment 3: Wastewater Branch: Recycled Water Use Map of Project Area



Attachment 2: Clean Water Branch: Water Quality Standards Map



Attachment 4: OEQC viewer (of past EA's, EIS's in area)



Attachment 5: U.S. EPA EJSCREEN Report for Project Area

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2016)

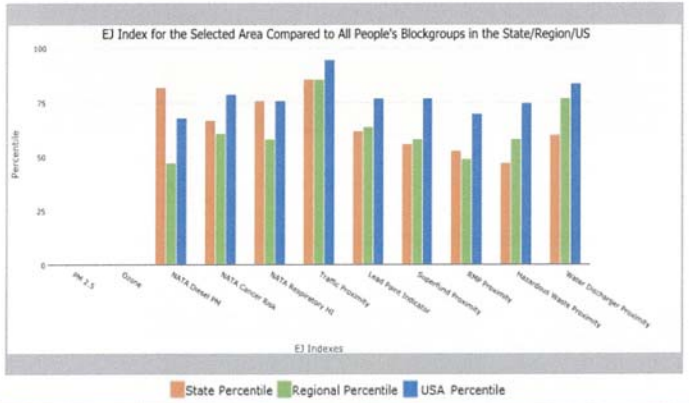
1 mile Ring Centered at 21.285721,-157.827885, HAWAII, EPA Region 9

Approximate Population: 61,500

Input Area (sq. miles): 3.14

Ala Canal Cable Relocation

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	82	47	68
EJ Index for NATA* Air Toxics Cancer Risk	67	61	79
EJ Index for NATA* Respiratory Hazard Index	76	58	76
EJ Index for Traffic Proximity and Volume	86	86	95
EJ Index for Lead Paint Indicator	62	64	77
EJ Index for Superfund Proximity	56	58	77
EJ Index for RMP Proximity	53	49	70
EJ Index for Hazardous Waste Proximity*	47	58	75
EJ Index for Water Discharger Proximity	60	77	84



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

January 06, 2017 1/3

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 21.285721,-157.827885, HAWAII, EPA Region 9

Approximate Population: 61,500

Input Area (sq. miles): 3.14

Ala Canal Cable Relocation



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EPA United States Environmental Protection Agency

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 21.285721,-157.827885, HAWAII, EPA Region 9

Approximate Population: 61,500

Input Area (sq. miles): 3.14

Ala Canal Cable Relocation

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.37	N/A	9.32	N/A
Ozone (ppb)	N/A	N/A	N/A	51	N/A	47.4	N/A
NATA* Diesel PM (µg/m³)	0.308	0.149	89	0.978	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	50	34	93	43	70-80th	40	80-90th
NATA* Respiratory Hazard Index	1.9	1	93	2	50-60th	1.8	60-70th
Traffic Proximity and Volume (daily traffic count/distance to road)	2500	990	88	1100	87	590	94
Lead Paint Indicator (% Pre-1960 Housing)	0.16	0.16	61	0.24	52	0.3	45
Superfund Proximity (site count/km distance)	0.051	0.098	46	0.15	36	0.13	43
RMP Proximity (facility count/km distance)	0.099	0.19	52	0.57	18	0.43	27
Hazardous Waste Proximity* (facility count/km distance)	0.072	0.14	43	0.14	47	0.11	53
Water Discharger Proximity (facility count/km distance)	0.26	0.34	58	0.2	81	0.31	71
Demographic Indicators							
Demographic Index	55%	52%	62	47%	62	36%	77
Minority Population	74%	77%	34	58%	64	37%	81
Low Income Population	34%	26%	70	36%	50	35%	53
Linguistically Isolated Population	14%	6%	88	9%	76	5%	88
Population With Less Than High School Education	9%	9%	58	17%	37	14%	43
Population Under 5 years of age	4%	6%	22	7%	23	6%	24
Population over 64 years of age	17%	15%	62	13%	77	14%	72

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

February 23, 2017
2013-33-3200 / 17P-014

Ms. Laura Leialoha Phillips MacIntyre, AICP
Program Manager
Environmental Planning Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Ms. Phillips McIntyre

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 6, 2017, and the Environmental Planning Office's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. We have briefed ourselves with your standard comments as provided on the website: http://health.hawaii.gov/epo/landuse/ and understand that projects are required to adhere to these standards. If applicable, required permits will be sought as stated by the standard comments.

2. We appreciate you apprising us of the updated environmental Geographic Information System website http://health.hawaii.gov/epo/egis/. We will continue to use this website as a reference in current and future environmental reports.

3. We have reviewed the Hawai'i Environmental Health Portal at https://eha-cloud.doh.hawaii.gov/portal/#/systems/list and will utilize its resources that are applicable to our project.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

4. It is acknowledged that all projects must comply with the State's Water Quality Standards and that noncompliance with the water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties. The construction area of the proposed project is larger than one acre and storm water runoff from the construction area is anticipated to flow into State surface waters. A National Pollutant Discharge Elimination System permit will be obtained from the Department of Health before construction commences. All rules of application filing will be followed.

5. We have reviewed previous Hawai'i Environmental Policy Act {Hawai'i Revised Statues, Chapter 343} documents on http://eha-web.doh.hawaii.gov/oeqc-viewer/. This website was utilized to help prepare this Draft EA.

6. Thank you for apprising us of the new environmental justice mapping and screening tool at https://www.epa.gov/ejscreen. We will utilize this tool in planning our future projects.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

DEPARTMENT OF HEALTH | 235 South Beretania Street, Suite 702, Honolulu, HI 96813 | oeqchawaii@doh.hawaii.gov

DAVID Y. IGE
GOVERNOR

SCOTT GLENN
DIRECTOR

(808) 586-4185

January 26, 2017

Kathy Sokugawa
Acting Director
Department of Planning and Permitting
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, HI 96813

Attn: William Ammons

Dear Ms. Sokugawa,

Subject: Comments on Draft Environmental Assessment (EA) for the Ala Wai 46KV Underground Cable Relocation project

The Office of Environmental Quality Control (OEQC) has reviewed the Draft EA for the subject project, and offers the following comments:

We observe that Section 1.4 on page 1-3 states that the Wastewater Branch of the Department of Planning and Permitting (DPP) is the Approving Agency for this project; Chapter 343, Hawai'i Revised Statutes establishes that "agencies" are "department-level" entities, so in this case, DPP should be indicated as the Approving Agency, rather than the Wastewater Branch.

The second paragraph of Section 2.1.1 "Methods of Installation" notes that the Horizontal Directional Drilling (HDD) method of drilling will require the excavation of "two large bore holes approximately 10 feet apart," yet does not indicate how "large" the diameter of these holes will be. Additionally, logic suggests these 50-foot deep bore holes will be located at either end of the 1,000-foot long HDD segment, rather than "10 feet apart." Further, line 6 of page 3-32 states the trenchless portion of the work is estimated to take approximately 227 months, which is inconsistent with the statement in Section 2.1.2 "Preliminary Schedule" that suggests construction will begin in late 2017 and be completed in early 2019. Please provide accurate information about these project details in the project's Final EA.

Figure 3-2 "Utilities Plan and Profile" depicts two 36-inch sewer lines in close proximity to the existing electrical cables this project proposes to relocate; however, the figure does not indicate the depth of these lines as they traverse under and across the Ala Wai Canal. The narrative does not provide any information about how these sewer lines may be affected by the proposed removal of 1) the existing electrical cables and 2) the overlying protective concrete panels "temporarily" placed on the floor of the canal in 2002. While we realize the applicant does not have jurisdiction over these sewer lines, a comprehensive EA should include a robust discussion of how the existence of these lines impact the stated goal of the proposed action, which is to ultimately facilitate the planned dredging of the Ala Wai Canal.

Appendix E-1 "Pre-consultation Letters" appears to be a 90-page reproduction of many identical letters sent by the project consultant to dozens of agencies, elected officials, project stakeholders and interested parties, seeking pre-consultation comments from the recipients. Given the list of pre-consultations provided in Chapter 7 of the Draft EA, there is no need to include more than perhaps one sample of the identical letter sent out to the various recipients.

Thank you for the opportunity to comment on the Draft EA. We look forward to a response that will also be included in the Final EA. If you have any questions, please contact our office at (808) 586-4185.

Sincerely,

Scott J. Glenn

Scott Glenn, Director

cc: Belt Collins Hawai'i; HECO

17-302

February 23, 2017
2013-33-3200 / 17P-020

Mr. Scott Glenn
Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Dear Mr. Glenn:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter dated January 26, 2017, and the Office of Environmental Quality Control's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

The Wastewater Branch was incorrectly named as the Approving Agency in Section 1.4 and will be corrected to the Department of Planning and Permitting for the Final EA.

In regards to your comments for Section 2.1.1 "Methods of Installation," there are two cables that will be installed side-by-side and crossing the width of the Ala Wai Canal at the proposed horizontal directional drilling location. The horizontal directional drilling process uses a drilling method to tunnel underground which are essentially called bore holes. First, the conduits will be installed within these horizontal bore holes at 10 feet apart. Then, the cables will be pulled through the conduits. The total length of the area excavated by the horizontal directional drilling process is approximately 1,000 feet. This includes sections of Kalaimoku Street, Ala Wai Boulevard, the Ala Wai Canal, and the Ala Wai Neighborhood Park and parking lot. Please review the profile at the bottom of Figure 3-2 showing the location of the directional drilling path under the Ala Wai Canal. The directional drilling bore hole will be approximately 11 feet below the 72-inch sewer line. The design for the horizontal directional drilling crossing is not complete, therefore, the diameter of each bore hole has not been finalized. The trenchless portion of the project under the Canal should take about six to eight weeks. The duration was a typographical error in Section 3.9.2 Potential Impacts and Mitigation Measures, Page 3-32, second paragraph, and it has been corrected for the Final EA.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We will revise Figure 3-2 "Utilities Plan and Profile" to show the relationship between the 36-inch force main and the existing electrical cables proposed for removal. The existing electrical cables and concrete panels are located within the accumulated sediment of the Canal no deeper than approximately 16 feet below mean sea level (MSL), while the sewer is installed below the Canal bottom at approximately 30 feet below MSL. The project is aware of the Beach Walk Buffer Zone and foresees to avoid any impacts to the existing force main.

We will adjust the appendices containing the letter copies to stakeholders and agencies during pre-consultation and the Draft EA comment period. The Final EA appendices will include a sample copy of the outreach letters, all comments letters received, and all our responses during both periods.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

OFFICE OF PLANNING
STATE OF HAWAII

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

RECEIVED
2017 JAN 25 PM 2:23
BELT COLLINS HAWAII

Ref. No. P-15448

January 23, 2017

Ms. Kathy Sokugawa
Acting Director
Department of Planning and Permitting
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, Hawaii 96813

Attn: Mr. William Ammons

Dear Ms. Sokugawa:

Subject: Draft Environmental Assessment for the Proposed Ala Wai 46kV Underground Cable Relocation;
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street
Tax Map Key: (1) 2-7-036: 001 and 007

Thank you for the opportunity to provide comments on the Draft Environmental Assessment (Draft EA) for the proposed Ala Wai 46kV Underground Cable Relocation project. The Draft EA review material was transmitted to our office via letter dated December 22, 2016.

It is our understanding that the Hawaiian Electric Company (HECO) proposes to relocate the route of the underground 46kV sub-transmission cables that connects the Waikiki Substation located on Kaiolu Street to two utility poles located on the mauka side of the project area. Currently the underground cables pass beneath Ala Wai Elementary School grounds and within the sediment layer of the Ala Wai Canal. This proposal will relocate the existing underground sub-transmission route to the west by installing new cables deep beneath the Ala Wai Canal using horizontal directional drilling techniques.

The removal of the current HECO transmission cables will allow for more efficient dredging of the Ala Wai Canal for maintenance purposes by the State of Hawaii Department of Land and Natural Resources who has jurisdiction over the canal.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. The Draft EA addresses a number of our comments made in a previous pre-consultation letter dated August 19, 2015 (Reference Number P-14873). The Draft EA:

   a) examines the goals and objectives of the Hawaii Coastal Zone Management program as listed in Hawaii Revised Statutes (HRS) § 205A-2;

   b) acknowledges the need for a U.S. Army Corps of Engineers Nationwide Permit No. 12 Utility Line; and,

   c) provides information on the impacts and mitigation measures employed to limit the effects of erosion, land-based pollutants, and safeguard water quality concerns that may result during the horizontal directional drilling and the relocation of the present transmission cable.

2. Section 4.1.1, page 4-1 states that a Nationwide Permit No. 12, Utility Line Activities will be required for this project from the U.S. Army Corps of Engineers. This federal permit may also require a Federal Consistency review.

   The national Coastal Zone Management Act requires that federal actions be consistent with approved state coastal programs enforceable policies. Federal actions are defined by this Act as activities performed by a federal agency; activities that require federal permits or approval; or state and local government projects that receive federal financial assistance.

   OP is the lead state agency with the authority to conduct Federal Consistency reviews. Please contact our office on the policies and procedures involved in this review.

3. Section 4.2.2, pages 4-4 to 4-5 of the Draft EA examines the project's consistency with the objectives and policies of the Hawaii State Planning Act, as listed in HRS Chapter 226. It states that the project supports the Physical Environment – Land Based, Shoreline, and Marine Resources, the Physical Environment – Scenic, Natural Beauty, and Historic Resources, the Physical Environment – Land, Air, and Water Quality, and Facility Systems – Energy.

   Section 4.2.3, pages 4-5 to 4-7 of the Draft EA examines State Functional Plans by identifying major statewide concerns, current strategies, and strategies for departmental policies, programs, and priorities. It lists the following State Functional Plans supported by this project: State Conservation Functional Plan, State Energy Functional Plan, State Historic Preservation Functional Plan, and State Recreation Functional Plan.

   The Draft EA does not include an analysis of the project's consistency with the priority guidelines of the Hawaii State Planning Act. The Final Environmental Assessment (Final EA) must include an analysis that examines the project's adherence to all of the themes of the Hawaii State Planning Act listed therein, including the priority guidelines. If any of these are not applicable, the Final EA should affirmatively state this. The most

efficient method is summarizing these in tabular form, followed by discussion paragraphs.

We have no further comments at this time. If you have any questions regarding this comment letter, please contact Joshua Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion
Director

c: ✓Ms. Joanne E. Hiramatsu, Belt Collins Hawaii, LLC.

BELT COLLINS

February 23, 2017
2013-33-320 / 17P-022

Mr. Leo Asuncion, Director
Office of Planning
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Asuncion:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 23, 2017, and the Office of Planning's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. Thank you for your acknowledgement of items the Draft EA addressed from pre-consultation.

2. A Nationwide Permit (NWP) #12 will be obtained from the U.S. Army Corps of Engineers (USACE) and a Coastal Zone Management Act consistency determination from the Department of Business, Economic Development & Tourism, Office of Planning, if applicable[1], for work in the waters of the United States, which includes the Ala Wai Canal waters.

3. The Final EA will include the project's consistency with the priority guidelines of the Hawai'i State Planning Act that include the seven major areas of statewide concern: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.

[1] The USACE is currently revising the NWPs and the new updates will be effective March 19, 2017.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

RECEIVED
2017 JAN 30 PM 12:24
BELT COLLINS HAWAII

January 25, 2017

KIRK CALDWELL, MAYOR

BRYAN P. ANDAYA, Chair
ADAM C. WONG, Vice Chair
DAVID C. HULIHEE
KAPUA SPROAT
KAY C. MATSUI

ROSS S. SASAMURA, Ex-Officio
FORD N. FUCHIGAMI, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

Ms. Joanne Hiramatsu
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

Subject: Your Letter Dated December 12, 2016 Requesting Comments on the Draft Environmental Assessment for the Proposed Ala Wai 46kV Underground Cable Relocation and Replacement – Tax Map Keys: 2-6-017: 064; 2-7-036: 001, 007

Thank you for the opportunity to comment on the proposed transmission cable relocation project.

Based on our experience on recent construction projects, we request Hawaiian Electric Company (Hawaiian Electric) address the following concerns during and after the execution of this and future construction projects:

1. Whenever fluidized thermal backfill (FTB) is utilized, include clear physical demarcations within the FTB that indicate proximity to the Hawaiian Electric cable. We understand other electric utilities use colored (red) FTB directly surrounding the power cable installation to differentiate from trench backfill.

2. Maintain and make available, upon request, accurate as-built information in three dimensions to clearly record the location of Hawaiian Electric underground facilities, particularly transmission cables.

Improving clarity on the location of installed facilities will increase worker safety and protection of Hawaiian Electric assets, while reducing location uncertainty that can slow or delay construction and increase unexpected costs.

The construction drawings should be submitted for our review.

The construction schedule should be coordinated to minimize impact to the water system.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Water for Life . . . Ka Wai Ola

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-005

Mr. Ernest Y.W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Dear Mr. Lau:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter dated January 25, 2017, and the Board of Water Supply's (BWS) input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

The contractor will utilize proper demarcation to indicate the location of the electrical utilities. The relocated cables within the roadways will also be installed within a concrete jacket to prevent damage. When available, Hawaiian Electric will provide updated as-built information and construction drawings for review. Consultation between the BWS and Hawaiian Electric is currently on-going, and will continue throughout the planning and construction phase for coordination and information sharing purposes.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROBERT J. KRONING, P.E.
DIRECTOR DESIGNATE

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

RECEIVED
2017 JAN 26 PM 2:52
BELT COLLINS HAWAII

January 23, 2017

Ms. Joanne Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, HI 96819

Dear Ms. Hiramatsu,

Subject: Chapter 343, Hawaii Revised Statutes (HRS) and Title 11, Chapter 200 Hawaii Administrative Rules (HAR) Draft Environmental Assessment (DEA)- Ala Wai 46kv Underground Cable Relocation and Replacement

Thank you for the opportunity to review and questions. The Department of Design and Construction, Facilities Branch, had some comments. Please see the enclosed attachment with their comments in red.

Should you have any questions, contact Clifford Lau of our Facilities Division at 768-8483.

Sincerely,

for Robert Kroning, P.E.
Director Designate

RJK:ms(674622)

SEGMENT 5 will trench a small section near the University Avenue utility pole to bring the cables from the underground duct bank to the overhead utility pole. The existing utility pole will be replaced with a new pole.

SEGMENT 6 connects the route from the Ala Wai Neighborhood Park via Hihiwai Street to a utility pole on Kamoku Street. Cables will be installed via open trenching and the existing utility pole will be replaced with a new pole.

The project provides Hawaiian Electric the opportunity to address its existing cables that currently cross under the Ala Wai Elementary School property and a small section of the Ala Wai Community Garden. Hawaiian Electric will remove the deactivated cables once it installs the new cables. Then Hawaiian Electric will either fill the conduit with concrete and leave it in place with the existing concrete jacket, or it will remove the conduits, and fill the voided space with grout, leaving only the concrete jacket in place.

This will have a major impact on the park. It will shut down this park for the during of the construction. DPR must be consulted and grant approval for this. Will HECO be compensating the City for the use of the park and will they be making improvements to offset the damages and shut down.

2.1.1 Methods of Installation

Two methods of installation are proposed for this project, open trench roadways of the project area (Segments 1, 3, 5, and 6), Horizontal Direct (HDD) (Segment 2) for the cables crossing under the Ala Wai Canal and through an existing duct bank (Segment 4). Open trenching is conside basic method for installing an underground duct bank. Typically, methodology of open trenching consists of: removing the concrete or surface, topsoil, and excavating material to a standard depth for electr The conduits are installed a minimum of three feet of cover in roadway inches of cover under sidewalk, curb and gutter areas. The PVC horizontally and vertically stacked and placed at the base of the op concrete jacket is poured over the conduits creating the duct bank. The be backfilled with soil that is free of debris and contamination. Any e material from the excavation is loaded into hauling trucks and tran landfill for either future reuse or disposal. All disturbed areas (road curbs, gutters and landscaping) will be restored to its pre-existing condi

The HDD method requires excavation of two large bore holes approxin apart, each having an approximate depth of 50 feet below msl under the canal. The project segment to utilize HDD is approximately 1,000 feet in length and includes drilling from Kalaimoku Street, under Ala Wai Boulevard, under the Ala Wai Canal, then resurfaces at Ala Wai Neighborhood Park parking lot. There are three steps to the HDD process. First, a small pilot hole is drilled from entry to exit. Second, a reamer is used to expand the pilot hole to a final bore hole diameter necessary for conduit installation. The conduits will be assembled in the Ala Wai Neighborhood Park and pulled back to Kalanimoku Street. Finally, a protective casing containing the cables is pulled through the bore hole completing the necessary ductline for the cables. The conduits are tied in at each entry and exit site of the borings by open trenching.

immediately above the proposed duct system alignment. It is recommended that no structures be constructed over the duct system and that they be accessible for utility maintenance purposes. The proposed project location within the City rights-of-way, would minimize the chance that structures would be built over the duct system. For the portion of the duct system within the Ala Wai Neighborhood Park and the Ala Wai Canal, an easement from the State DLNR will be required.

In the short term, temporary project impacts are expected during the project's construction phase. Full use of the affected properties may be temporarily hindered by site preparation, trenching, stockpiling, utility installation, backfilling, site cleaning, and restoration. Those sections of the project area that occur through existing streets will experience temporary traffic delays from possible lane closures, rerouting, and parking prohibitions.

To mitigate these potential impacts, the contractor will be responsible for preparing a traffic control plan (TCP) and submitting it to the City's Department of Planning and Permitting (DPP) Traffic Review Branch for review and approval. The plan will show the limits of construction, lane closures, traffic movements, flag person (if needed), hours of operation, and provisions for access to the adjacent parcels should the access points become blocked. The contractor will perform work within the roadways during off-peak traffic hours. See Section 3.9.2 of this chapter for detailed mitigation measures.

Hawaiian Electric has previously engaged in outreach with community stakeholders including: the Department of Education for the Ala Wai Elementary School, 'Iolani School, McCully/Mō'ili'ili Neighborhood Board, Waikīkī Improvement Association, Waikīkī Business District Improvement Association, Department of Parks and Recreation, Area Elected Officials, cultural descendants, O'ahu Island Burial Council, and the condo resident managers in the surrounding areas.

What is the mitigation for the park?

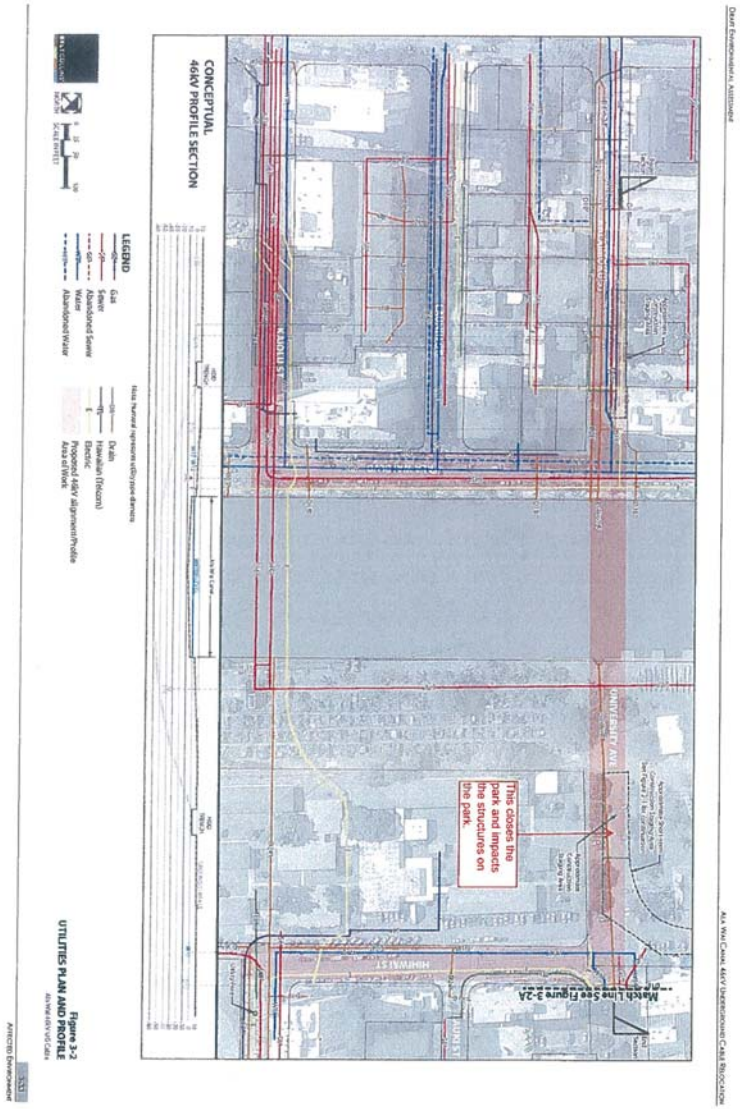
3.2 GEOLOGY, SOILS AND TOPOGRAPHY

3.2.1 Geology

The island of O'ahu consists of two basaltic shield volcanoes: the Ko'olau volcano to the east and the Wai'anae volcano to the west. Millions of years of erosion and sea level change have further shaped the island and its subsurface composition to the O'ahu we are familiar with today.[2] The geology of the Waikīkī and McCully-Mō'ili'ili area consists of sedimentary deposits.[3]

[2] Stearns, H., & K. Vaksvik. 1935, Reprinted March 2001. *Geology and Ground-Water Resources of the Island of O'ahu, Hawai'i*. Prepared for U.S. Geological Survey. Pg 98.

[3] Stearns, H., & K. Vaksvik. 1938, Reprinted March 2001. *Geologic and Topographic Map of the Island of O'ahu, Hawai'i* Bulletin 2, Plate 2. Prepared for U.S. Geological Survey.



during construction. Ingress and egress at Ala Wai Elementary School and 'Iolani School may also be temporarily affected by this work.

What will be done to mitigate the short term impact of shutting down the park. Will HECO maintain and restore all structures damaged by the construction work.

In the short-term, the proposed action would temporarily affect surrounding park and recreation areas and their users. Full use of Ala Wai Neighborhood Park, Ala Wai Community Garden, Ala Wai Canal, and Ala Wai Boulevard Promenade may be temporarily hindered by construction staging, site preparation, trenching, stock piling, utility installation, back filling, site cleaning, and restoration. Hawaiian Electric has initiated consultation with DPR administration and the onsite Ala Wai Community Park staff. Hawaiian Electric has also met with the Community Gardens Coordinator and will continue to work with the DPR and park user groups in advance of the planned construction. Hawaiian Electric has engaged in community outreach with park users and community members at neighborhood board meetings in Waikīkī and McCully-Moiliili.

Cable removal may also disrupt day-to-day operations at Ala Wai Elementary School and the Community Gardens. Part of the proposed project includes removing the existing cables that currently cross under the Ala Wai Elementary School and a small section of the Ala Wai Community Garden. Hawaiian Electric proposes to deactivate these cables, pull them from their conduits, remove the conduits and fill the conduit space with concrete. Hawaiian Electric has already initiated early consultation with both Ala Wai Elementary School and 'Iolani School. Hawaiian Electric intends to continue consultation with both schools as the proposed project nears construction.

During construction, solid waste generated from construction activities would go either to a recycler or to a licensed debris landfill, such as the PVT Landfill. Excavated soil will be tested for chemicals of potential concern using appropriate Environmental Protection Agency (EPA) SW-846 methods to determine if the soil is suitable for reuse[100]. Suitable soil will be reused to fill trenches of the new cables. Any remaining soil that cannot be reused will be characterized using the toxicity characteristic leaching procedure (TCLP) to determine if the soil is suitable for disposal as non-hazardous waste at PVT Landfill in Nanakuli for disposal. Any soil failing the TCLP testing will need to be handled as hazardous waste and disposed at a permitted facility on the U.S. mainland The impact on the area's solid waste facilities is anticipated to be minor.

Hawaiian Electric will coordinate its construction schedule with the DLNR, DPR, Ala Wai Elementary School, 'Iolani School, as well as the impacted community members and organizations in order to minimize the impact of the proposed action on the use of and access to the schools, Ala Wai Neighborhood Park, Ala Wai Community Garden, and the Ala Wai Canal.

100 State of Hawai'i, Department of Health, Hazard Evaluation and Emergency Response Office. October 2011. *Guidance for the Evaluation of Imported and Exported Fill Material, Including Contaminant Characterization of Stockpile.* Pg. 3

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-006

Mr. Robert Kroning, P.E.
Director Designate
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, HI 96813

Dear Mr. Kroning:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter received on January 23, 2017, and the Department of Design and Construction's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

Hawaiian Electric has been in consultation with the Department of Parks and Recreation (DPR) and continues outreach efforts to those individuals and recreational groups who may be affected by the cable relocation within the Ala Wai Neighborhood Park and Hihiwai Street. Discussions regarding scheduling with all parties involved are ongoing, however, the intention is to not shutdown the park during the peak recreational seasons. Access to certain sections of the park may be temporality closed, but Hawaiian Electric intends to notify the DPR district supervisor and Ala Wai Community Park users in advance through media advisories and community notifications. Any damages to the park's property will be restored to its original or better condition.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DPP

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Ulu'ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROSS S. SASAMURA, P.E.
DIRECTOR AND CHIEF ENGINEER DESIGNATE

EDUARDO P. MANGLALLAN
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 17-33

January 25, 2017

Ms. Joanne E. Hiramatsu
Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

RECEIVED
'17 JAN 24 P2:02
DEPT OF PLANNING AND PERMITTING
CITY & COUNTY OF HONOLULU

Dear Ms. Hiramatsu:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Cable Relocation
Tax Map Key: (1) 2-7-36:1 and 7, and
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

Thank you for allowing the Department of Facility Maintenance the opportunity to review and comment on your letter dated December 22, 2016, on the above subject. The following are Road Division's comments:

1. Once construction phase commences, install approved Best Management Practices fronting all affected drainage facilities.

2. During construction and upon completion of the project, any damages/deficiencies to University Avenue, Hihiwai Street, Kalaimoku Street, Kaiolu Street, and Ala Wai Boulevard right-of-ways shall be corrected to City standards and accepted by the City.

If you have any questions, please contact Mr. Kyle Oyasato of the Division of Road Maintenance at 768-3697.

Sincerely,

Ross S. Sasamura, P.E.
Director and Chief Engineer Designate

cc: William Ammons
Department of Planning and Permitting, Urban Design Branch

February 23, 2017
2013-33-3200 / 17P-007

Mr. Ross Sasamura, P.E.
Director and Chief Engineer Designate
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, HI 96707

Dear Mr. Sasamura:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter dated January 25, 2017, and the Department of Facility Maintenance, Road Division's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. Best Management Practices will be implemented throughout the duration of the construction phase to minimize discharge into the drainage facilities.

2. The right-of-ways affected by the project will be repaired and restored to its original or better condition with proper inspection from the City and County of Honolulu.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp
cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

Record agency comments for Job 058966989-002 (2016/ED-10)

Process Edit

Record agency comments
Job 058966989-002 (2016/ED-10)

Civil Engineering Branch review

			Scheduled		Actual	
Assigned To	**Status**	**Outcome**	**Start**	**Completed**	**Start**	**Completed**
MEL TAKAKURA	Complete	Recorded	Dec 14, 2016			Dec 15, 2016 10:45:4

Details

Agency Comments:	1) Section 2.1.1 (Methods of Installation): Revise the last sentence of the first paragraph to read "All disturbed areas within the City's right-of-way shall be restored to DPP's prevailing standards and specifications. Landscaping will be restored to its pre-existing condition." 2) Section 4.3.5 (Summary of Required Permits and Approvals): Revise Table 4-1 to include a trenching permit for work within the City's right-of-way. Also, be advised that the following permits may be required: a) grading permit to dispose the earth material from the horizontal directional drilling process and b) permit to dispose the dewatering effluent from the trenching operation.
Agency:	Civil Engineering Branch
Comments:	
Reviewed by:	Don Fujii

February 23, 2017
2013-33-3200 / 17P-015

Mr. Marvin Fukagawa
Acting Director
Civil Engineering Branch
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Attn: Mr. Mel Takakura

Dear Mr. Fukagawa:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your comment transmittal (Ref: Job 058966989-002 (2016/ED-10)) dated December 15, 2016, and the Department of Planning and Permitting, Civil Engineering Branch's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. The last sentence of the first paragraph in Section 2.1.1 (Methods of Installation) will be revised in the Final Environment Assessment to read "All disturbed areas within the City's right-of-way shall be restored to DPP's prevailing standards and specifications. Landscaping will be restored to its pre-existing condition."
2. Table 4-1 in Section 4.3.5 (Summary of Required Permits and Approvals) will be revised to include the trenching permit for work within the City's right-of-way. We will also research the possible need to obtain a grading permit for disposal of the displaced material from the horizontal directional drilling process and a dewatering disposal permit for the open trenching work in the right-of-ways.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We look forward to your continued participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

2016/ED-10

DPPMemorandum

Planning Division

December 19, 2016

To: William Ammons, Urban Design Branch

Via: Eugene Takahashi, Branch Chief
Kathy Sokugawa, Division Chief

From: Jeffrey Lee, Policy Planning Branch

Subject: Ala Wai 46kV Underground Cable Relocation and Replacement

We have reviewed the information provided and offer the following comments;

The Draft Environmental Assessment (DEA) should include an analysis of the possible impact of sea level rise on the project. If it is likely that sea level rise will increase the risk of flooding during the life of the project structures, the DEA should discuss how the design of the project and proposed operations at the project site will address that risk and provide resilience in recovering from any flooding.

The national standard for making such project assessments has been developed by the U. S. Army Corps of Engineers (USACE). The USACE issued an Engineering Regulation (ER 1100-2-8162) on December 13, 2013, which provides "guidance for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects." The guidance in the regulation can be used as the basis for assessing the "potential relative sea level change" that might be experienced by projects in shoreline areas, and is required to be used for all USACE civil works. See http://www.corpsclimate.us/rccslca.cfm for more details, including use of an online sea-level calculator which can be used to produce Oahu specific projections of sea level rise through 2100.

P:\MISC\Jeff\EIS Review\2016ED-10 Ala Wai underground Cable.doc

Record agency comments for Job 058966989-002 (2016/ED-10)

Process Edit

Record agency comments

Job 058966989-002 (2016/ED-10)

Request for comments for Ala Wai underground Cable Relocation and Replacement

			Scheduled		Actual	
Assigned To	**Status**	**Outcome**	**Start**	**Completed**	**Start**	**Completed**
EUGENE TAKAHASHI	Scheduled		Dec 16, 2016			

Details

Agency Comments: We have reviewed the information provided and offer the following comments;

The Draft Environmental Assesment (DEA) should include an analysis of the possible impact of sea level rise on the project. If it is likely that sea level rise will increase the risk of flooding during the life of the project structures, the DEA should discuss how the design of the project and proposed operations at the project site will address that risk and provide resilience in recovering from any flooding.

The national standard for making such project assessments has been developed by the U. S. Army Corps of Engineers (USACE). The USACE issued an Engineering Regulation (ER 1100-2-8162) on December 13, 2013, which provides "guidance for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects." The guidance in the regulation can be used as the basis for assessing the "potential relative sea level change" that might be experienced by projects in shoreline areas, and is required to be used for all USACE civil works. See http://www.corpsclimate.us/rccslca.cfm for more details, including use of an online sea-level calculator which can be used to produce Oahu specific projections of sea level rise through 2100.

Agency: Policy Planning Branch

Comments:

Reviewed by: Jeffrey Lee

Dec 16, 2016 13:46 Name: PIQ_125 ObjectId: 59052014 Page 1 of 1

February 23, 2017
2013-33-3200 / 17P-016

Mr. Eugene Takahashi, Branch Chief
Policy Planning Branch
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Attn: Mr. Jeffrey Lee

Dear Mr. Takahashi:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your comment memorandum and review transmittal (Ref: Job 058966989-002 (2016/ED-10)) dated December 19, 2016, and the Department of Planning and Permitting, Policy Planning Branch's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

We will address the effect of sea level rise to the cables in the Final Environmental Assessment. The design is not complete, but we anticipate that sea level rise will not affect the infrastructure. The majority of Hawaiian Electric's cables in this area are submerged in water and services have not been affected by inundation.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

RECEIVED
2017 JAN 12 PM 1:07
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

MARK K. KIKUCHI, P.E.
ACTING DIRECTOR
JON Y. NOUCHI
DEPUTY DIRECTOR

TP12/16-674681R

January 13, 2017

Ms. Joanne E. Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

SUBJECT: Draft Environmental Assessment (DEA) for Ala Wai 46kV Underground Cable Relocation and Replacement, Waikiki, Oahu, Hawaii

In response to your letter dated December 12, 2016, we have the following comments:

1. In your November 18, 2015 letter, you mentioned that a Traffic Impact Analysis Report or Traffic Management Plan (TMP) will not be prepared, because the project will not increase traffic and is a short-term construction activity. The project will not have long-term impacts after construction, but will likely have short-term impacts during construction on several local streets. Therefore, we recommend that the DEA include a TMP, which discusses the short-term traffic impacts during construction to any surrounding City roadways with corresponding measures to mitigate these impacts.

2. Section 3.9.2 Potential Impacts and Mitigation Measures, Page 3-31, second paragraph, remove "Street Usage Permit" and replace with "Traffic Control Plans" and add the following BMP "Construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.) to minimize any possible disruption to traffic on the local streets. For work sites near a school, avoid deliveries during school dismissal periods for the safety of the students and pedestrians."

3. Section 3.9.2 Potential Impacts and Mitigation Measures, Page 3-32, second paragraph, states that the "trenchless construction portion of the work is estimated to take approximately 227 months." We understand this to be a typographical error that should say "2 months" and recommend the DEA be corrected accordingly.

4. Encourage workers to bike, use public transit or carpool to the job site.

5. All access driveways to the work sites should be designed and constructed with the highest pedestrian and bicycle safety measures.

6. Any damage to the existing roadways and sidewalks that are caused by the project should be restored to its original or better condition.

7. Continue to keep the area Neighborhood Board, as well as the area residents, businesses, emergency personnel (fire, ambulance and police), Oahu Transit Services, Inc. (TheBus), etc., apprised of the details of the proposed project as it progresses and any impacts that the project may have on the adjoining local street area network.

Should you have any questions, please contact Renee Yamasaki of my staff at 768-8383.

Very truly yours,

Mark K. Kikuchi, P.E.
Acting Director

cc: Department of Planning and Permitting

BELT COLLINS

February 27, 2017
2013-33-3200 / 17P-027

Mr. Mark K. Kikuchi, P.E.
Acting Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, HI 96813

Dear Mr. Kikuchi:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your letter dated January 13, 2017, and the Department of Transportation Services' (DTS) input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

1. Hawaiian Electric sought clarification on DTS' recommendation that the EA include a Traffic Management Plan (TMP) for short-term traffic impacts during construction to surrounding City roadways. In a phone conversation with DTS, Hawaiian Electric was informed that a TMP was not required for the subject project work in the City streets on the ma kai side of the canal. However, Hawaiian Electric was advised to and consulted with Department of Parks and Recreation (DPR) on any impacts construction may have to the park and parking lot. Hawaiian Electric will work with DPR and other stakeholders on the mau ka side of the canal to collaboratively develop traffic mitigation measures that best meets the needs of the collective group.

2. The project's Traffic Control Plans will be prepared as part of the construction plan set and submitted to the Department Planning and Permitting for approval. For the Final Environmental Assessment (FEA), we will add your suggested mitigation, that where possible: "Construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.), to minimize any possible disruption to traffic on the local streets. For work sites near a school, avoid deliveries during school dismissal periods for the safety of the students and pedestrians."

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

3. The typographical error in Section 3.9.2 Potential Impacts and Mitigation Measures, Page 3-32, second paragraph, has been corrected for the FEA.

4. Construction workers will be encouraged to bike, use public transit or carpool to the job site.

5. Hawaiian Electric intends to keep all trenching work within roadways. However, this cannot be confirmed until the design is complete. As required by the DTS, where pedestrian walkways and crosswalks exist, they shall be maintained in passable condition or other options provided for pedestrian movements. The design will include safety measures for the pedestrians and bicyclists.

6. Trenching may cause some damage to the existing roadways and sidewalks. We understand that any damage to the existing roadway and sidewalks that are caused by the project should be restored to its original or better condition.

7. Hawaiian Electric has and will continue to engage in public outreach efforts, particularly with the McCully/Mō'ili'ili Neighborhood Board No. 8, the Waikīkī Neighborhood Board No. 9, area residents and businesses, emergency personnel, and O'ahu Transit Services, Inc. (The Bus). Hawaiian Electric aims to keep these affected parties informed of the proposed project details, construction schedule, and expected impacts during construction activities.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

RECEIVED
2017 JAN 17 PM 2:21
BELT COLLINS HAWAII

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF
LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

January 9, 2016

Ms. Joanne Hiramatsu
Belt Collins Hawaii, LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Ms. Hiramatsu:

Subject: Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200
Hawaii Administrative Rules
Draft Environmental Assessment (DEA)
Tax Map Keys: 2-6-017: 064; 2-7-036: 001 and 007

In response to a letter from Mr. Arthur Challacombe of the City and County of Honolulu's Department of Planning and Permitting (DPP) dated December 12, 2016, regarding the above-mentioned subject, the Honolulu Fire Department determined that there will be no significant impact to department services.

Please contact Battalion Chief Howard Naone of our Fire Operations section (OPS) at 723-7182 or hnaone@honolulu.gov to discuss possible road closures and alternate routes before the project commences.

Should you have questions, please contact Acting Battalion Chief Jarin Wong of our Fire Prevention Bureau at 723-7151 or jwong1@honolulu.gov.

Sincerely,

SOCRATES D. BRATAKOS
Assistant Chief

SDB/DB:jl

cc: OPS
DPP

February 23, 2017
2013-33-3200 / 17P-018

Mr. Socrates D. Bratakos
Assistant Chief
City and County of Honolulu
Honolulu Fire Department
636 South Street
Honolulu, HI 96813

Dear Mr. Bratakos:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 9, 2017, stating that the Ala Wai 46kV Underground Transmission Cable Relocation project will have no significant impact to the Honolulu Fire Department services.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

KIRK CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

CARY OKIMOTO
JERRY INOUYE
DEPUTY CHIEFS

OUR REFERENCE MT-DK

January 3, 2017

Ms. Joanne E. Hiramatsu
Senior Associate and Director of Planning
Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Ms. Hiramatsu:

This is in response to a letter (dated December 12, 2016) from the Department of Planning and Permitting, City and County of Honolulu, requesting comments on a Draft Environmental Assessment for the proposed Ala Wai 46kV Underground Cable Relocation and Replacement project. This project involves Ala Wai Elementary School, the Ala Wai Canal, University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kaiolu Street in Waikiki.

The Honolulu Police Department has reviewed this project and has concerns regarding the safe flow of vehicular traffic, parking in the project area, and nuisance complaints.

We recommend that the contractor evaluate the outcome of the traffic flow affected by construction vehicles commuting to the project site. The contractor should also consider effects to the community caused by vehicles moving in and out of the area during the construction phases of this project. This area will require a sufficient amount of traffic safety oversights and controls (e.g., flag persons or traffic monitors, clear signage and cones, special duty officers, etc.) to accommodate the construction vehicles driving to and from the work site. In particular, this involves Kapiolani Boulevard, University Avenue, the Ala Wai Neighborhood Park, Ala Wai Elementary School, Ala Wai Boulevard, and Kalaimoku Street. This will ensure a safe means of ingress/egress for construction vehicles, motorists, and pedestrians in the vicinity.

In addition, the contractor should research and include a passage plan for bicyclists who will be using the bike lanes along the project sites areas. The Waikiki special district is subject to Section 15-4.6 of the Revised Ordinances of Honolulu which states that "No

Serving and Protecting With Aloha

person shall ride a bicycle, skateboard or roller skates upon any sidewalk in Waikiki…" Special permits may be needed if it is the intention to divert the bicyclist in the bike lane to the sidewalk areas.

If there are any questions, please call Major Clyde Ho of District 6 (Waikiki) regarding Ala Wai Boulevard and Kalaimoku and Kaiolu Streets at 723-3345 and Major Gordon Shiraishi of District 7 (East Honolulu) regarding Ala Wai Elementary School, University Avenue, and Hihiwai and Kamoku Streets at 723-3369.

Thank you for the opportunity to review this project.

Sincerely,

CARY OKIMOTO
Acting Chief of Police

By
MARK TSUYEMURA
Management Analyst VI
Office of the Chief

BELT COLLINS

February 23, 2017
2013-33-3200 / 17P-019

Mr. Cary Okimoto
Acting Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, HI 96813

Dear Mr. Okimoto:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard, Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 3, 2017, and the Honolulu Police Department's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

We acknowledge your recommendation to evaluate the traffic flow that will be affected by the construction vehicles commuting to the project site. We also understand that traffic control plans will be needed to ensure the safety of the community and schools nearby. We will work with the appropriate City and State agencies to ensure that the impacts of the project do not hinder the community's access to their homes or the schools. Construction work within the City right-of-ways will adhere to the parameters of the required permits that may limit work to be performed during off-peak traffic hours to alleviate some of the impacts. The Hawaiian Electric Company has also engaged in outreach to the surrounding schools regarding scheduling and hours.

We appreciate your suggestion to research and include a passage plan for bicyclists and understand that the Waikīkī Special District is subject to Section 15-4.6 of the Revised Ordinances of Honolulu. Special permits will be obtained if applicable and if there is need to divert bicyclists from the bike lanes.

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

WAIKIKI NEIGHBORHOOD BOARD NO. 09
c/o NEIGHBORHOOD COMMISSION OFFICE
TEL: (808) 768-3710 INTERNET: www1.honolulu.gov/nco

January 23, 2017

Department of Planning and Permitting
Urban Design Branch
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813
Attn: William Amons

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

Belt Collins Hawaii LLC
2153 North King Street, Suite 200
Honolulu, HI 96819
Attn: Joanne E. Hiramatsu

Re: Draft Environmental Assessment, Proposed Ala Wai Underground Cable Relocation, Waikiki

Thank you for circulating the draft Environmental Assessment for the proposed project described above. The Waikiki community understands the ongoing need to maintain, upgrade and replace our aging infrastructure. And while at times disruptive, we appreciate that these investments are being made to ensure we have modern, safe and efficient infrastructure.

While I could not personally attend, I understand there were Waikiki citizens who attended your community outreach in Waikiki a few weeks ago. These types of outreach activities are always appreciated and show a concerted effort to hear individual concerns and explain the project in detail.

An overarching comment/idea early on for this project was to possibly incorporate the proposed pedestrian/bicycle bridge across the Ala Wai into the design of the replacement cable. The concept was to run the replacement cable along the underside of the bridge resulting in less impacts from tunneling, cutting and construction costs. This would also address the ongoing concern over regular dredging of the canal and the impacts that poses to an underground cable. While a creative and efficient idea, our community understands that the timing of these two projects cannot be coordinated. The cable must be replaced soon, prior to dredging project and any permits and approvals for a bridge would likely be years away. However, the Waikiki Neighborhood Board has gone on record as supporting this bridge concept and would like to ensure official documents reflect this support if, and when, this bridge project is approved in future years

During the construction, please ensure all permit requirements are strictly met related to construction hours, street closure notifications and noise. This area contains a high density of residences and construction impacts are intensified is these areas.

Again, thank you for engaging with the Waikiki community and we wish you success with your project.

Sincerely,

Jeff Merz AICP, LEED AP
Waikiki Neighborhood Board
Development Review

Oahu's Neighborhood Board System – Established 1973

February 23, 2017
2013-33-3200 / 17P-023

Mr. Jeffery Merz
Waikīkī Neighborhood Board
c/o Neighborhood Commission Office
2222 Aloha Drive, Unit 704
Honolulu, HI 96815

Dear Mr. Merz:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kai'olu Street
Honolulu, O'ahu, Hawai'i

We thank you for your letter dated January 23, 2017, and the Waikīkī Neighborhood Board's input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the DEA, we provide the following:

We appreciate the Waikīkī community's involvement and interest in this project. We also appreciate your efforts to encourage their participation. Hawaiian Electric will continue to offer updates as the construction phase approaches. In regards to the pedestrian/bicycle bridge access, although it is currently not feasible for this project due to the timeline for cable removal, our EA has record of it as an alternative supported by the Waikīkī community and we understand your position to have one built in the future.

We can ensure that all applicable permits for this project will be obtained. The project will adhere to the parameters of those permits to ensure the public's safety and minimize the construction impacts in a high density area.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

COMMENT SHEET

THE ALA WAI 46 KV UNDERGROUND CABLE RELOCATION
DRAFT ENVIRONMENTAL ASSESSMENT
Waikīkī Community Center, January 17, 2017

We would like to hear from the community. Please use the space provided below to share any additional comments on the Ala Wai 46 kV Underground Cable Relocation project. We would like to make sure we understand what you see as the major concerns and priorities for the Hawaiian Electric Company as we go forward with this project. Mahalo!

I am representing Waikiki Surf Club (WSC). We have a couple concerns about the project since it may interfere with our paddling season.

① Paddling runs generally from Jan/Feb thru October. WSC needs access to the park & parking. Please consider asking City Parks for use of their field to accomodate parking stall that will be removed as a result of the equip staging area.

② We are always concerned about water quality. If water quality issues arise as a result of the project we would appreciate some sort of communication plan so we know whether or not to launch our canoes. Also, will we have access to showers or will water be turned off?

Name: Konia Freitas E-mail: konia808@gmail.com Phone: _____

If you are unable to return your comments to us by the end of today's meeting, submit it to us by e-mail at jhiramatsu@bchdesign.com, or by mail at Joanne Hiramatsu, Belt Collins Hawai'i LLC, 2153 North King Street, Honolulu, Hawai'i 96819 by January 23, 2017. Thank you!

February 23, 2017
2013-33-3200 / 17P-024

Sent via e-mail to: konia808@gmail.com

Ms. Konia Freitas
Waikīkī Surf Club

Dear Ms. Freitas:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your participation at the public informational meeting on January 17, 2017, and submitting comments on behalf of the Waikīkī Surf Club for the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

Thank you for advising us of the paddling schedule from January/ February through October, and for your suggestion to request the Department of Parks and Recreation (DPR) to allow use of the Ala Wai Neighborhood Park's field for parking because of the construction activities within the parking lot. We are currently working with the DPR on options that will serve both the needs of the project and the community during construction. We will keep Waikīkī Surf Club informed of the affected areas within the park near the canal when the schedule becomes more finite.

We are currently working with the Department of Health (DOH) Clean Water Branch (CWB) to ensure proper protocols are in place regarding the water quality of the canal. If the DOH CWB determines that water is unsuitable for entry due to the project, warning signs will be posted around the Ala Wai Canal. If the potable water needs to be shut down for a certain period of time, signs will be posted to notify the public. Our goal is to keep any impact to the community at a minimum.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer

Joanne Hiramatsu

From: Laura Ruby <lruby@hawaii.edu>
Sent: Friday, January 20, 2017 8:56 PM
To: Joanne Hiramatsu
Subject: Ala Wai 46 KV Underground Cable Relocation

Hello Joanne,

Just to reiterate my comment from the other night:

Please have ethical-moral parity for both the neighborhoods of Moiliili and Waikiki.
HE has acknowledged that Waikiki is the economic engine for the state, so why not do all of our neighborhood cable needs with horizontal directional drilling putting all the cables underground and eliminating the utility poles? This will mean that BC does not bring home as much of a profit, but you will have lasting good will in the University Ave-Hihiwai-Kamoku-Kapiolani area.

Also, I read all of the on-line EA and EIS documents and the entire focus is on Waikiki. How did BC come to accept such an unbalanced report on the project area?

Also the one quote attributed to me was copied incorrectly--the approximate boundaries of Moiliili both historically and geologically are: Ala Wai Canal, Manoa Stream, Dole Street, and the soft boundary of Old Stadium Park (The Termite Palace). Please correct this misinformation. Thank you.

Laura Ruby
366-0847

February 23, 2017
2013-33-3200 / 17P-021

Via email to lruby@hawaii.edu

Dear Ms. Ruby:

Draft Environmental Assessment
Proposed Ala Wai 46kV Underground Transmission Cable Relocation
Tax Map Keys: (1) 2-7-036:001, 2-7-036:007, and 2-6-017:064
University Avenue, Hihiwai Street, Kamoku Street, Ala Wai Boulevard,
Kalaimoku Street, and Kaiʻolu Street
Honolulu, Oʻahu, Hawaiʻi

We thank you for your email dated January 20, 2017, and your input on the Draft Environmental Assessment (EA) for the Hawaiian Electric Company's proposed utility relocation in the Ala Wai Canal area. In response to your comments on the Draft EA, we provide the following:

We appreciate your involvement and interest in this project. The project involves replacing the existing underground cables within the Waikīkī and the McCully/ Mōʻiliʻili areas, as well as in the Ala Wai Canal. Directional drilling will be used to route cables under the Ala Wai Canal to avoid trenching in Canal. Replacement of all other cables on land, both in the Waikīkī and the McCully/ Mōʻiliʻili areas, will be installed in trenches within the roadway right-of-ways. Once the underground installation of the new cables is complete, the neighborhoods will be restored to their original condition.

Thank you for bringing the misquote of your book regarding the boundaries of Mōʻiliʻili to our attention. We asked the report writers to correct the quote used in the Archaeological Inventory Survey (AIS). The correction will be included in the Final AIS. Both the project EA and the AIS carefully examined the project areas in McCully/Mōʻiliʻili and Waikīkī with respect to existing conditions and potential impacts.

We appreciate your participation in this EA review process. If you have any questions or additional comments, please feel free to contact Joanne E. Hiramatsu at 521-5361, extension 309 or email at jhiramatsu@bchdesign.com.

Sincerely yours,

BELT COLLINS HAWAII LLC

Joanne E. Hiramatsu
Senior Associate, Director of Planning

JEH:hp

cc: Jayson Shibata, Hawaiian Electric Company
William Ammons, Department of Planning and Permitting, Urban Design Branch

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@bchdesign.com
Belt Collins Hawaii is an Equal Opportunity Employer