VOLUME 2 OF 2

(Appendices A to L-3 of Final EA)

Application for Chapter 2.97, MCC Fast-Tracked Residential Workforce Housing Project Approval

HALE MAHAOLU KE KAHUA AFFORDABLE HOUSING COMMUNITY

TMK: (2)3-3-001:106

Prepared for:
Waiehu Housing, LP

February 2023

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MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

VOLUME 2 OF 2

(Appendices A to L-3 of Final EA)

Application for Chapter 2.97, MCC Fast-Tracked Residential Workforce Housing Project Approval

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MUNEKIYO HIRAGA

Final Environmental Assessment

HALE MAHAOLU KE KAHUA AFFORDABLE HOUSING COMMUNITY WAIEHU, MAUI, HAWAI‘I

(TMK NO. (2)3-3-001:106)

VOLUME II OF II
(Appendices)

Prepared for:
Waiehu Housing, LP

June 2022

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MUNEKIYO HIRAGA

List of Appendices

Appendix A.	Project Plans
Appendix B.	Preliminary Report
Appendix C.	Geotechnical Investigation
Appendix D.	Approved Jurisdictional Determination (December 23, 2008)
Appendix E.	Botanical and Fauna Survey
Appendix F.	Request for State Historic Preservation Division Letter of Determination
Appendix F-1.	Acceptance Letter from State Historic Preservation Division
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Appendix G.	Archaeological Monitoring Plan
Appendix G-1.	State Historic Preservation Division Acceptance Letter of Archaeological Monitoring Plan
Appendix H.	Cultural Impact Assessment Report
Appendix I.	Phase 1 Environmental Site Assessment and Phase 2 Subsurface Investigation Reports
Appendix J.	Traffic Impact Analysis Report
Appendix J-1.	Letter from State Department of Transportation Regarding Fair Share Contribution for Traffic Impacts
Appendix K.	State Land Use Commission - District Boundary Interpretation
Appendix L-1.	Hawai‘i State Plan – Assessment of Project Applicability to Goals, Objectives, and Policies
Appendix L-2.	Countywide Policy Plan – Assessment of Project Applicability to Goals, Objectives, and Policies
Appendix L-3.	Maui Island Plan – Assessment of Project Applicability to Goals, Objectives, and Policies

Final Environmental Assessment

HALE MAHAOLU KE KAHUA AFFORDABLE HOUSING COMMUNITY
WAIEHU, MAUI, HAWAI‘I
(TMK NO. (2)3-3-001:106)

VOLUME II OF II
(Appendices)

Prepared for:

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June 2022

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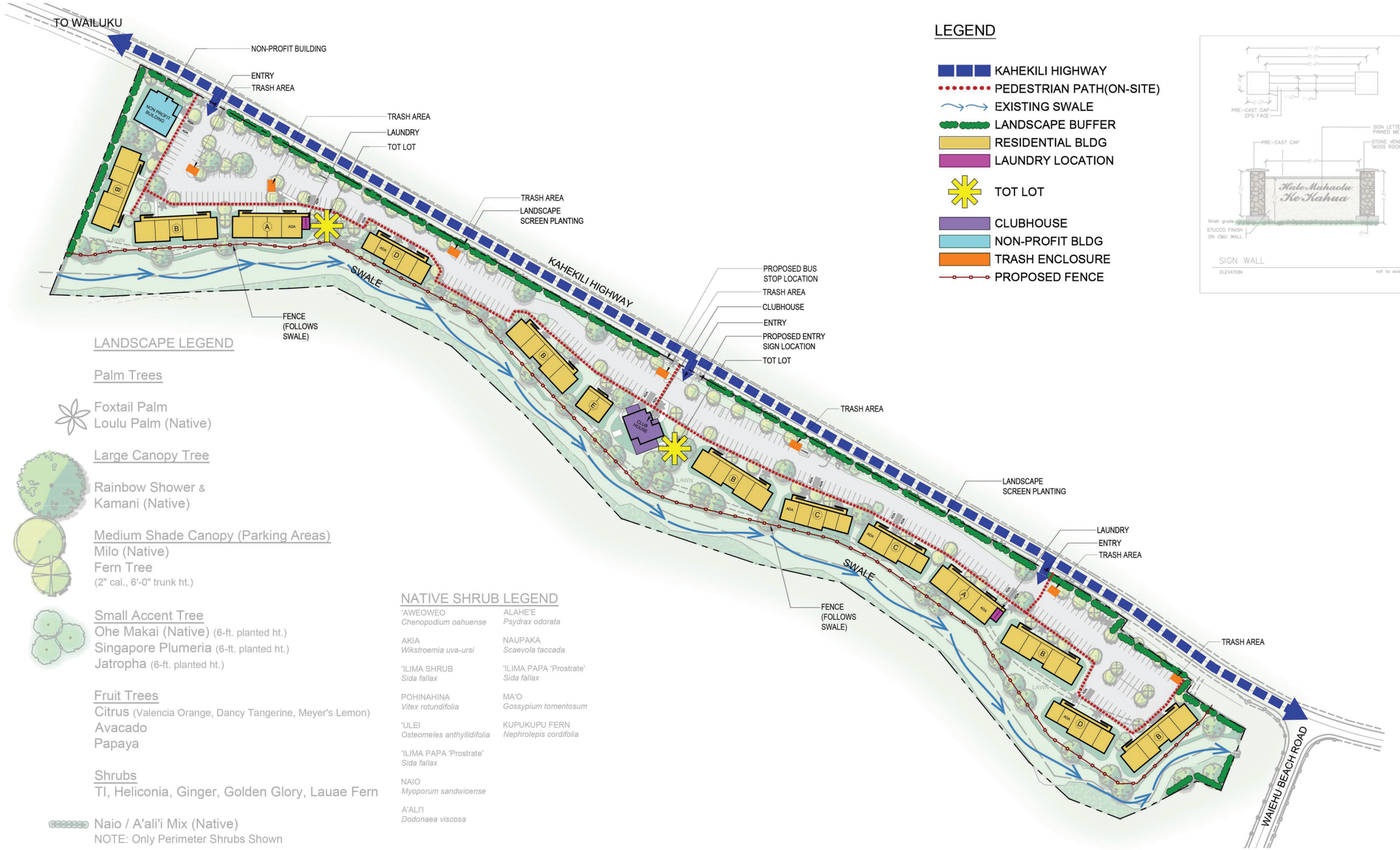
APPENDIX

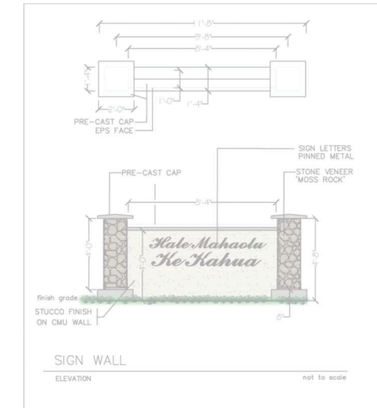
A

PROJECT PLANS



LEGEND

- KAHEKILI HIGHWAY
- PEDESTRIAN PATH(ON-SITE)
- EXISTING SWALE
- LANDSCAPE BUFFER
- RESIDENTIAL BLDG
- LAUNDRY LOCATION
- TOT LOT
- CLUBHOUSE
- NON-PROFIT BLDG
- TRASH ENCLOSURE
- PROPOSED FENCE



LANDSCAPE LEGEND

Palm Trees

Foxtail Palm
Loulu Palm (Native)

Large Canopy Tree

Rainbow Shower &
Kamani (Native)

Medium Shade Canopy (Parking Areas)

Milo (Native)
Fern Tree
(2" cal., 6'-0" trunk ht.)

Small Accent Tree

Ohe Makai (Native) (6-ft. planted ht.)
Singapore Plumeria (6-ft. planted ht.)
Jatropha (6-ft. planted ht.)

Fruit Trees

Citrus (Valencia Orange, Dancy Tangerine, Meyer's Lemon)
Avacado
Papaya

Shrubs

TI, Heliconia, Ginger, Golden Glory, Lauae Fern

Naio / A'ali'i Mix (Native)
NOTE: Only Perimeter Shrubs Shown

NATIVE SHRUB LEGEND

'AWEOWEO *Chenopodium oahuense*	ALAHE'E *Psydrax odorata*
AKIA *Wikstroemia uva-ursi*	NAUPAKA *Scaevola taccada*
'ILIMA SHRUB *Sida fallax*	'ILIMA PAPA 'Prostrate' *Sida fallax*
POHINAHINA *Vitex rotundifolia*	MA'O *Gossypium tomentosum*
'ULEI *Osteomeles anthyllidifolia*	KUPUKUPU FERN *Nephrolepis cordifolia*
'ILIMA PAPA 'Prostrate' *Sida fallax*	
NAIO *Myoporum sandwicense*	
A'ALI'I *Dodonaea viscosa*	

WAIEHU PARCEL

WAIEHU HOUSING, LP

CONCEPT SITE PLAN

FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED

LANDSCAPE LEGEND

Palm Trees

Foxtail Palm
Loulu Palm (Native)

Large Canopy Tree

Rainbow Shower &
Kamani (Native)

Medium Shade Canopy (Parking Areas)

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A'ALI'I *Dodonaea viscosa*	

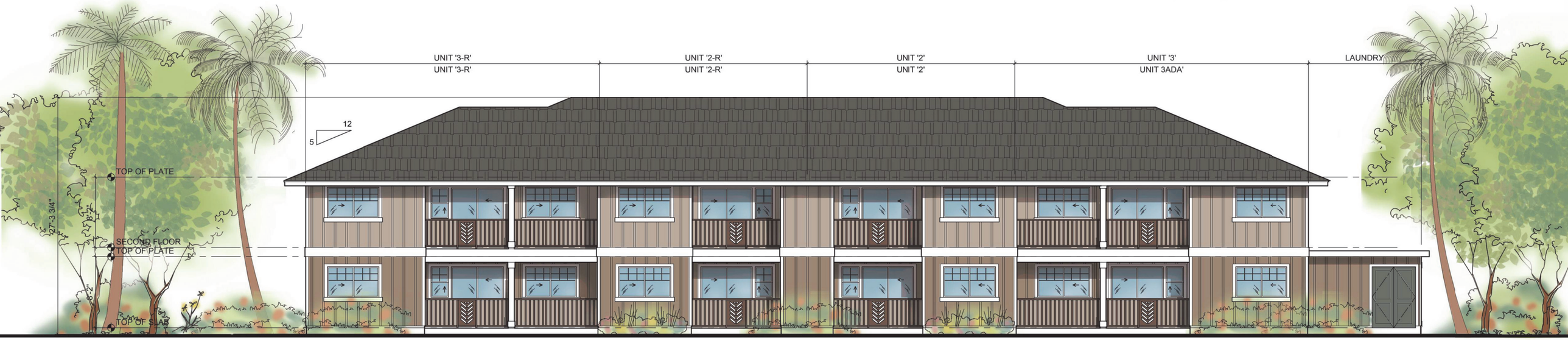
WAIEHU PARCEL

WAIEHU HOUSING, LP

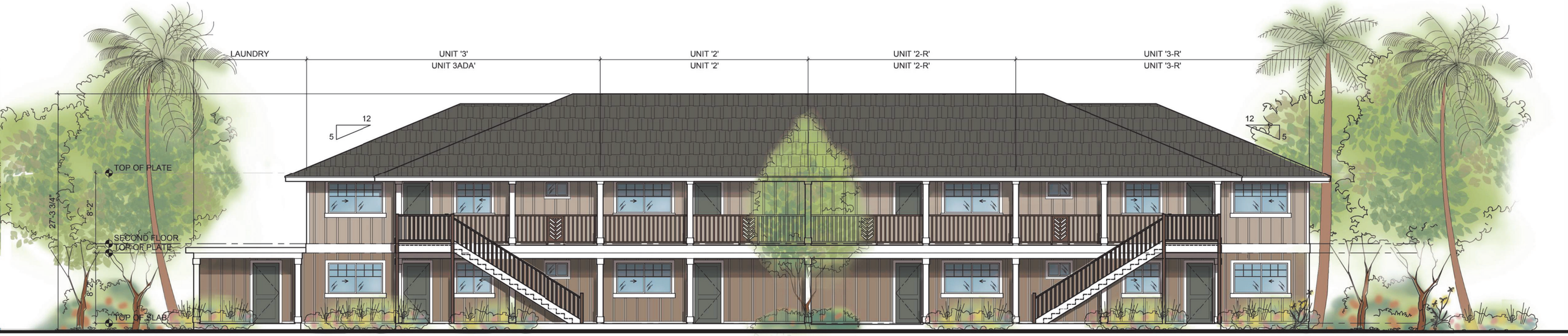
Landscape Plan

FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



REAR ELEVATION



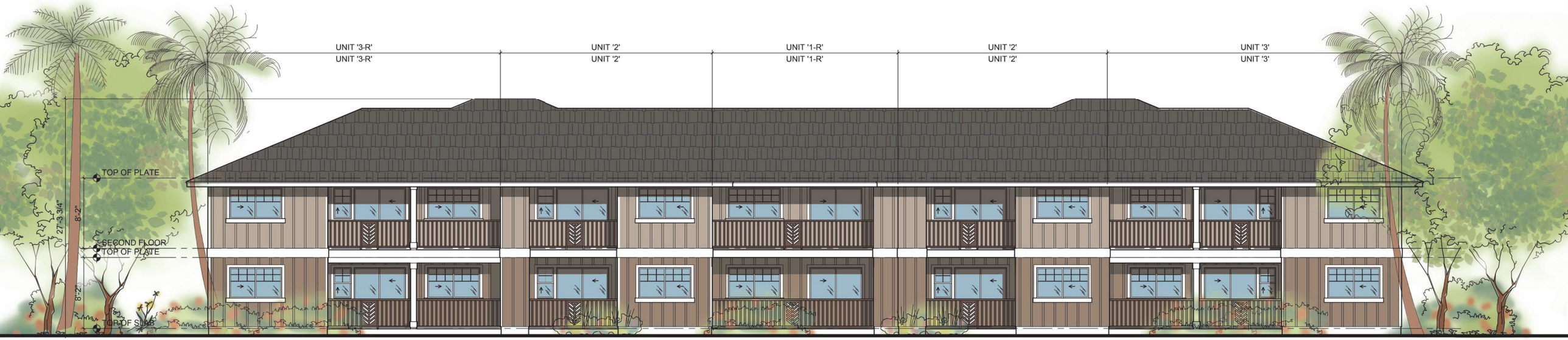
FRONT ELEVATION

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

BUILDING 'A' EXTERIOR ELEVATIONS
FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



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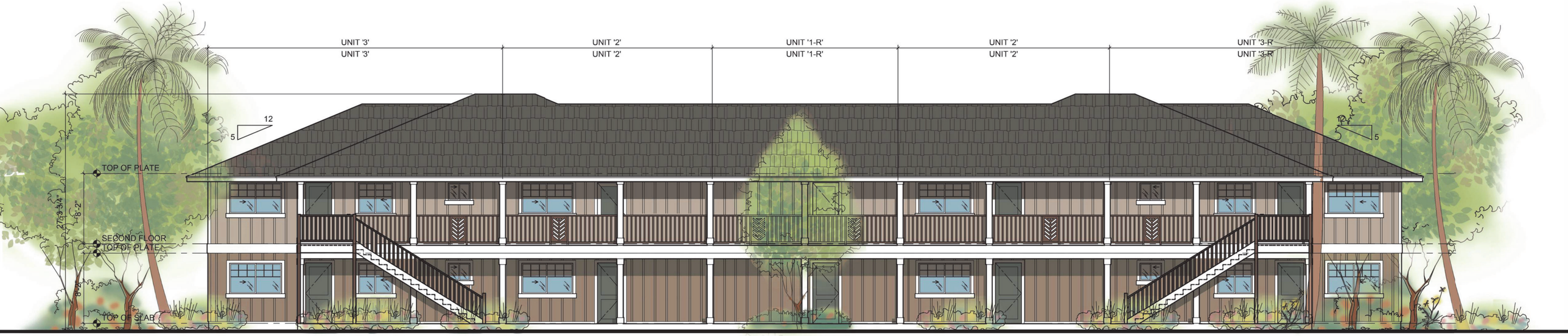


FRONT ELEVATION

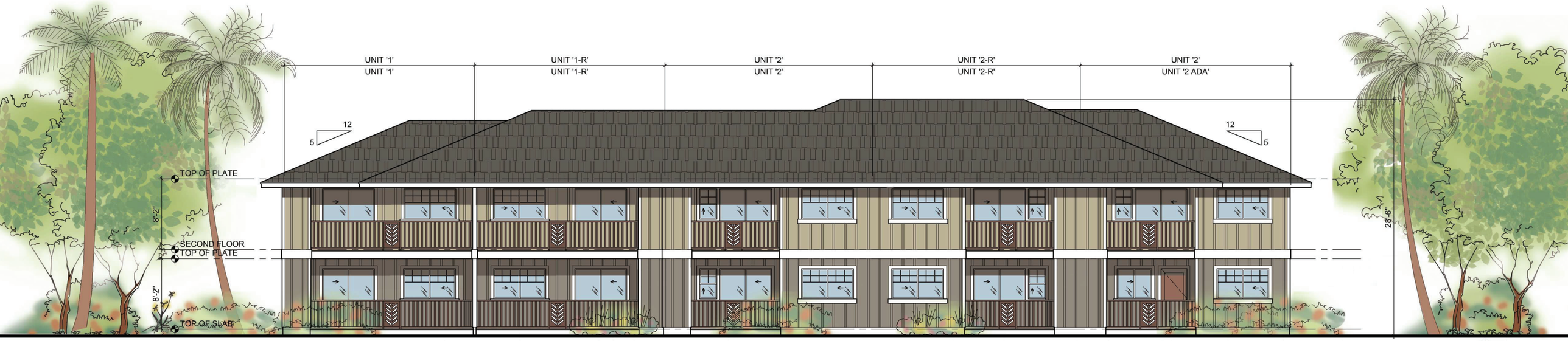
0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

Building 'B' Exterior elevations

FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



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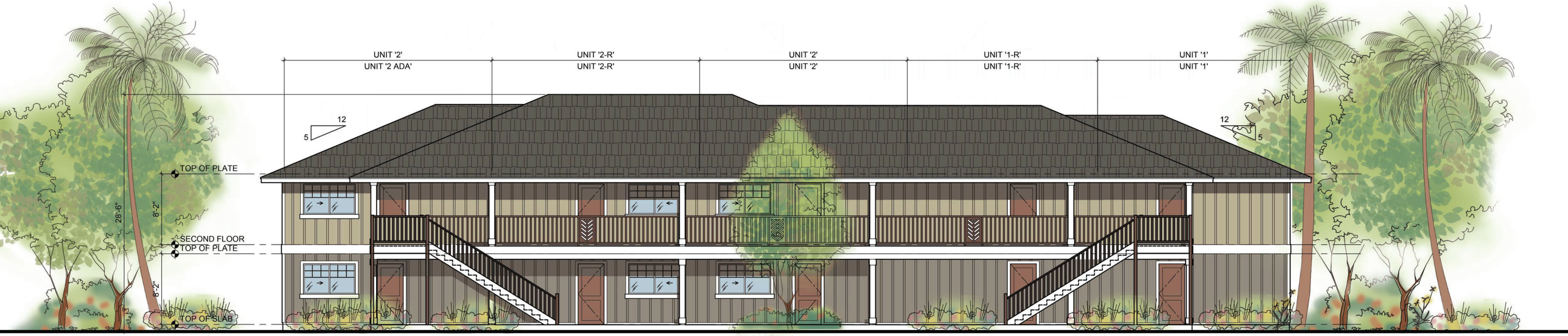


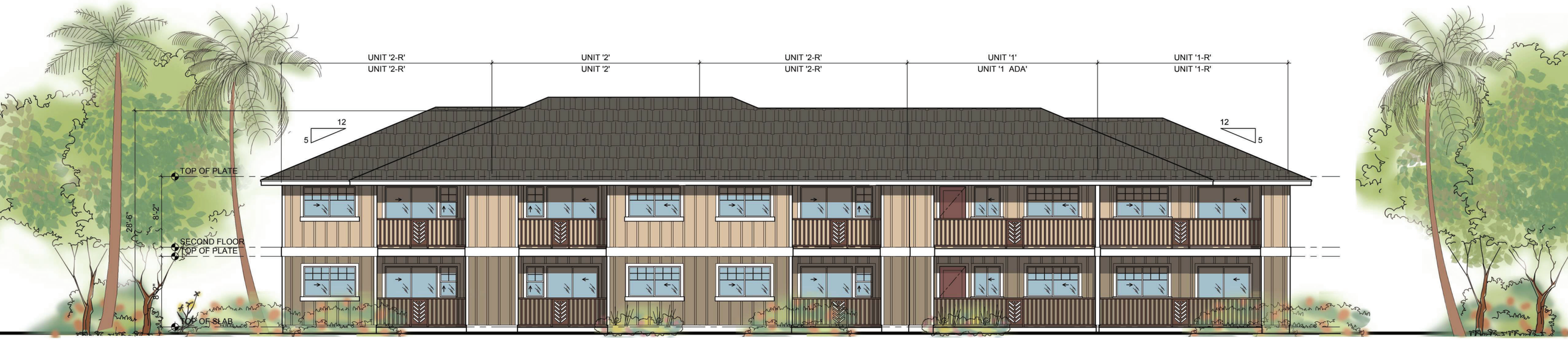
FRONT ELEVATION

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

Building 'C' Exterior elevations
FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



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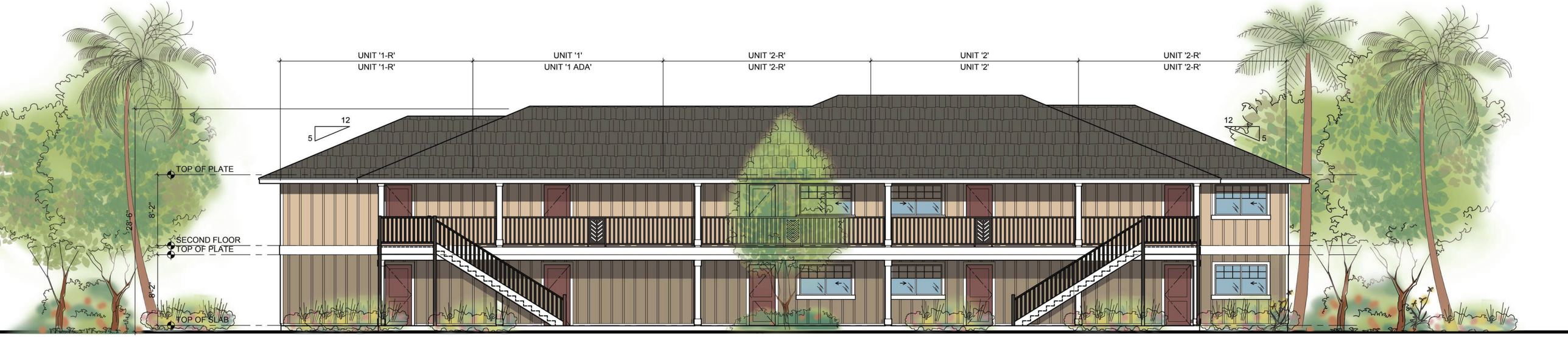


FRONT ELEVATION

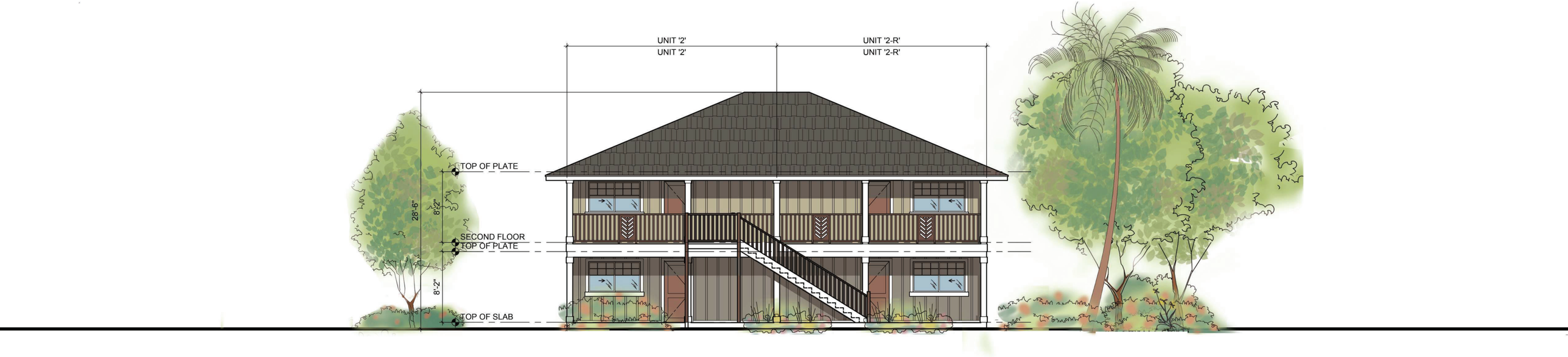
0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

Building 'D' Exterior elevations
FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED

REAR ELEVATION



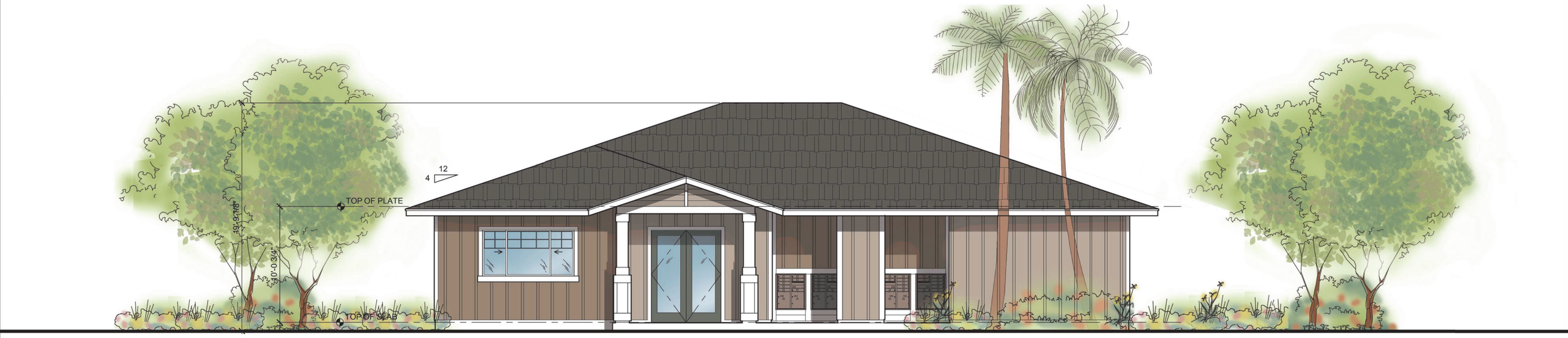
FRONT ELEVATION

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

Building 'E' Exterior elevations
FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



FRONT ELEVATION

REAR ELEVATION

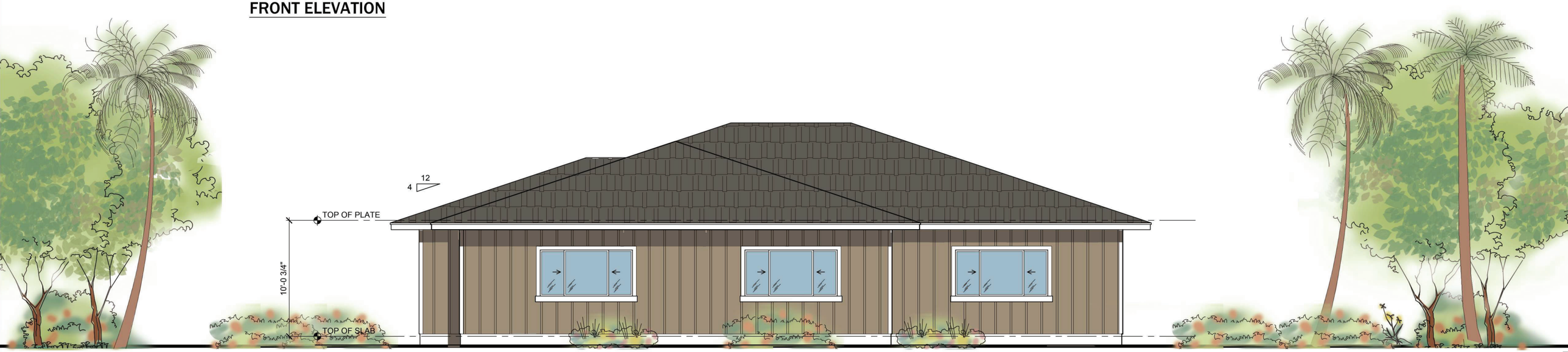
0 2' 4' 6'
SCALE: 1/4" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

CLUBHOUSE EXTERIOR ELEVATIONS
FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED

FRONT ELEVATION



REAR ELEVATION

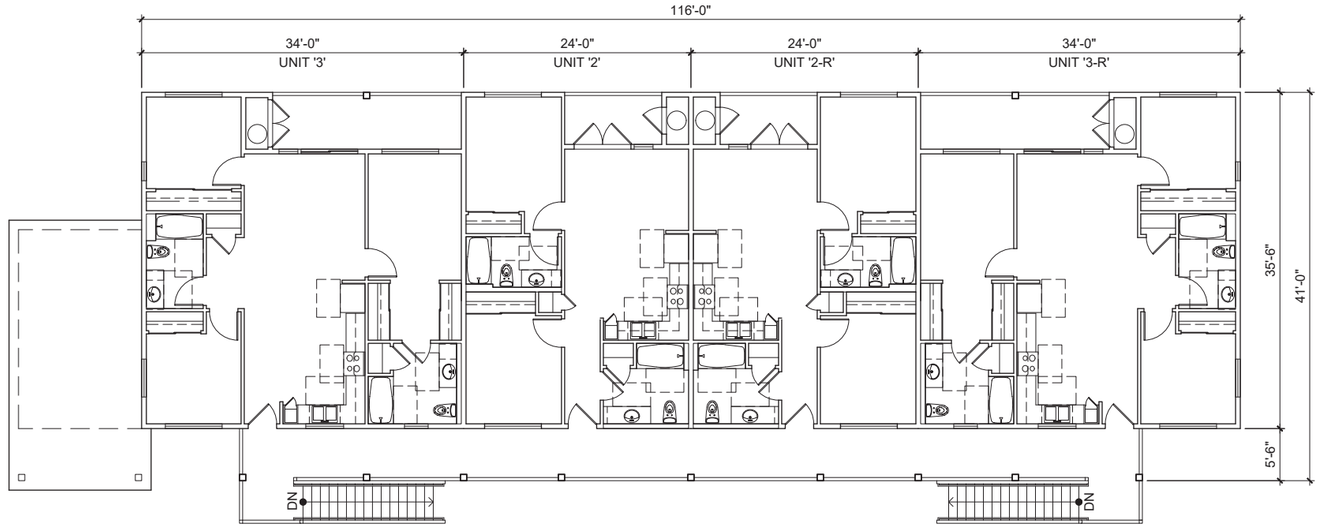
0 2' 4' 6'
SCALE: 1/4" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

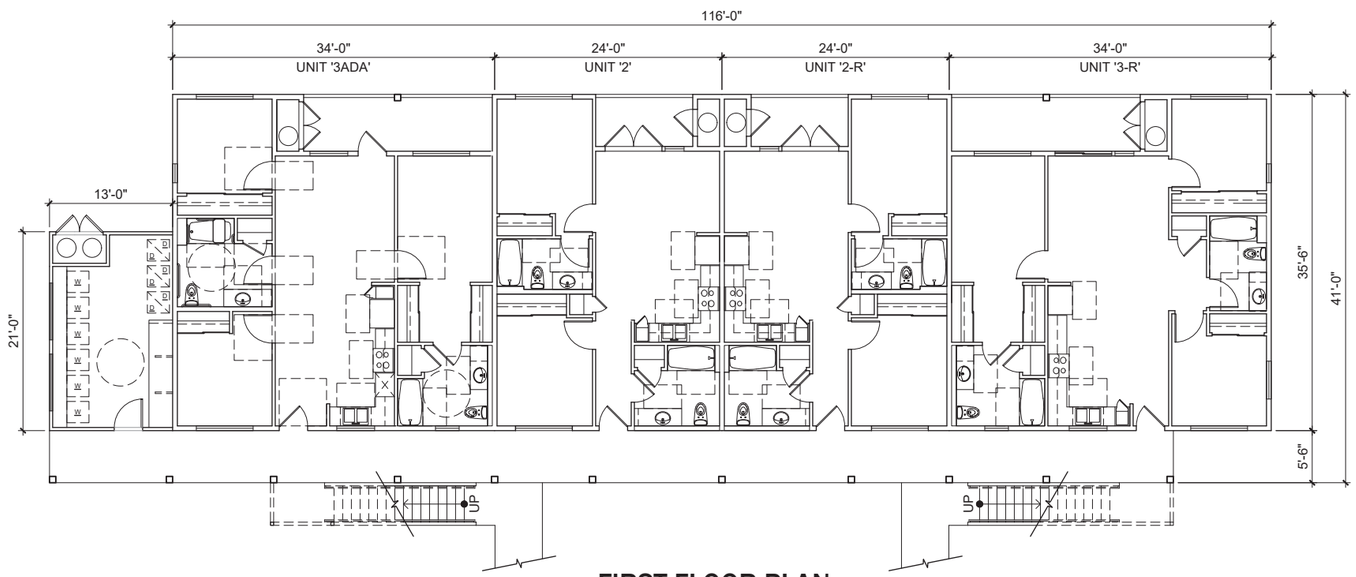
NON PROFIT BUILDING EXTERIOR ELEVATIONS

FEBRUARY 8, 2022

DESIGN PARTNERS INCORPORATED



SECOND FLOOR PLAN



FIRST FLOOR PLAN

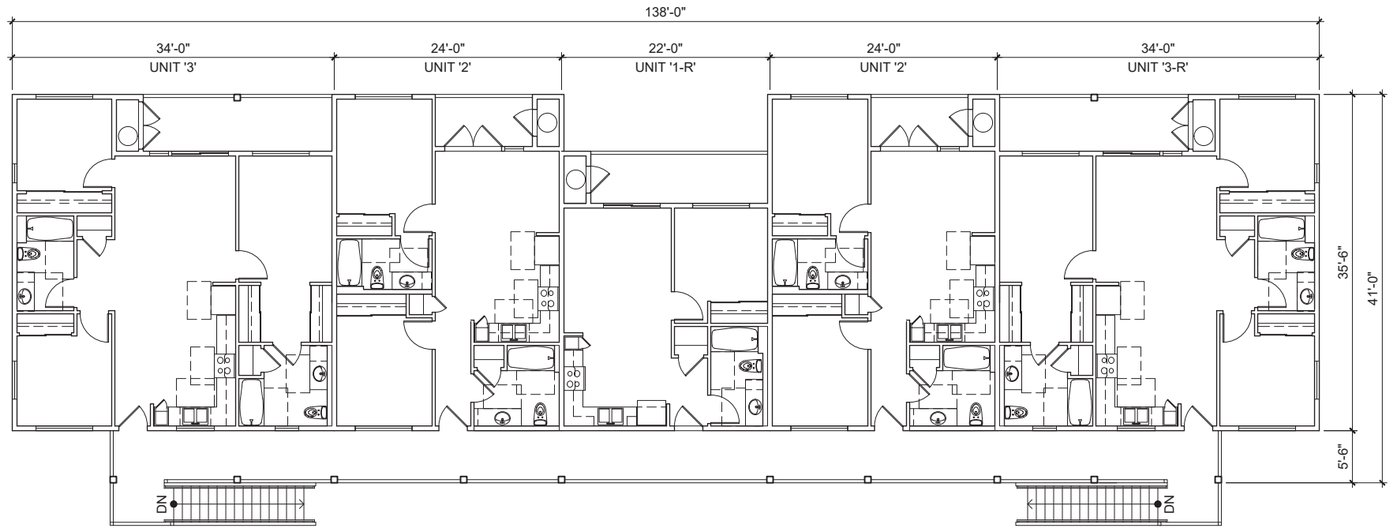
0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

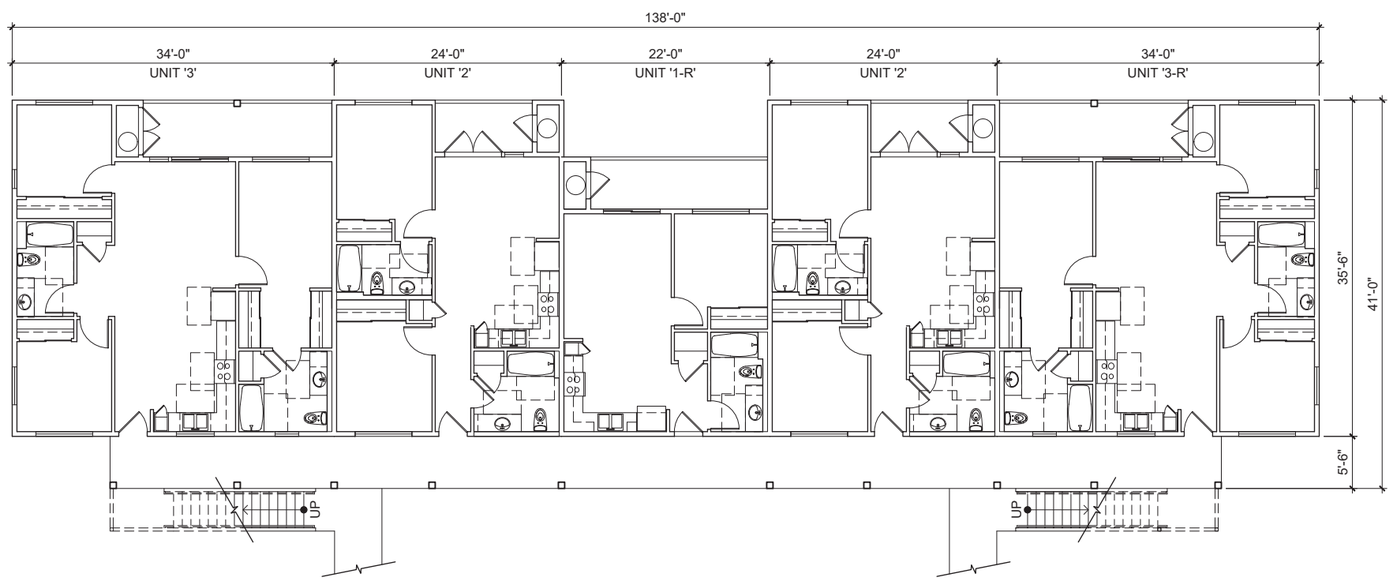
Building 'A' Floor Plans

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



SECOND FLOOR PLAN



FIRST FLOOR PLAN

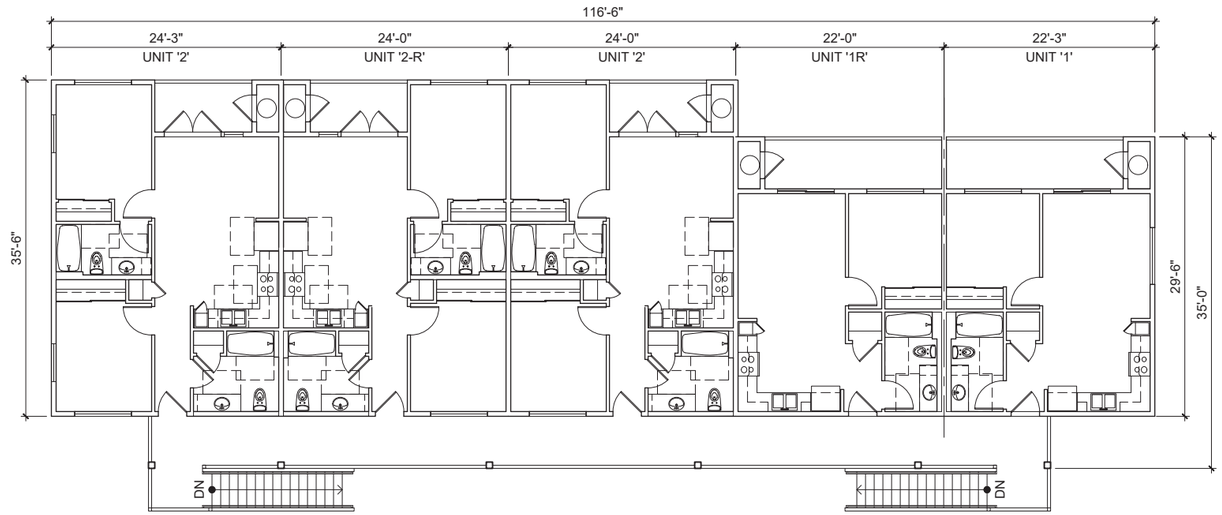
0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

WAIEHU PARCEL
WAIEHU HOUSING, LP

Building 'B' Floor Plans

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



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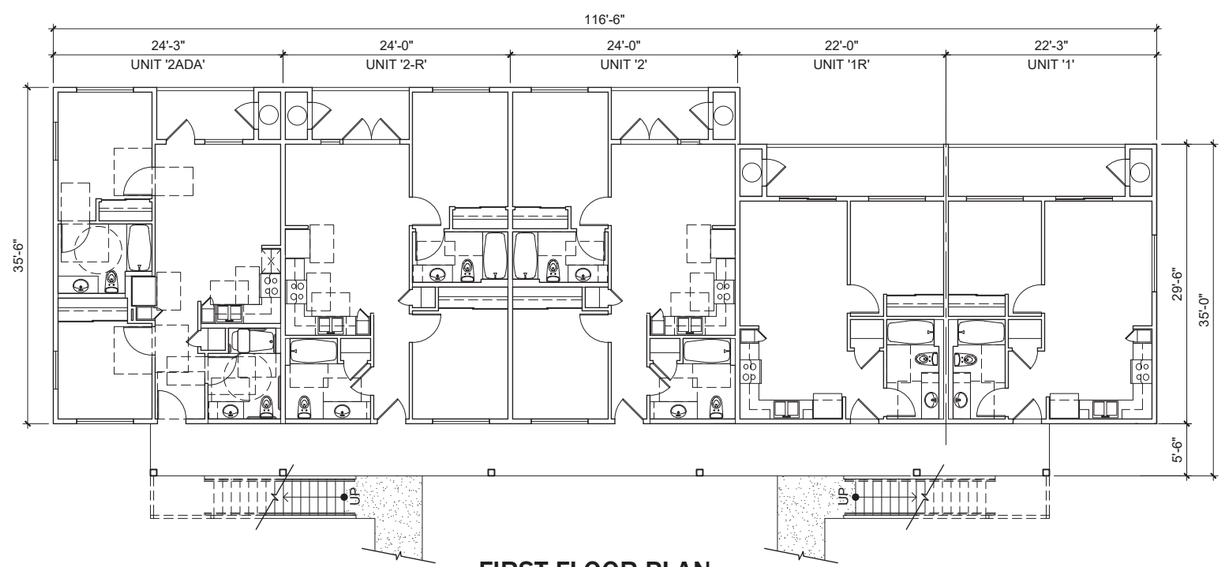


FIRST FLOOR PLAN

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

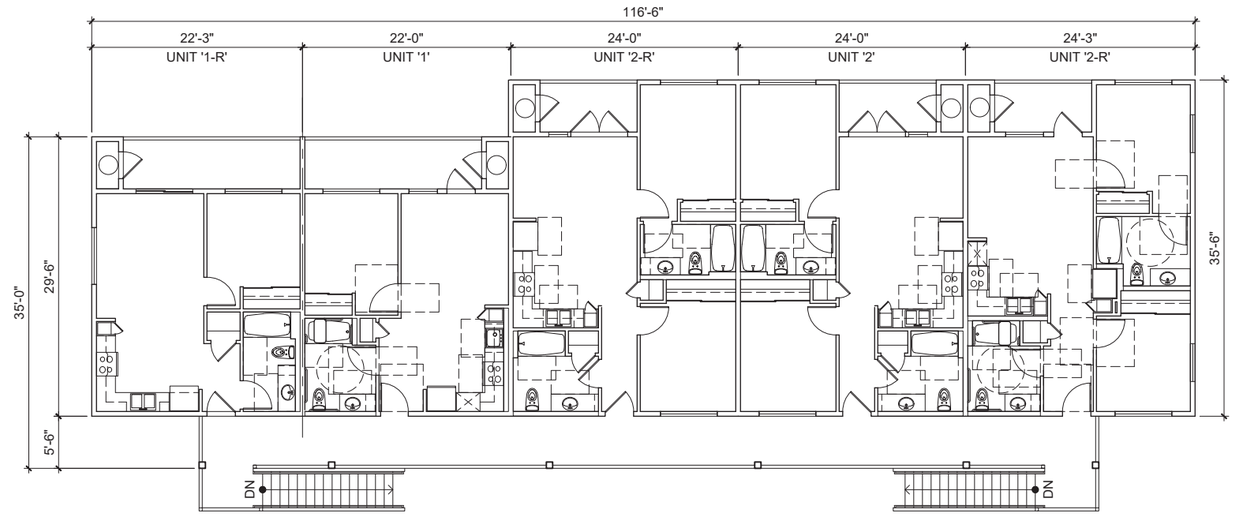
WAIEHU PARCEL

WAIEHU HOUSING, LP

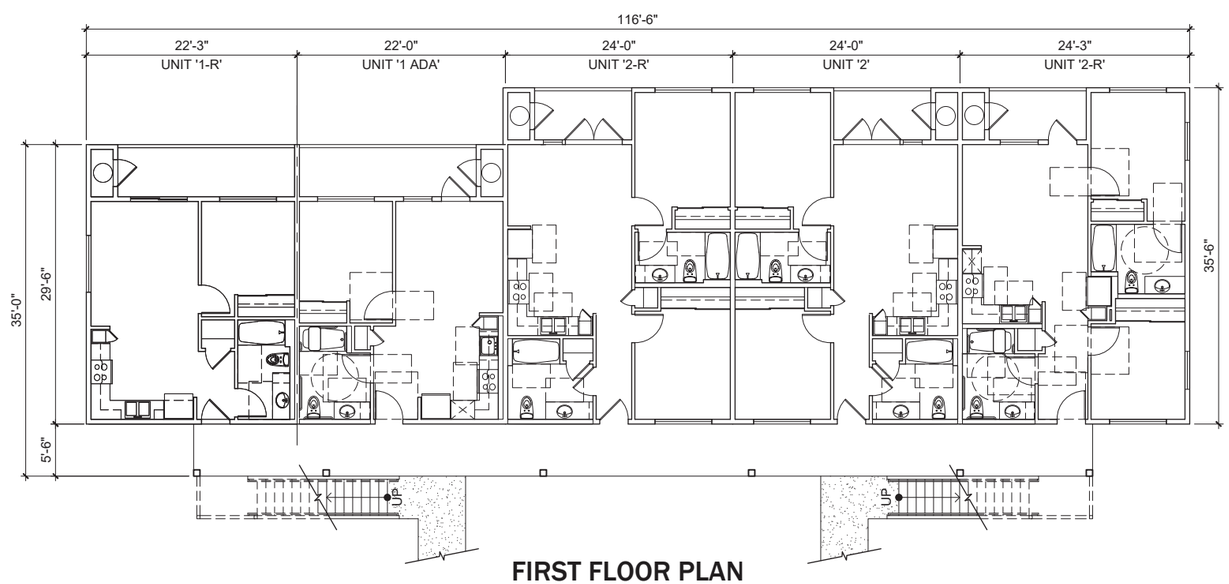
Building 'C' Floor Plans

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



SECOND FLOOR PLAN



FIRST FLOOR PLAN

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

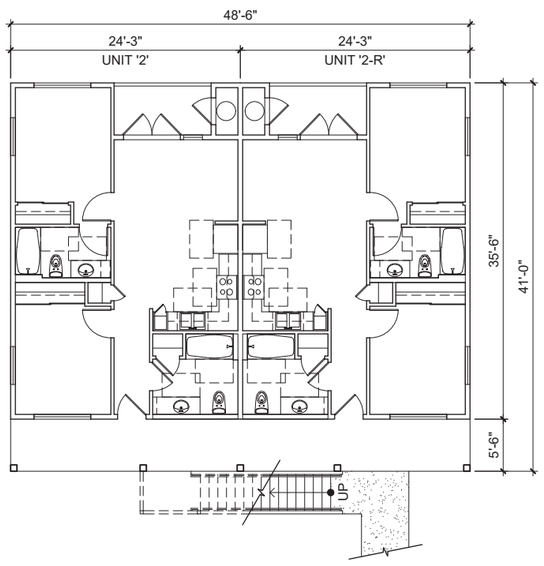
WAIEHU PARCEL

WAIEHU HOUSING, LP

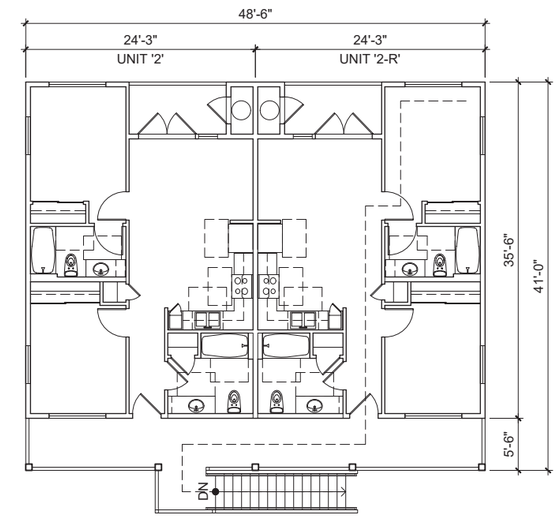
Building 'D' Floor Plans

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



FISRT FLOOR PLAN



SECOND FLOOR PLAN

0 2' 4' 8' 16'
SCALE: 1/8" = 1'-0"

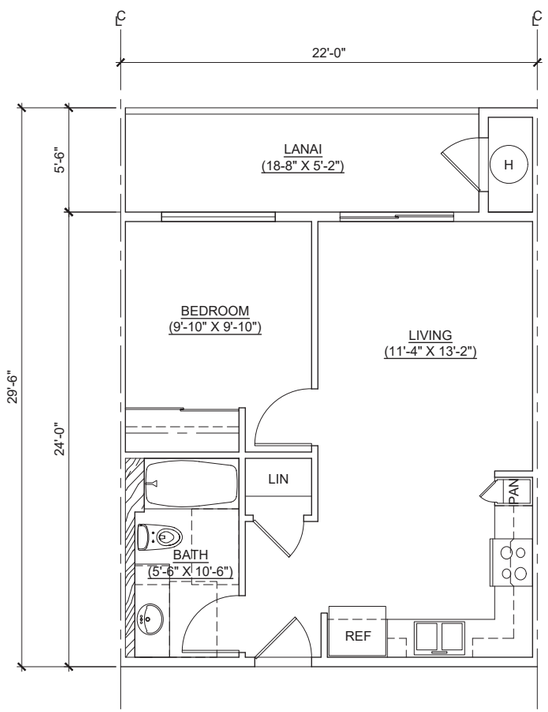
WAIEHU PARCEL

WAIEHU HOUSING, LP

Building 'E' Floor Plans

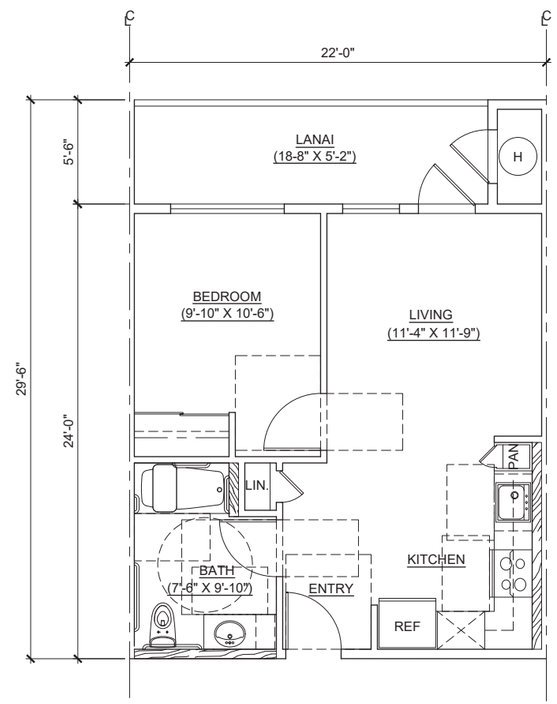
JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



1-BEDROOM UNIT

652 SF



1-BEDROOM ADA UNIT

652 SF

0 2' 4' 6'
SCALE: 1/4" = 1'-0"

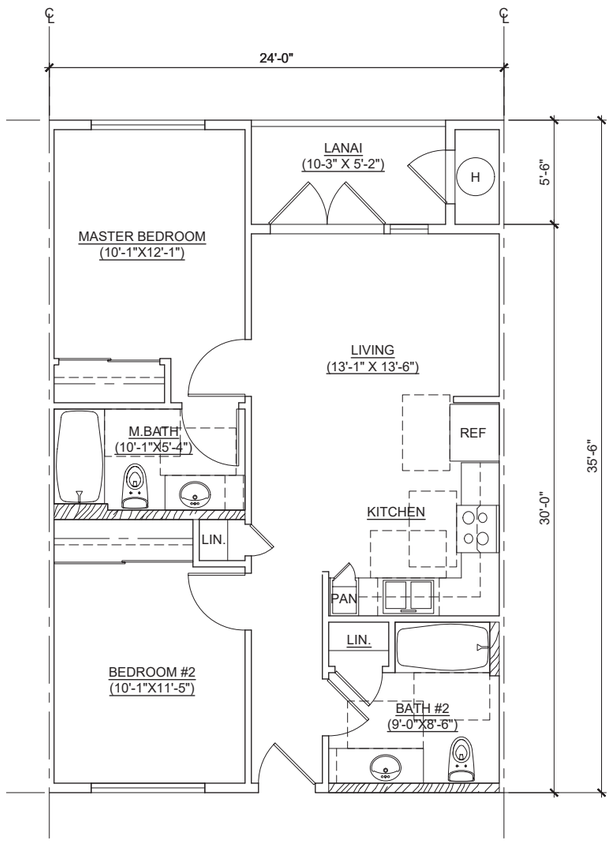
WAIEHU PARCEL

WAIEHU HOUSING, LP

1BR Unit Floor Plans

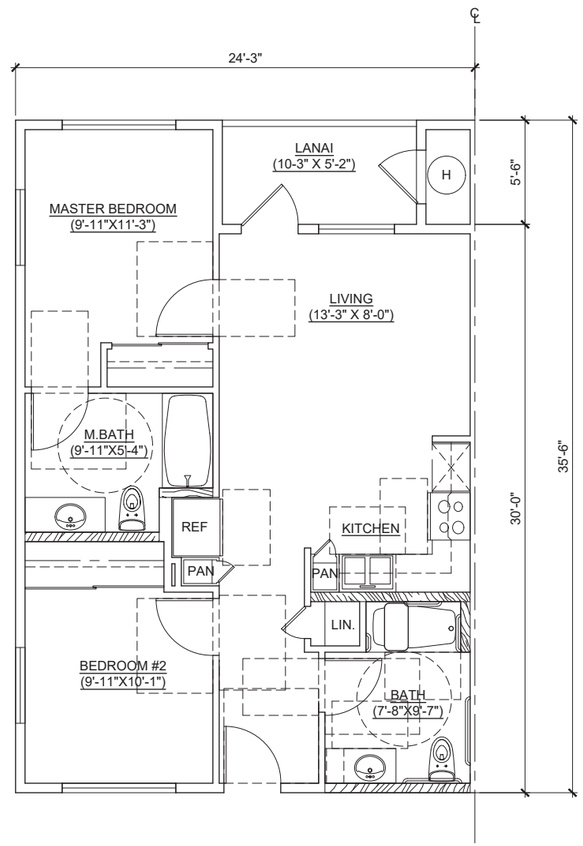
JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



2-BEDROOM UNIT

852 SF



2-BEDROOM ADA UNIT

852 SF

0 2' 4' 6'
SCALE: 1/4" = 1'-0"

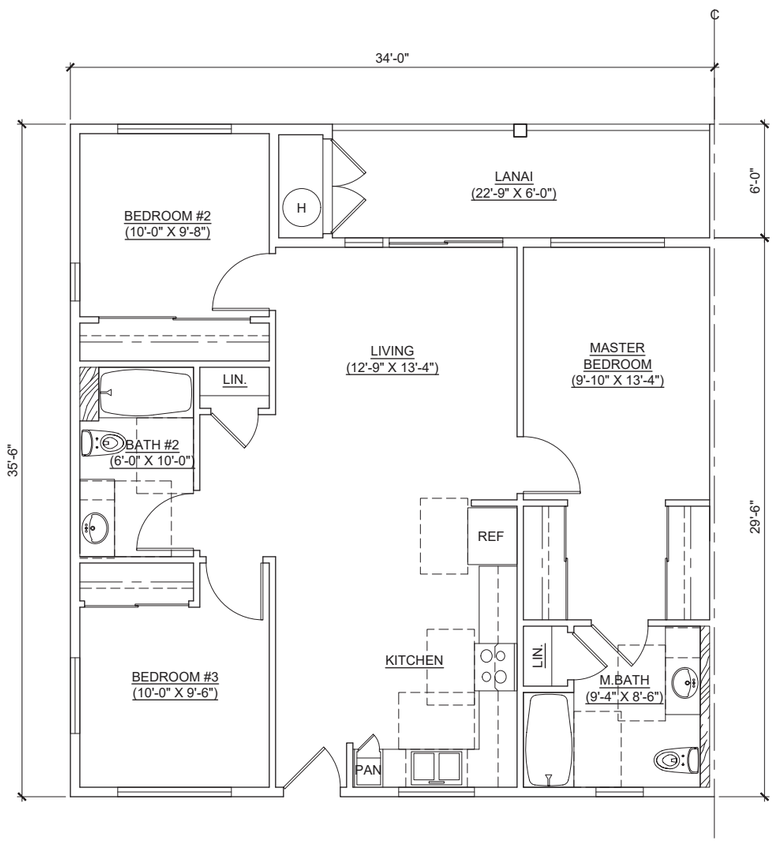
WAIEHU PARCEL

WAIEHU HOUSING, LP

2BR Unit Floor Plans

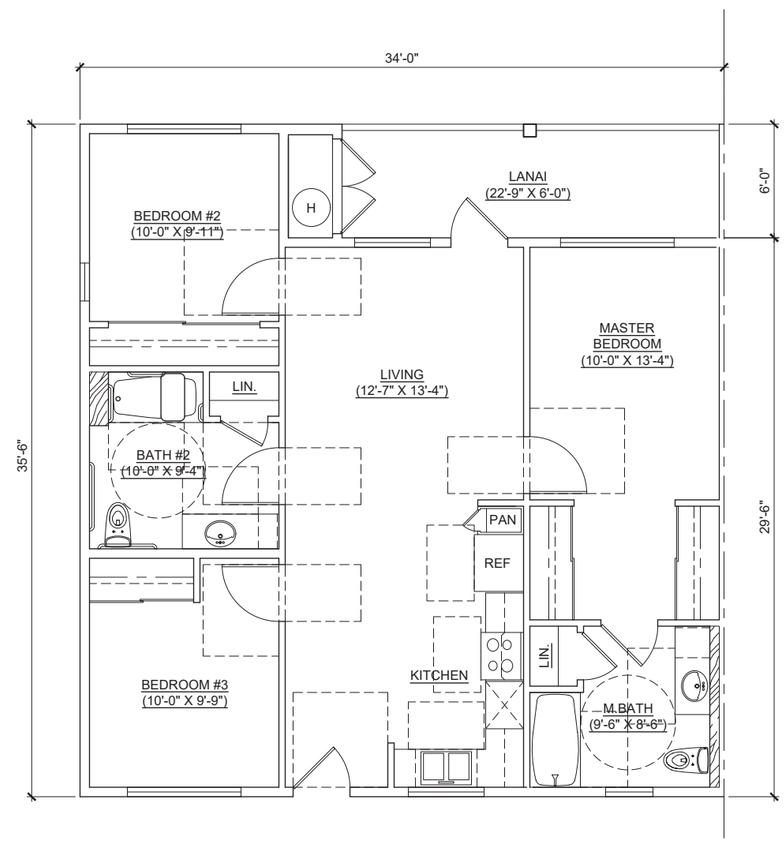
JUNE 24, 2021

DESIGN PARTNERS INCORPORATED



3-BEDROOM UNIT

1,208 SF



3-BEDROOM ADA UNIT

1,208 SF

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SCALE: 1/4" = 1'-0"

WAIEHU PARCEL

WAIEHU HOUSING, LP

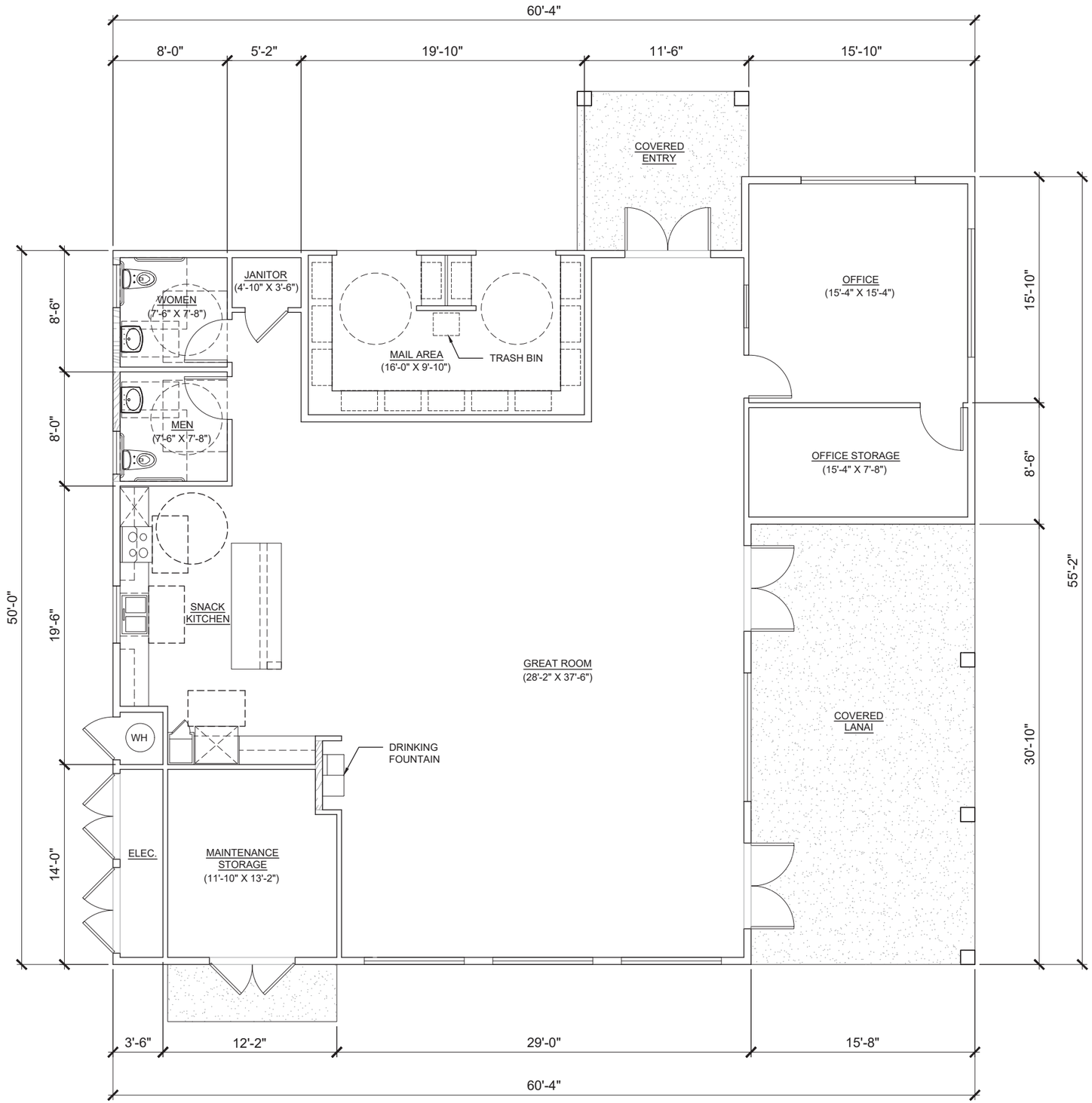
3BR Unit Floor Plans

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED

CLUBHOUSE

AREA CALCULATION	
INTERIOR SPACE	2,395 SF
COVERED ENTRY	131 SF
COVERED LANAI	483 SF
MAIL AREA	222 SF
TOTAL	3,231 SF



PLAN NORTH

0 2' 4' 6'
SCALE: 1/4" = 1'-0"

WAIEHU PARCEL

WAIEHU HOUSING, LP

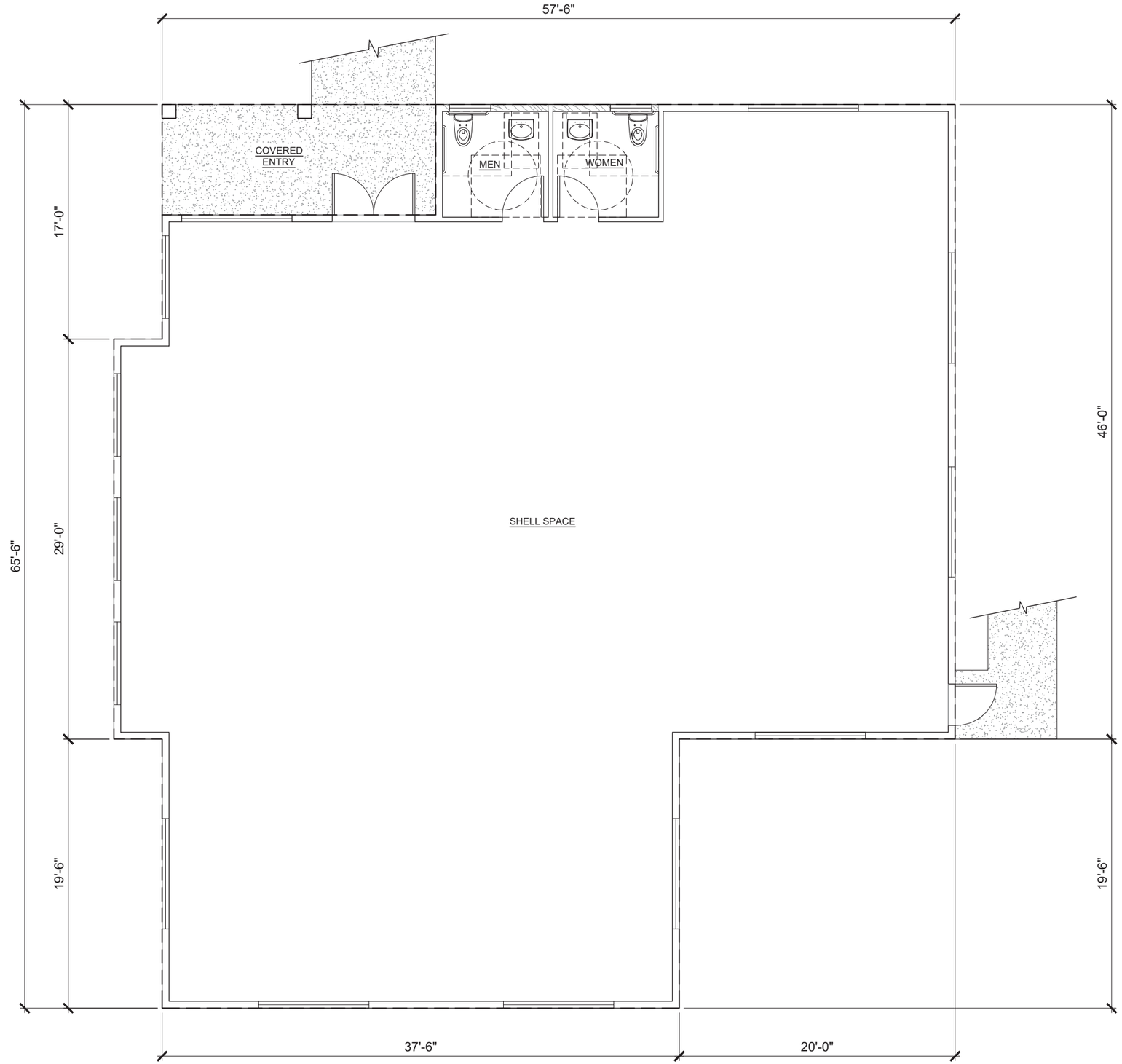
CLUBHOUSE FLOOR PLAN

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED

NON-PROFIT BUILDING

AREA CALCULATION	
INTERIOR SPACE	3,319 SF
COVERED ENTRY	158 SF
TOTAL	3,477 SF



0 2' 4' 6'
SCALE: 1/4" = 1'-0"

WAIEHU PARCEL

WAIEHU HOUSING, LP

NON-PROFIT BUILDING PLAN

JUNE 24, 2021

DESIGN PARTNERS INCORPORATED

PRELIMINARY ENGINEERING REPORT

APPENDIX B

PRELIMINARY ENGINEERING REPORT

FOR

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

Waiehu, Maui, Hawaii

T.M.K.: (2) 3-3-001: 106

Prepared for:

Waiehu Housing LP
330 West Victoria Street
Gardena, California 90248

Prepared by:

OTOMO
ENGINEERING, INC.

CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

May 2021
Revised March 2022

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PRELIMINARY ENGINEERING REPORT
FOR
HALE MAHAOLU KE KAHUA HOUSING COMMUNITY
T.M.K.: (2) 3-3-001: 106

1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure, which will be servicing the proposed project and to also evaluate the adequacy of the existing infrastructure and anticipated improvements, which may be required for the proposed project.

The subject parcel is identified as T.M.K.: (2) 3-3-001: 106, which encompasses an area of approximately 11.476 acres. It is also known as Lot 1-C of the Paukukalo Large-lot Subdivision. It is bordered by Waiehu Beach Road to the north, the Waiehu Heights Subdivision to the east, vacant agricultural land to the south, and Kahekili Highway to the west.

The project site is undeveloped and was previously used as a macadamia nut orchard. The proposed project includes the construction of the Hale Mahaolu Ke Kahua Housing Community, which will consist of 120 units in a two-story, garden-style affordable family community. The project will also include a 3,231 sf clubhouse, fitness room, computer room, playground, and a 3,477 sf nonprofit building. Associated improvements include grading, driveways, paved parking, utility connections, and landscaping.

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

Kahekili Highway is located immediately west of the project site. It is a two-lane State highway north of its intersection with Waiehu Beach Road that runs in the north-south direction between Wailuku and Waihee. South of the said intersection, it is a two-lane County roadway. The posted speed limit is 30 miles per hour (mph) in the vicinity of the project site. Kahekili Highway has paved shoulders on both sides of the travel lanes, but no curbs, gutters, or sidewalks.

Waiehu Beach Road connects Kahekili Highway with Lower Main Street. It is a two-lane, two-way State roadway that runs in a northwest-southeast direction. The posted speed limit is 30 mph. Its intersection with Kahekili Highway is an unsignalized T-intersection with a stop sign along Waiehu Beach Road. There are no separate turning lanes along any of the approaches.

2.2 DRAINAGE

Elevations on the site ranges from approximately 48 feet above mean sea level at the project site's northwesterly corner to approximately 155 feet above mean sea level at the project site's southeasterly corner. The project site generally slopes toward Waiehu Beach Road, averaging approximately 3%. There is an existing bank along the easterly boundary of the property.

According to Panel Number 150003 0383E of the Flood Insurance Rate Map, revised November 4, 2015, prepared by the United States Federal Emergency Management Agency, parcel is situated in Flood Zone X, which represents areas that are outside of the 0.2% annual chance flood plain.

According to the Soil Survey Geographic Database for the Island of Maui, State of Hawaii (September 2014), prepared by the United States Department of Agriculture, Natural Resources Conservation Service, the soils within the project site are classified as Iao sitly clay, 0 to 3 percent slopes (IaA), Iao cobbly silty clay, 3 to 7 percent slopes (IbB), and Puuone sand, 7 to 30 percent slopes (PZUE). IaA is characterized as having slow runoff and no more than slight erosion hazard. IbB is characterized as having medium runoff and a moderate erosion hazard. PZUE is characterized as having slow runoff, rapid permeability above the cemented layer, and moderate to severe wind erosion hazard.

Onsite runoff generally sheet flows in a southwest to northeast direction toward Waiehu Beach Road. There is an existing culvert crossing Kahekili Highway to Lot 1-B, the adjacent property to the south. Runoff is then conveyed through a swale through Lot 1-B and the project site and eventually flows to the existing 48-inch culvert near the intersection of Waiehu Beach Road and Kahekili Highway. It is estimated that the existing 50-year, 1-hour storm runoff from the project site is 7.868 cfs, corresponding to a runoff volume of 23,605 cf.

2.3 SEWER

There are no existing gravity sewerlines in the immediate vicinity of the project site. The nearest wastewater facility is an existing 6-inch force main along Waiehu Beach Road.

Wastewater collected from the Wailuku and Waihee areas is transported to the Wailuku-Kahului Wastewater Reclamation Facility in Naska.

According to the Wastewater Reclamation Division, County of Maui, as of July 28, 2020, the Wailuku-Kahului WWRF has a capacity of 7.9 million gallons per day (mgd). The average flow into the KWRF is approximately 5.8 mgd, and the allocated capacity is 6.9 mgd. The remaining capacity is approximately 1.0 mgd. The remaining affordable housing allocation is 0.29 mgd (of 0.34 mgd).

2.4 WATER

There are no existing waterlines along Kahekili Highway adjacent to the project site. There are existing 8-inch and 12-inch waterlines along Kahekili Highway to the north of the Waiehu Beach Road intersection. Both waterlines traverse onto Waiehu Beach Road from Kahekili Highway.

Storage in this area is from an existing 1.0 million gallon reservoir located approximately 6,000 feet to the west of the project site at an elevation of 490 feet. The sources for this project shall originate from the North Waihee system.

There is an existing irrigation well and storage tanks on the project site.

2.5 ELECTRIC, TELEPHONE, AND CABLE TV

There are existing overhead electrical, cable, and telephone lines along the mauka side of Kahekili Highway.

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

Access for the proposed project will be from three (3) new driveways on Kahekili Highway.

The following are the recommendations from the Draft Final Traffic Impact Analysis Report prepared by Austin, Tsutsumi & Associates, Inc. dated March 1, 2022:

- Project Driveways 1 and 3 (north and south driveways) are proposed to operate as right-in, right-out (RIRO) intersections.
- Project Driveway 2 (central driveway) is proposed as a full access intersection. A southbound entering left-turn auxiliary lane is recommended.
- At all three driveways, a right-turn auxiliary lane is recommended. However, at Project Driveway 2 (central driveway), it is anticipated that only one fo the two auxiliary lanes (southbound left-turn lane OR northbound right-turn lane) can be accommodated due to right-of-way constraints.

If this is the case, the provision of the southbound left-turn lane should be prioritized over the northbound right-turn lane.

- Due to relatively low turning movements generated by the Project, signals are not warranted and all intersections are recommended to be unsignalized with stop control along the westbound Project exit approaches.

3.2 DRAINAGE

After the development of the proposed project, it is estimated that the 50-year, 1-hour storm runoff will be 22.205 cfs, corresponding to a runoff volume of 49,961 cf. The increase in runoff will be 14.337 cfs, with an increase in runoff volume of 26,356 cf (49,961 cf - 23,605 cf) (See Appendix A). Onsite runoff will be intercepted by catch basins located within the paved parking area and conveyed to a subsurface drainage system. The subsurface drainage system will consist of a perforated drainline embedded in crushed rock, which will be wrapped with a layer of filter fabric. Surface runoff entering the perforated pipe will be allowed to infiltrate into the ground. The drainage system will be designed to accommodate the increase in surface runoff volume from a 50-year, 1-hour storm for the proposed project. The proposed project will not alter the grades or capacity of the existing swale.

The design intent of the development plan will be to utilize the existing topography to the greatest extent practicable and to limit the need for extensive grading. Development of the project will include the implementation of site-specific best management practices (BMPs) during the construction to provide erosion control and minimize impacts to downstream properties. BMPs may include:

1. Prevention of cement products, oil, fuel, and other toxic substances from falling or leaching into the water;
2. Prompt and proper disposal of all loosened and excavated soil

and debris material from drainage structure work;

3. Retention of existing ground cover until the last possible date;
4. Stabilization of denuded areas by sodding or planting as soon as possible;
5. Implementation of sediment trapping measures and basins;
6. Control of access and vehicular movement across disturbed areas;
7. Early construction of drainage features; and
8. Minimization of construction time.

The project will also include post-construction BMPs, which will improve the quality of storm water runoff from the proposed development.

The drainage design criteria will be to minimize any alterations to the natural pattern of the existing onsite surface runoff. The proposed drainage plan will meet the requirements of Chapter 4, “Rules for the Design of Storm Drainage Facilities in the County of Maui” and Chapter 111, “Rules for the Design of Storm Water Treatment Best Management Practices”.

3.3 SEWER

The proposed project will generate approximately 30,600 gallons of wastewater daily (See Appendix C). The onsite sewerage collection system will be designed to accommodate this flow. The nearest gravity sewer connection is located approximately 1,500 feet from the proposed site, along Waiehu Beach Road. Connection to this system will require a lift station for the project.

According to the Wastewater Reclamation Division, County of Maui, as of July 28, 2020, the Wailuku-Kahului WWRF has a capacity of 7.9 million gallons per day (mgd). The average flow into the KWRF is approximately 5.8 mgd, and the allocated capacity is 6.9 mgd. The remaining capacity is approximately 1.0 mgd. The remaining

affordable housing allocation is 0.29 mgd (of 0.34 mgd). The wastewater generated from the project will be transported to the Wailuku-Kahului Wastewater Treatment Facility. At the present time, the treatment plant has sufficient capacity to accommodate the additional wastewater generated from the proposed project.

3.4 WATER

In accordance with the Department of Water Supply's Domestic Consumption Guidelines for multi-family and commercial development, the average daily demand for the project is approximately 70,800 gallons per day (See Appendix B). Fire flow demand for multi-family development is 2,000 gallons per minute for a 2-hour duration. The project shall install approximately 2,000 feet of 8-inch waterline along Kahekili Highway and fire hydrants with a maximum spacing of 250 feet. The subject parcel was part of a large-lot subdivision, and some improvements, such as water service and fire protection, were not required until the development of the individual large lots. Fire hydrants will be installed with a maximum spacing of 250 feet.

Domestic water and fire flow calculations will be prepared and submitted during the building permit process. Water meter and fire protection improvements will be made as necessary to meet the requirements of the Department of Water Supply and Fire Department.

To the greatest extent practicable, the existing irrigation well shall be used for landscaping within the project site.

3.5 ELECTRIC, TELEPHONE, AND CABLE TV

The proposed electrical, telephone, and cable TV distribution systems shall be serviced from the existing overhead facilities on

Kahekili Highway that currently service the area. Within the project site, the electric and telephone systems will be installed in accordance with the utility companies' rules and regulations. Interior project lighting shall be provided as approved by the Planning Department.

APPENDIX A

HYDROLOGIC CALCULATIONS

DRAINAGE SYSTEM ANALYSIS AND DESIGN

Project:	**Hale Mahaolu Ke Kahua Housing Community**
T.M.K.:	**(2) 3-3-001: 106**
Location:	**Waiehu, Maui, Hawaii**
Project No.:	**2020-18**

I. Determine Runoff Coefficients

Landscaped / Unimproved Runoff Coefficent:

Infiltration:	Medium	0.07
Relief:	Flat (0-5%)	0.00
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Landscape	0.15
	Composite Runoff Coefficient, C=	0.25

Roof Runoff Coefficent:

C= 0.95

Pavement Runoff Coefficent:

C= 0.95

II. Determine pre- and post-development runoff

Area: 11.476 acres

	Existing	Developed	Δ
Roof	0	1.480	
Pavement	0	2.780	
Landscape	11.476	7.216	
C	0.25	0.51	
Tc (min)	50	25	
I (in/hr)	2.743	3.795	
Q (cfs)	7.868	22.205	**14.337**
V (cf)	23,605	49,961	**26,356**

APPENDIX B

WATER DEMAND CALCULATIONS

WATER DEMAND CALCULATIONS

Project Data:

Multi-family Residential:

- 120 Units
- 10.876 acres

Commercial:

- Non-profit Building & Community Center
- 0.6 acres

Daily Consumption Guidelines (per 2002 Water System Standards):

Multi-family Low Rise: 560 gallons/unit or 5,000 gallons/acre

Commercial: 6,000 gallons/acre

Average Daily Demand (ADD):

Multi-family Residential:

ADD = 560 gallons/unit x 120 units = **67,200 gallons**

ADD = 5,000 gallons/acre x 10.876 acres = 54,380 gallons

Commercial:

ADD = 6,000 gallons/acre x 0.6 acres = **3,600 gallons**

Total Average Daily Demand = 70,800 gpd

Max Daily Demand (1.5 x ADD) = 106,200 gpd

APPENDIX C

WASTEWATER CALCULATIONS

WASTEWATER CALCULATIONS

Project Data:

Multi-family Residential:

- 120 Units

Daily Contribution Guidelines (per the 1993 Wastewater Flow Standards):

Multi-family Residential: 255 gallons/unit/day

Daily Contribution:

Multi-family Residential:

Contribution = 255 gallons/unit/day x 120 units = 30,600 gpd

Total daily contribution is 30,600 gpd

EXHIBITS

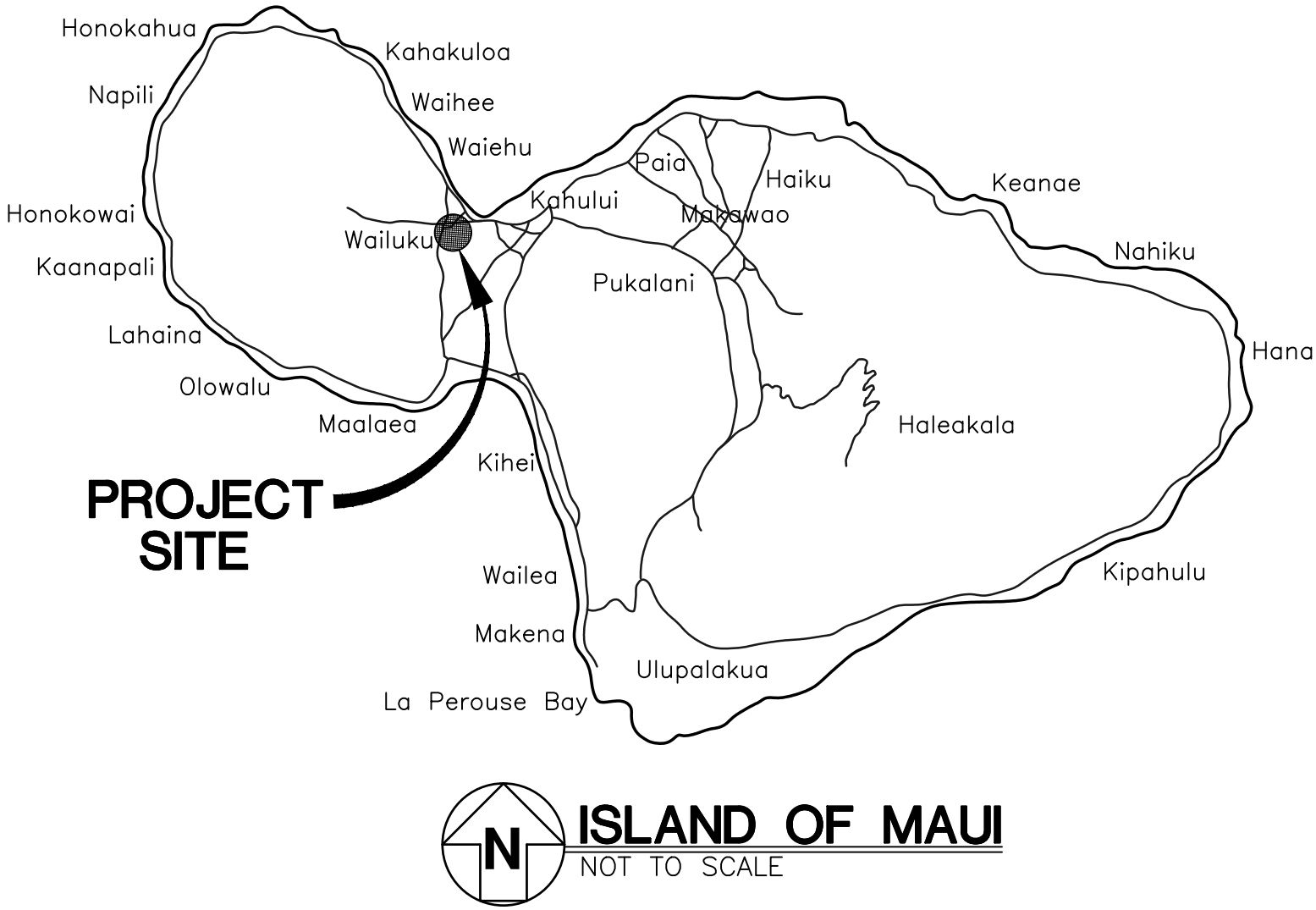
1 Location Map

2 Vicinity Map

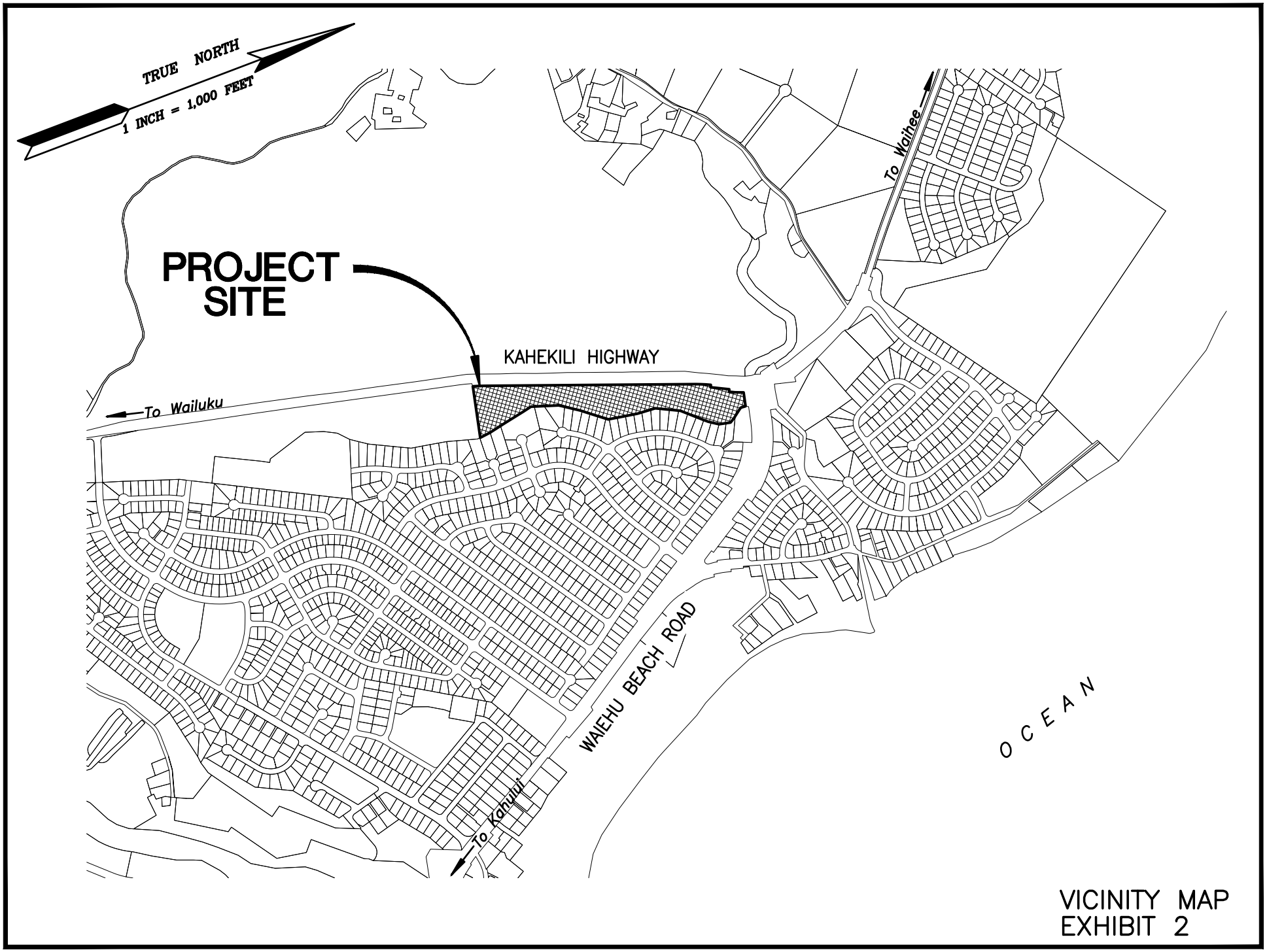
3 Soil Survey Map

4 Flood Insurance Rate Map

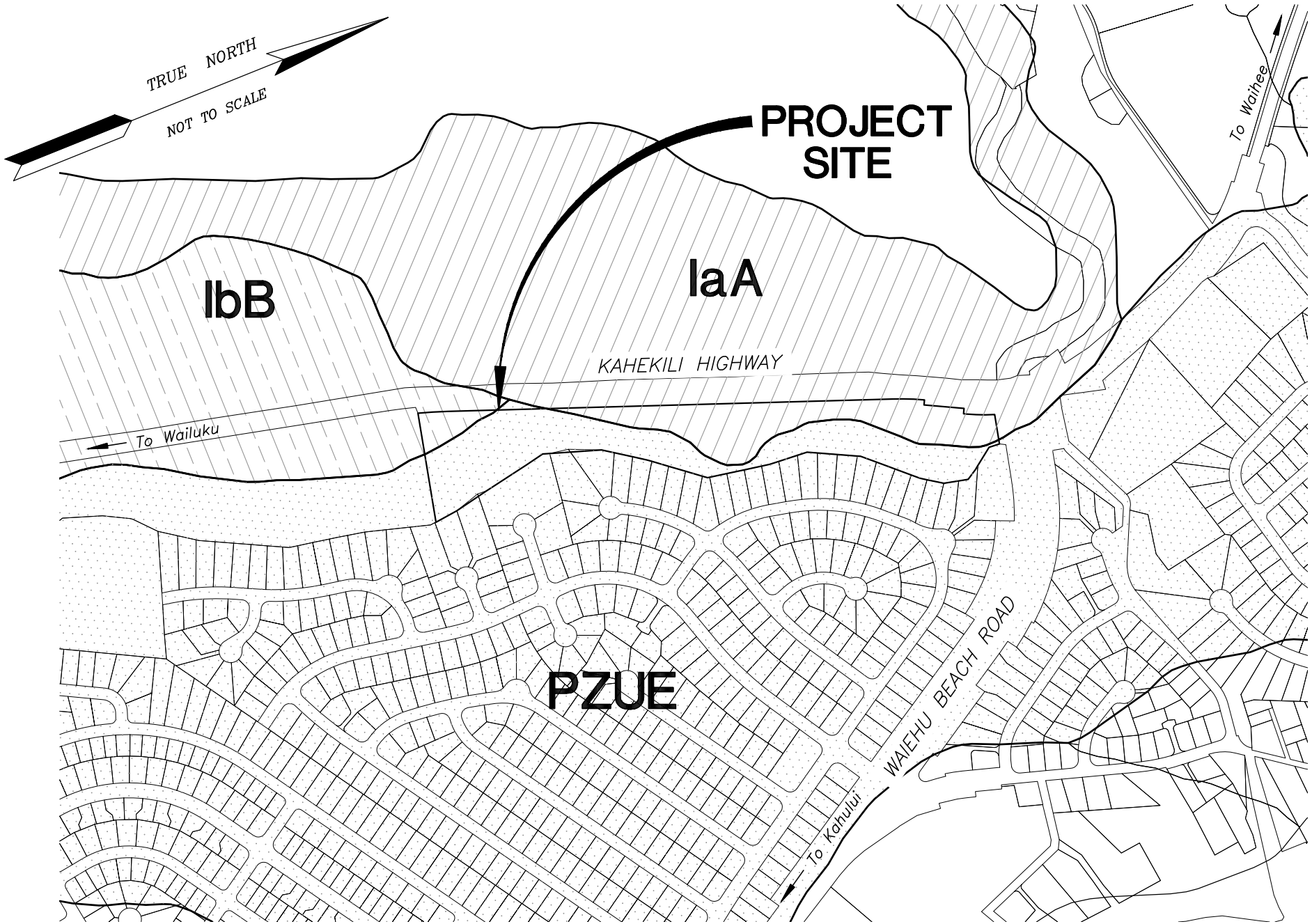
5 Preliminary Grading & Drainage Plan



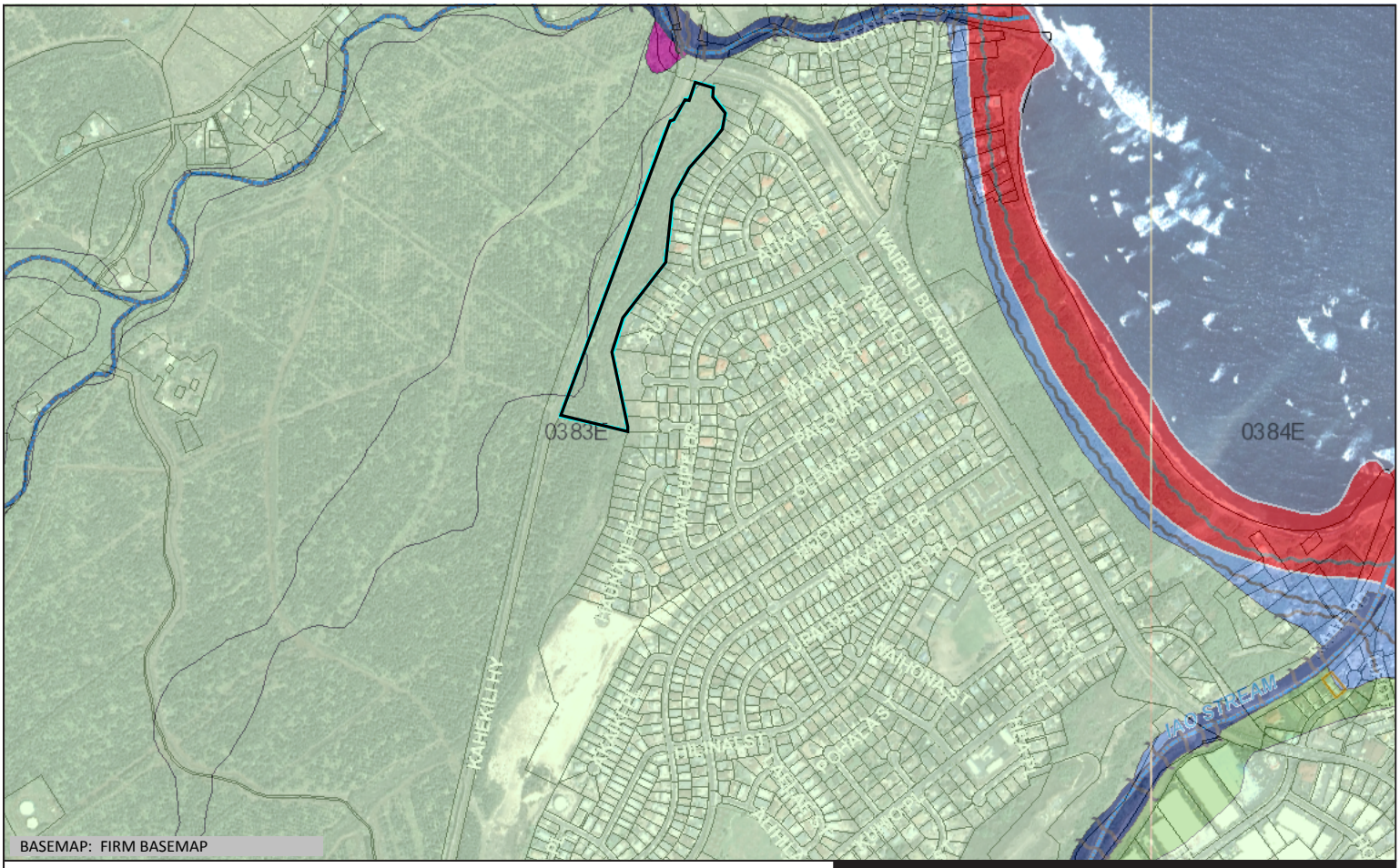
LOCATION MAP
EXHIBIT 1



VICINITY MAP
EXHIBIT 2



SOIL SURVEY MAP
EXHIBIT 3



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	MAUI
TMK NO:	(2) 3-3-001:106
WATERSHED:	WAIEHU
PARCEL ADDRESS:	ADDRESS NOT DETERMINED WAILUKU, HI 96793

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 04, 2015
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1500030383E
PANEL EFFECTIVE DATE:	SEPTEMBER 25, 2009

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 600 1,200 ft

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 is not to 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.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(*Note: legend does not correspond with NFHL*)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs 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.

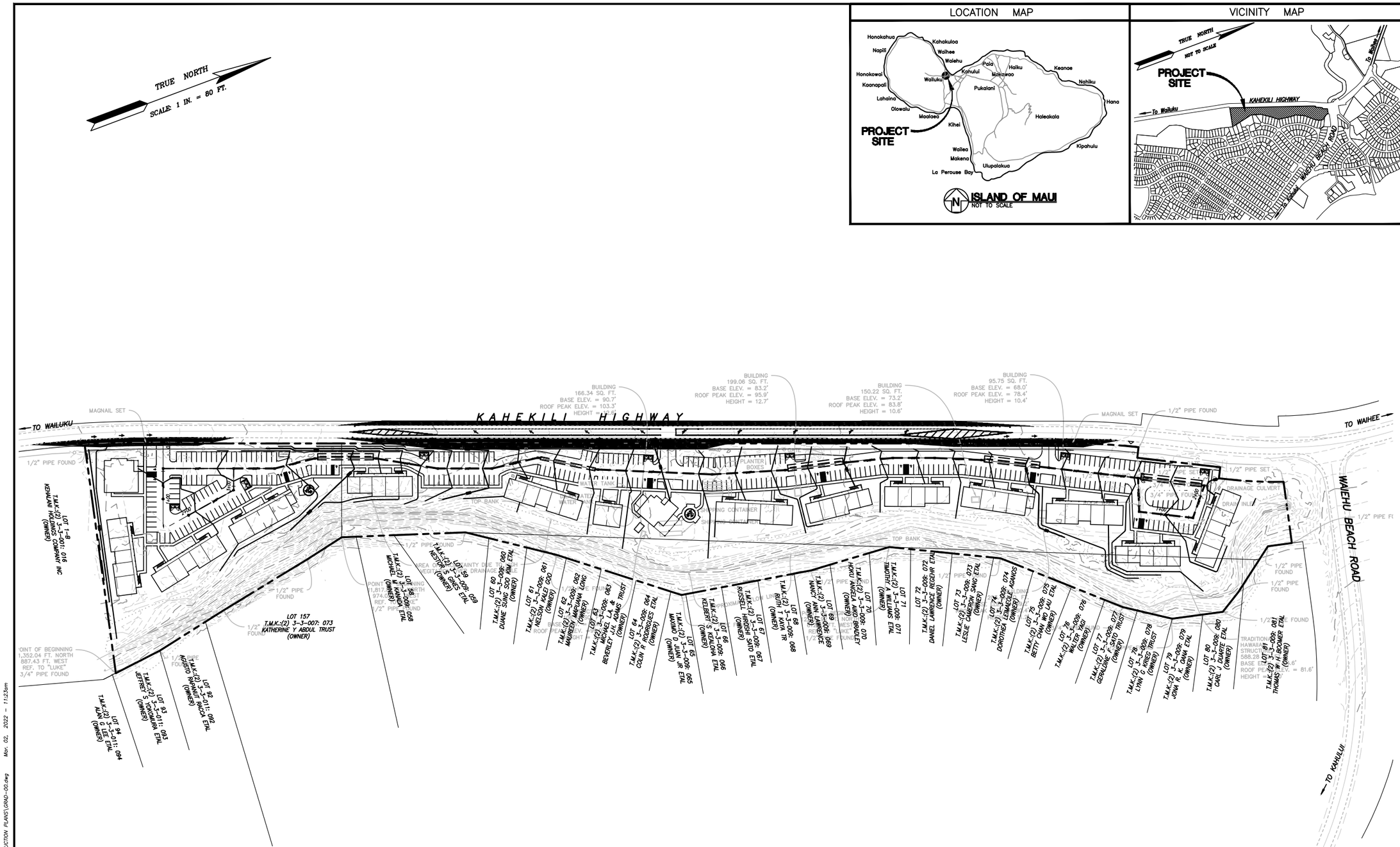
NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **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 apply, but coverage is available in participating communities.

EXHIBIT 4



REDUCED COPY
NOT TO SCALE

NOT FOR CONSTRUCTION

PRELIMINARY GRADING & DRAINAGE PLAN
SCALE: 1 IN. = 80 FT.

EXHIBIT 5

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

LICENSE EXPIRES: 4-30-22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.)

SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

(2) 3-3-001: 106
WAILUKU, MAUI, HAWAII

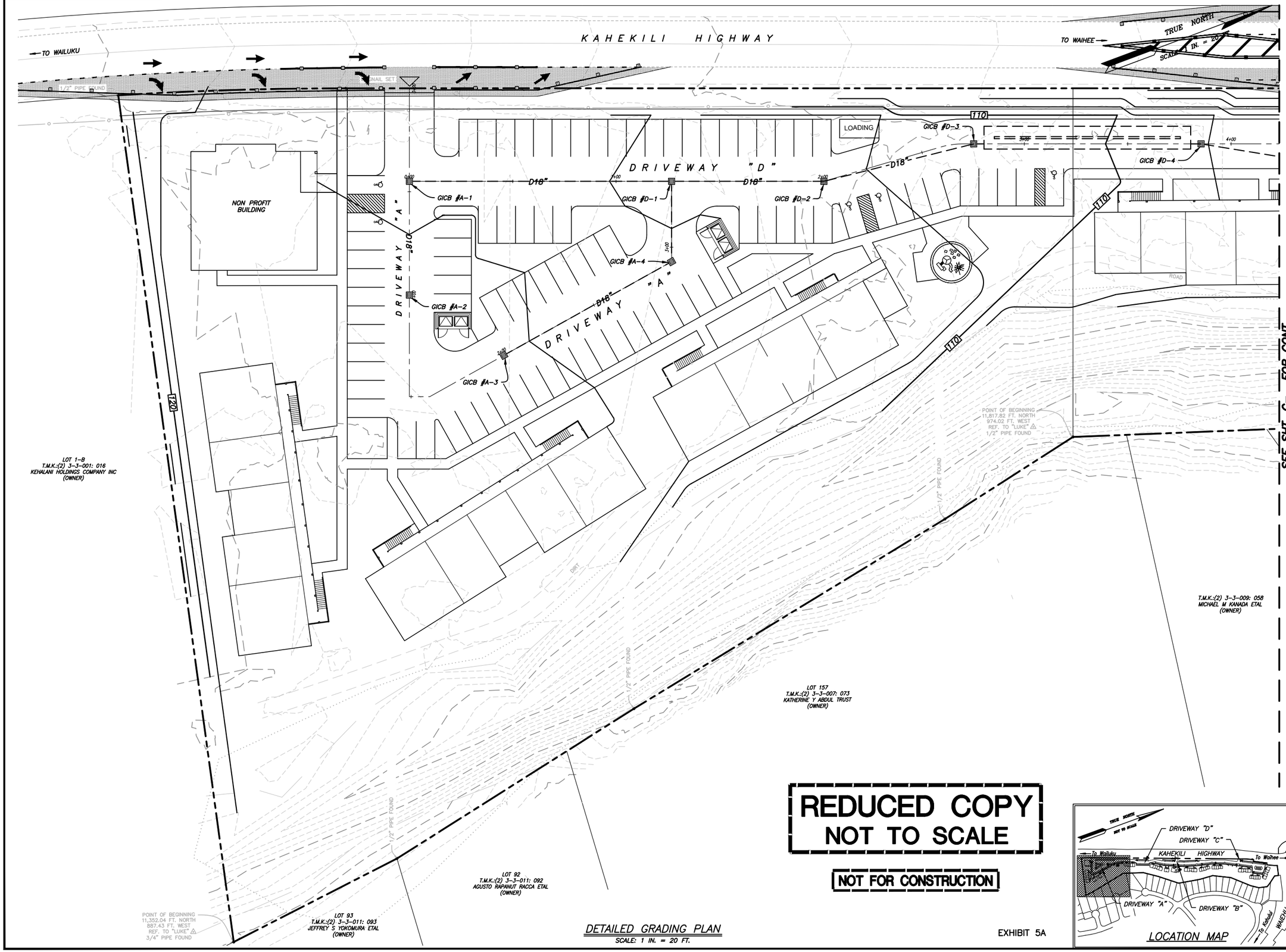
PRELIMINARY GRADING & DRAINAGE PLAN

REVISION	DATE	NOTE
△		
△		
△		
△		
△		
△		
△		

DESIGNED BY: A.N.M.O.
DRAWN BY: L.C.O.
PROJECT NO.: 2020-18
DRAWING NAME: GRAD-00
DATE: 5-31-21

SHEET NO.
C-1
OF SHEETS

G:\2020 PROJECTS\2020-18 (Waiehu Affordable Housing)\CONSTRUCTION PLANS\GRAD-00.dwg Mar. 02, 2022 - 11:23am



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NOT TO SCALE

NOT FOR CONSTRUCTION

DETAILED GRADING PLAN
SCALE: 1 IN. = 20 FT.

EXHIBIT 5A

LOCATION MAP

OTOMO
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

LICENSE EXPIRES: 4-30-22

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SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

(2) 3-3-001: 106
WAILUKU, MAUI, HAWAII

DETAILED GRADING PLAN

REVISION	DATE	NOTE

DESIGNED BY:	A.N.M.O.
DRAWN BY:	L.C.O.
PROJECT NO.:	2020-18
DRAWING NAME:	GRAD-DET
DATE:	5-31-21

SHEET NO.
C-2
OF SHEETS

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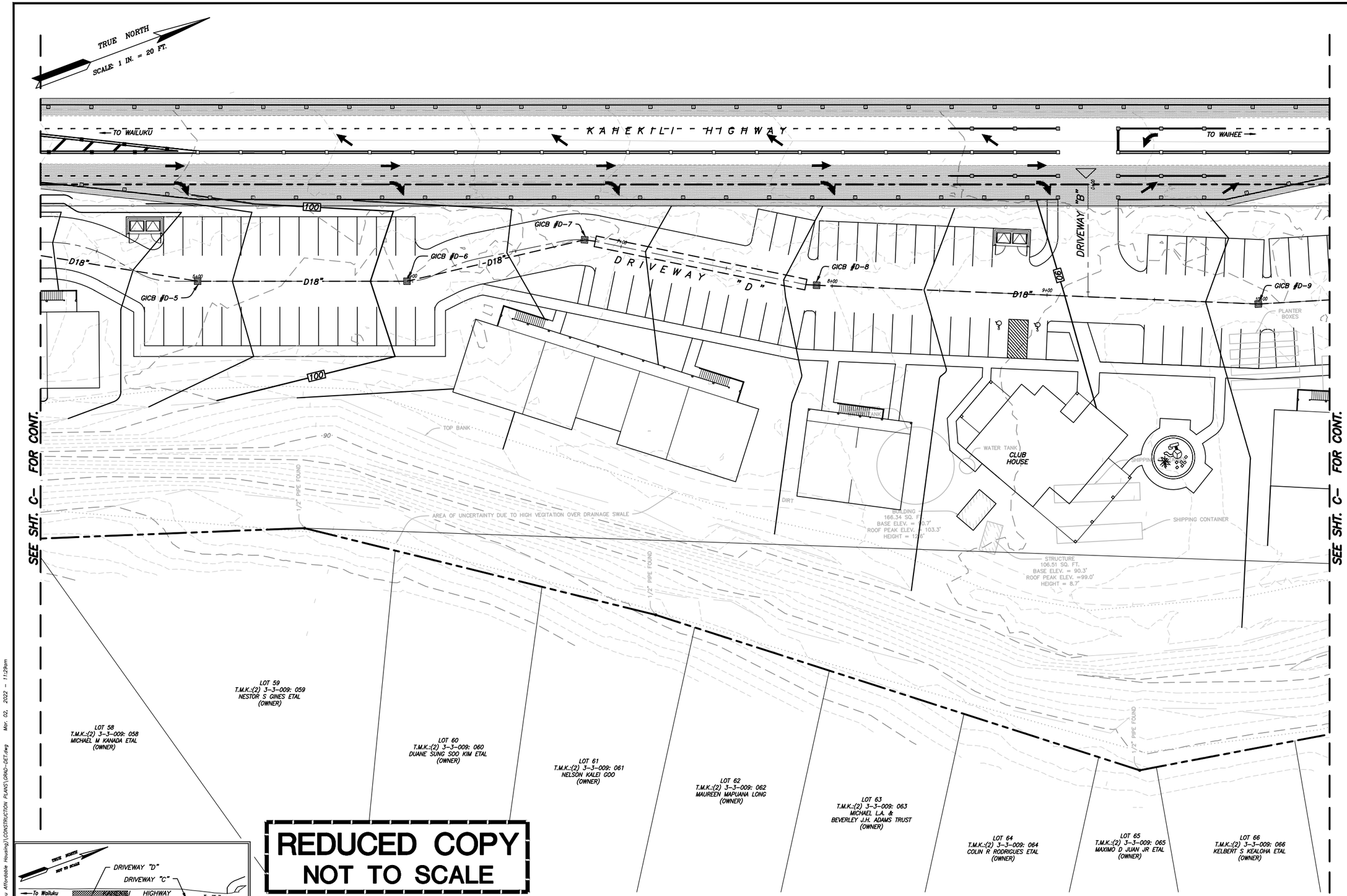

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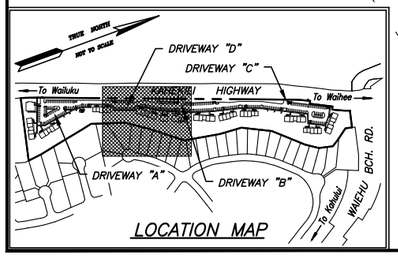
NOT FOR CONSTRUCTION



LOCATION MAP

EXHIBIT 5B

DETAILED GRADING PLAN
SCALE: 1 IN. = 20 FT.

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OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

LICENSE EXPIRES: 4-30-22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.)

SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

(2) 3-3-001: 106
WAILUKU, MAUI, HAWAII

DETAILED GRADING PLAN

REVISION	DATE	NOTE
△		
△		
△		
△		
△		
△		
△		

DESIGNED BY: A.N.M.O.
DRAWN BY: L.C.O.
PROJECT NO.: 2020-18
DRAWING NAME: GRAD-DET
DATE: 5-31-21

SHEET NO.
C-3
OF SHEETS

TRUE NORTH

SCALE: 1 IN. = 20 FT.

TO WAILUKU

KAHEKILI HIGHWAY

TO WAIHEE

DRIVEWAY "D"

DRIVEWAY "C"

D18"

GICB #D-10

GICB #D-11

GICB #D-12

GICB #D-13

GICB #D-14

GICB #D-15

11+00

13+00

14+00

16+00

BUILDING
199.06 SQ. FT.
BASE ELEV. = 83.2'
ROOF PEAK ELEV. = 95.9'
HEIGHT = 12.7'

BUILDING
150.22 SQ. FT.
BASE ELEV. = 73.2'
ROOF PEAK ELEV. = 83.8'
HEIGHT = 10.6'

BASE ELEV. = 68.0'
ROOF PEAK ELEV. = 78.4'
HEIGHT = 10.4'

GATE

ROAD

DIRT

TOP BANK

APPROXIMATE FLOW LINE

1/2" PIPE FOUND

POINT OF BEGINNING
12,733.92 FT. NORTH
612.82 FT. WEST
REF. TO "LUKE"
1/2" PIPE FOUND

SEE SHT. C- FOR CONT.

LOT 67
T.M.K.:(2) 3-3-009: 067
RUSSELL HIROSHI SATO ETAL
(OWNER)

LOT 68
T.M.K.:(2) 3-3-009: 068
RUTH T KAYA TR
(OWNER)

LOT 69
T.M.K.:(2) 3-3-009: 069
NANCY ANN LAWRENCE
(OWNER)

LOT 70
T.M.K.:(2) 3-3-009: 070
HOKU ANGELA AIKO BRADLEY
(OWNER)

LOT 71
T.M.K.:(2) 3-3-009: 071
TIMOTHY A WILLIAMS ETAL
(OWNER)

LOT 72
T.M.K.:(2) 3-3-009: 072
DANIEL LAWRENCE REGEHR ETAL
(OWNER)

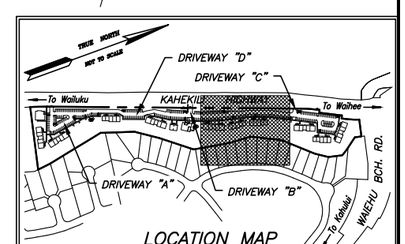
LOT 73
T.M.K.:(2) 3-3-009: 073
LESLIE CAMERON SANG ETAL
(OWNER)

LOT 74
T.M.K.:(2) 3-3-009: 074
DOROTHEA LEIMAEOLE AGANOS
(OWNER)

LOT 75
T.M.K.:(2) 3-3-009: 075
BETTY CHAN WO LAU ETAL
(OWNER)

REDUCED COPY
NOT TO SCALE

NOT FOR CONSTRUCTION



LOCATION MAP

DETAILED GRADING PLAN

SCALE: 1 IN. = 20 FT.

EXHIBIT 5C

OTOMO
ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

LICENSE EXPIRES: 4-30-22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.)

SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

(2) 3-3-001: 106

WAILUKU, MAUI, HAWAII

DETAILED GRADING PLAN

REVISION	DATE	NOTE
△		
△		
△		
△		
△		
△		
△		

DESIGNED BY: A.N.M.O.
DRAWN BY: L.C.O.
PROJECT NO.: 2020-18
DRAWING NAME: GRAD-DET
DATE: 5-31-21

SHEET NO.

C-4

OF SHEETS

G:\2020 PROJECTS\2020-18 (Waiehu Affordable Housing)\CONSTRUCTION PLANS\GRAD-DET.dwg Mar. 02, 2022 - 11:31am

TRUE NORTH

SCALE: 1 IN. = 20 FT.

TO WAILUKU

KAHEKILI HIGHWAY

TO WAIHEE

MAGNAIL SET

1/2" PIPE FOUND

GATE

1/2" PIPE SET

3/4" PIPE FOUND

DRIVEWAY "D"

D18"

GICB #D-16

GICB #D-17

GICB #D-18

ROCK WALL

DRIVEWAY "E"

GICB #E-1

GICB #E-2

TRADITIONAL HAWAIIAN STRUCTURE
588.28 SQ. FT.
BASE ELEV. = 64.8'
ROOF PEAK ELEV. = 81.6'
HEIGHT = 17.0'

DRAINAGE CULVERT

DRAIN INLET

WAIEHU BEACH ROAD

TO KAHULUI

SEE SHT. C- FOR CONT.

LOT 76
T.M.K.:(2) 3-3-009: 076
WALTER YAGI
(OWNER)

LOT 77
T.M.K.:(2) 3-3-009: 077
GERALDINE F SATO TRUST
(OWNER)

LOT 78
T.M.K.:(2) 3-3-009: 078
LYNN G KRIEG TRUST
(OWNER)

LOT 79
T.M.K.:(2) 3-3-009: 079
JONA R. K. OANA ETAL
(OWNER)

LOT 80
T.M.K.:(2) 3-3-009: 080
CARL J DUARTE ETAL
(OWNER)

LOT 81
T.M.K.:(2) 3-3-009: 081
THOMAS W H BOOMER ETAL
(OWNER)

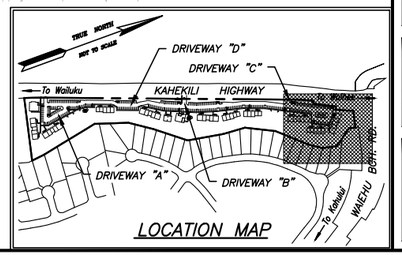
REDUCED COPY
NOT TO SCALE

NOT FOR CONSTRUCTION

EXHIBIT 5D

DETAILED GRADING PLAN

SCALE: 1 IN. = 20 FT.



LOCATION MAP

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 S. HIGH STREET, STE. 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032

LICENSE EXPIRES: 4-30-22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. ("OBSERVATION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-115-2 OF THE HAWAII ADMINISTRATIVE RULES, PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.)

SIGNATURE DATE

NOTE: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AT THE JOB SITE BEFORE PROCEEDING WITH THE WORK.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

(2) 3-3-001: 106
WAILUKU, MAUI, HAWAII

DETAILED GRADING PLAN

REVISION	DATE	NOTE

DESIGNED BY:	A.N.M.O.
DRAWN BY:	L.C.O.
PROJECT NO.:	2020-18
DRAWING NAME:	GRAD-DET
DATE:	5-31-21

SHEET NO.

C-5

OF SHEETS

G:\2020 PROJECTS\2020-18 (Waiehu Affordable Housing)\CONSTRUCTION PLANS\GRAD-DET.dwg Mar. 02, 2022 - 11:33am

GEOTECHNICAL INVESTIGATION

APPENDIX C

REPORT
GEOTECHNICAL INVESTIGATION

PROPOSED WAIEHU APARTMENTS
KAHEKILI HIGHWAY
WAIEHU, MAUI, HAWAII
TMK: (2) 3-3-001:106 [(2) 3-3-001:016 (POR.)]

for

HIGHRIDGE COSTA DEVELOPMENT COMPANY, LLC

Project No. 20-0094
January 8, 2021

SHINSATO ENGINEERING, INC.
98-747 KUAHAO PLACE, #E
PEARL CITY, HI 96782

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS

98-747 KUAHAO PLACE, SUITE E
PEARL CITY, HAWAII 96782
PHONE: (808) 487-7855
FAX: (808) 487-7854

January 8, 2021
Project No. 20-0094

Highridge Costa Development Company, LLC
Attention: Harrison Herzberg
330 Victoria Street
Gardena, California 90248-3527

Subject: REPORT
Geotechnical Investigation
Proposed Waiehu Apartments
Kahekili Highway
Waiehu, Maui, Hawaii
TMK: (2) 3-3-001:106, [(2) 3-3-001:016 por.]

Dear Mr. Herzberg:

This report presents the data, conclusions and recommendations of a geotechnical investigation for the proposed apartment development to be constructed at Kahekili Highway in Waiehu, Maui, Hawaii.

1) The subsurface conditions at the site were explored by excavating 16 test pits to depths of 7 to 9 feet below grade, and performing 8 soil infiltration tests.

   In general, the test pits disclosed the site to be underlain by medium stiff, light-brown and brown elastic SILT and loose to medium dense, light-brown, tan, and brown silty SAND and SAND to the final depths of the test pits. At Test Pit 12, medium dense, tan silty GRAVEL was found from the ground surface to a depth of 6 feet followed by medium dense tan SAND.

   No groundwater was encountered in the test pits at the time of the field investigation.

2) Based on the findings and observations of this investigation, it is concluded that from a geotechnical engineering perspective, the site may be developed for the intended use. The proposed structures may be supported on relatively shallow footings that bear on firm on-site soils and/or properly compacted structural fill.

3) Special considerations will be required in the design and construction of the project due to the subsurface conditions encountered in this investigation. These include but may not be limited to the following:

   a) The on-site elastic SILT soil has a moderate swelling potential when allowed to air-dry. In order to minimize the possible adverse effects from swelling of the on-site soils, it is recommended that:

      I) Where the subgrade soil consists of the elastic SILT, the surface should be kept moist by intermittent sprinkling of water to maintain the in-situ moisture content until non-expansive fill have been placed over the soil.

ii) Where the subgrade soil beneath concrete floor slabs consists of the elastic SILT, the elastic SILT shall be over excavated to a depth of 12-inches below the bottom of the slab elevation and then be backfilled with non-expansive granular fill. Any granular cushion or capillary moisture barrier may be considered as a part of the 12-inch thickness. For exterior slabs, the thickness may be reduced to a minimum of 6-inches.

b) The on-site elastic SILT soil should not be used as fill and backfill material within 12-inches from finished subgrade elevation under building slabs. It may be used as fill below 12-inches from finished subgrade elevations provided the soil is placed at a moisture content of between optimum moisture and 3 percent above optimum moisture, and the degree of compaction shall be between 90 and 95 percent of the maximum dry density. The maximum dry density and optimum moisture shall be determined by the ASTM D1557 test procedure.

4) A summary of the foundation design parameters is as follows:

a) Allowable soil bearing pressure: 2,500 psf for footings bearing on firm on-site soil and/or properly compacted structural fill.

b) Minimum footing embedment depth: 18-inches below lowest adjacent grade (measured to bottom of footing). This may be reduced to 12 inches by providing 6-inches of compacted structural fill beneath the footing.

c) Estimated settlement: less than 1-inch.

d) Earth pressure coefficients:

On-site soil:
Kp = 3.00
Ka = 0.40 (unrestrained)
Ko = 0.60 (restrained, at-rest)
Soil Unit Weight: 100 pcf
Coefficient of Friction: 0.4 x DL

Imported structural fill:
Kp = 3.50
Ka = 0.27 (unrestrained)
Ko = 0.42 (restrained, at-rest)
Soil Unit Weight: 140 pcf
Coefficient of Friction: 0.7 x DL

e) Site class definition: D - “stiff soil” (2006 and 2012 IBC)

f) Slab-on-grade: Where the subgrade soil consists of the elastic SILT, provide a minimum of 12-inches of structural fill beneath interior floor slabs; any granular cushion or capillary moisture barrier may be considered as a part of the 12-inch thickness.

g) The soil infiltration rates per the field tests varied from 1.80 to 5.62 inch per hour.

h) Pavement Design

Gross Vehicle Weight (lbs.)	Representative Vehicle Type	Flexible Pavement			Rigid Pavement	
		AC	Base	Select Borrow	Concrete	Base
10,000 or less	cars, SUVs, pick-up trucks, delivery vehicle	2"	6"	0	5"	4"
10,001 to 33,000	cargo van, delivery truck, small bus	2.5"	6"	6"	6"	6"
over 33,000	semi-tractor trailer, concrete mixer, dump truck, garbage truck, fire truck, large bus	3"	6"	12"	6"	8"

Details of the findings and recommendations are presented in the attached report.

This investigation was made in accordance with generally accepted engineering procedures and included such field and laboratory tests considered necessary for the project. In the opinion of the undersigned, the accompanying report has been substantiated by mathematical data in conformity with generally accepted engineering principles and presents fairly the design information requested by your organization. No other warranty is either expressed or given.

Respectfully submitted,

SHINSATO ENGINEERING, INC.

Lawrence S. Shinsato, P.E.
President

LSS:ls

LAWRENCE S. SHINSATO
LICENSED PROFESSIONAL ENGINEER
No. 4169-C
HAWAII, U.S.A.

This work was prepared by me
or under my supervision.
License Expires 04/30/22

GEOTECHNICAL INVESTIGATION REPORT
Proposed Waiehu Apartments
Kahekili Highway
Waiehu, Maui, Hawaii
TMK: (2) 3-3-001:106 [(2) 3-3-001:016 por.]

1.0 INTRODUCTION

This investigation was made for the purpose of obtaining information on the subsurface conditions from which to provide geotechnical engineering recommendations for the design and construction of the proposed Waiehu Apartment development at Kahekili Highway in the Waiehu, Maui, Hawaii. The location of the site, relative to the existing streets and landmarks, is shown on the Vicinity Map, Plate 1.

2.0 SCOPE OF WORK

The services included excavating 16 test pits to the depths of 7 to 9 feet below the existing grade, performing 8 soil infiltration tests, obtaining samples of the underlying soils, performing laboratory tests to determine pertinent engineering properties of the representative soil samples, and performing an engineering analysis to in order to provide foundation design parameters and site work procedures. The following information is provided for use by the Architect and/or Engineer:

1) General subsurface conditions, as disclosed by the test pits.
2) Physical characteristics of the soils encountered at the site.
3) Recommendations for foundation design, including bearing values, embedment depth and estimated settlement.
4) Recommendations for sitework including placement of fill and backfill.
5) Results of the falling head percolation used to calculate the soil percolation and infiltration rates.
6) Special considerations.

3.0 PLANNED DEVELOPMENT

From the information provided, Waiehu Apartments will be a planned 120-unit, two-story garden style affordable family community located in Waiehu, Maui. The currently vacant site is approximately 11.476 acres adjacent to Kahekili Highway and Waiehu Beach Road. In addition to offering affordable homes in and around the community where the residents live and work, the project's amenities will include a clubhouse, manager's office, fitness room, computer room, playground, and 3,000 square foot community center reserved primarily for programs targeted at the resident population. Additionally, there will be a 3,500 square foot building for local non-profit, Maui Economic Opportunity, Inc. (MEO), to run their programs out of.

The 120 affordable units will be comprised of two 8-unit buildings, ten 10-unit buildings, and one 4-unit building. 30 units will be one-bedroom, one-bath apartments, 58 will be two-bedroom, two-bath apartments and 32 will be three-bedroom, two-bath apartments. All units will be set aside for individuals and families earning 60% or less of area median income.

4.0 FIELD INVESTIGATION

4.1 General

The field investigation consisted of excavating test pits with a CASE 580M backhoe at the locations shown on the Plot Plans, Plates A2.1 and A2.2. Material excavated from the pit and the sides and bottom of the pits were visually inspected and a continuous log of each hole was kept.

4.2 Soil Sampling

Bulk samples of the underlying soils were obtained from test pits. The soil samples were visually classified in the field using the Unified Soil Classification System. Samples were packed in moisture proof containers and transported to the laboratory for testing.

4.3 Soil Infiltration Testing

Eight (8) falling head percolation tests were performed to determine the percolation/infiltration rates of the on-site soils. The falling head percolation tests were performed in general accordance with the procedures detailed in the Hawaii Administrative Rules 11-62 Appendix C. The Porchet Method was used to estimate the infiltration rate based on the results of the falling head percolation tests.

The results of the tests are as follows:

Percolation Test No.	Test Depth (ft)	Percolation Rate (min/inch)	Infiltration Rate (inch/hour)	Soil Description
P-1	1.5	2.86	3.15	silty SAND
P-2	1.5	4.44	1.80	silty SAND
P-3	1.5	3.33	2.57	silty SAND
P-4	1.5	2.11	4.89	silty SAND
P-5	1.5	3.08	2.85	silty SAND
P-6	1.5	2.50	3.79	silty SAND
P-7	1.5	1.93	5.62	silty SAND
P-8	1.5	2.00	5.29	silty SAND

5.0 LABORATORY TESTING

5.1 General

Laboratory tests are performed on various soil samples to determine their engineering properties. Descriptions of the various tests are listed below.

5.2 Unit Weight and Moisture Content

The in-place moisture content and unit weight of the samples are used to correlate similar soils at various depths. The sample is weighed, the volume determined, and a portion of the sample is placed in the oven. After oven-drying, the sample is again weighed to determine the moisture loss. The data is used to determine the wet-density, dry-density and in-place moisture content.

5.3 Classification Tests

The terms and symbols used to describe the soil materials are based on the Unified Soil Classification System which provides a basis for classifying soils using either visual methods or laboratory test results. Laboratory

tests include sieve and hydrometer analysis for particle size distribution, and Atterberg Limits test for liquid limit, and plasticity index determination.

Grain-size distribution of the soil is determined by passing the soil through a series of sieves. If 50 percent or more of the soil by dry weight passes the #200 sieve, the soil is classified as fine-grained. If more than 50 percent of the soil by dry weight is retained on the #200 sieve, the soil is classified as coarse grained.

Coarse grained soils are described as follows:

Boulder	Material retained on a 12-inch square sieve
Cobble	Material passing a 12-inch sieve but retained on a 3-inch sieve
Gravel	Material passing a 3-inch sieve but retained on a #4 sieve
Sand	Material passing a #4 sieve but retained on a #200 sieve

Fine-grained materials are silts and clays. The liquid limit and plastic limit results from an Atterberg Limits test are used to determine if the soil is a silt or clay.

6.0 SITE CONDITIONS

6.1 Surface

The property is located along the southeast side of Kahekili Highway at the intersection with Waiehu Beach Road and is bordered by Kahekili Highway to the northwest and a residential subdivision to the southeast.

At the time of the field investigation, the site was vacant. The interior of the property has grass covered sections while the perimeter of the lot is overgrown by trees and brush.

6.2 Subsurface

The subsurface conditions at the site were explored by excavating 16 test pits to depths of 7 to 9 feet below grade and performing 8 field percolation tests at depths of 1.5 feet below grade. The locations of the test pits and field percolation tests are shown on the Plot Plans, Plates A2.1 and A2.2. Detailed logs of the test pits are presented at the end of this report on the Log of Test Pits, Plates TP1 through TP16.

In general, the test pits disclosed the site to be underlain by medium stiff, light-brown and brown elastic SILT and loose to medium dense, light-brown, tan, and brown silty SAND and SAND to the final depths of the test pits. At Test Pit 12, medium dense, tan silty GRAVEL was found from the ground surface to a depth of 6 feet followed by medium dense tan SAND.

No groundwater was encountered in the test pits at the time of the field investigation.

From the USDA Soil Conservation Service "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," the soils within the majority of the site (along Kahekili Highway) are designated as Iao silty clay, 0 to 3 percent slopes (IaA). The soils along the southeast perimeter adjacent to the existing residential subdivision is designated as Puuone sand, 7 to 30 percent slopes (PZUE).

The USDA manual describes the soil types as follows:

"The Iao soil series consists of well-drained soils on valley fill and alluvial fans. They developed in alluvium derived from basic igneous rock. In a representative profile of the IaA soil, the surface layer is dark brown clay about 15 inches thick. The subsoil, about 45 inches thick is very dark brown, dark-brown and very dark grayish-brown clay and silty clay. The substratum is clayey alluvium. Permeability is moderately slow. Runoff is medium and the erosion hazard is slight to moderate." (USDA, 1972, pp. 46).

"The Puuone soil series consists of somewhat excessively drained soils on low uplands on the island of Maui. They developed in material derived from coral and seashells. In a representative profile of the PZUE soil, the surface layer is grayish-brown, calcareous sand about 20 inches thick. This is underlain by grayish-brown, cemented sand. Permeability is rapid above the cemented layer. Runoff is slow and the wind erosion hazard is moderate to severe." (USDA, 1972, pp. 117).

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 General

Based on the findings and observations made during this investigation, it is concluded that from a geotechnical perspective, the site may be developed for the intended use provided the recommendations contained in this report are included in the design and construction of the project.

7.2 Special Considerations

Special considerations will be required in the design and construction of the project due to the subsurface conditions encountered in this investigation. These include but may not be limited to the following:

a) The on-site elastic SILT soil has a moderate swelling potential when allowed to air-dry. In order to minimize the possible adverse effects from swelling of the on-site soils, it is recommended that:

   I) Where the subgrade soil consists of the elastic SILT, the surface should be kept moist by intermittent sprinkling of water to maintain the in-situ moisture content until non-expansive fill have been placed over the soil.

   ii) Where the subgrade soil beneath concrete floor slabs consists of the elastic SILT, the elastic SILT shall be over excavated to a depth of 12-inches below the bottom of the slab elevation and then be backfilled with non-expansive granular fill. Any granular cushion or capillary moisture barrier may be considered as a part of the 12-inch thickness. For exterior slabs, the thickness may be reduced to a minimum of 6-inches.

b) The on-site elastic SILT soil should not be used as fill and backfill material within 12-inches from finished subgrade elevation under building slabs. It may be used as fill below 12-inches from finished subgrade elevations provided the soil is placed at a moisture content of between optimum moisture and 3 percent above optimum moisture, and the degree of compaction shall be between 90 and 95 percent of the maximum dry density. The maximum dry density and optimum moisture shall be determined by the ASTM D1557 test procedure.

7.3 Foundations

An allowable bearing value of 2,500 pounds per square foot may be used for footings that bear on firm on-site soil and/or properly compacted structural fill. The bearing value is for dead plus live loads and may be increased by one-third (1/3) for momentary loads due to wind or seismic forces. If any footing is eccentrically loaded, the maximum edge pressure shall not exceed the bearing pressure for permanent or for momentary loads.

Footings shall be embedded a minimum of 18-inches below the lowest adjacent finished grade (measured to the bottom of the footing) and shall bear on firm soil. The embedment depth may be reduced to 12 inches by providing 6-inches of compacted structural fill beneath the footing. Any soft or loose soil encountered at the bottom of the footing excavation shall be removed to firm soil and the resulting depression shall be backfilled with properly compacted structural fill.

For interior footings (slab-on-grade construction), the footing embedment depth may be reduced to 12-inches below the top of the floor slab.

For footings located adjacent to utility trenches, the bottom of the footing shall be deepened below a 1 horizontal to 1 vertical plane projected upwards from the edge of the utility trench.

For footings located on or adjacent to slopes, the footing shall be deepened such that there is a minimum horizontal distance of 5-feet from the edge of the footing to the slope face.

For footings located adjacent to retaining walls or other structural elements which are not designed for surcharge loading, the new footing shall be deepened below a 45-degree plane projected upwards from the adjacent structure.

All loose and disturbed soil at the bottom of footing excavations shall be removed to firm soil or the disturbed soil shall be compacted prior to laying of steel or pouring of concrete.

7.4 Site Class Definition

In accordance with the 2006 and 2012 International Building Code, the site class and soil profile name may be assumed as D: stiff soil profile.

7.5 Settlement

Under the fully applied recommended maximum bearing pressure of 2,500 psf, it is estimated that the total settlement of 4-feet square column footings and 3-feet wide continuous footings that bear on firm on-site soils and/or properly compacted FILL will be on the order of 1-inch.

For the purpose of estimating differential settlement between footings, the total settlement may be assumed to increase or decrease in proportion to the increase or decrease in footing width and applied bearing pressure.

7.6 Lateral Earth Coefficients

The values for the lateral earth pressure coefficients and frictional resistance may be assumed as follows:

Material Type	Passive Earth Coefficient (Kp)	Active Earth Coefficient (Ka)	At-Rest Earth Coefficient (Ko)	Frictional Coefficient (x D.L.)	Unit Weight (pcf)
on-site soil	3.0	0.40	0.60	0.4	100
Imported Structural Fill	3.5	0.27	0.42	0.7	140

NOTES:

a) The passive, active and at-rest earth pressures are determined by multiplying the respective earth coefficient by the unit weight.

b) The allowable passive earth resistance values may be used for structural elements in direct contact with undisturbed material. Where the ground surface adjacent to the resisting element is exposed to the weather, the top 12 inches shall be neglected in calculating the passive earth resistance. This is to allow for soil shrinkage and/or erosion.

c) Lateral resistance and friction may be combined.

d) The above active earth coefficients do not include surcharge loads such as footings located within a 45-degree plane projected upwards from the heel of the footing, sloping ground and/or from hydrostatic pressures. If such conditions occur, the active earth pressures shall be increased accordingly.

e) The active earth pressure coefficient is for unrestrained conditions. Unrestrained walls are defined as walls that are allowed to rotate between 0.005 and 0.01 times the wall height. The rotation of the wall develops the "active earth pressure." If the wall is not allowed to move as in the case of basement walls or walls that are restrained at the top, the soil pressure that will develop is known as an "at-rest" pressure. For restrained walls, the above “at-rest” earth pressures shall be used to design the structure.

f) The active earth pressure coefficient for imported structural fill may be used to design retaining walls where the imported structural fill is placed within a 1H:2V plane projected upward and outward from the heel of the wall footing. Where this cannot be accomplished, the active earth pressure for the on-site soil shall be used to design the wall.

g) Drainage for the retaining wall backfill shall be accomplished by providing 4-inch diameter weepholes spaced 8-feet on-center or by using a minimum 4-inch diameter perforated PVC footing drain pipe. A 2-foot thick layer of crushed gravel (ASTM No. 67), which is wrapped with geotextile filter fabric, shall be placed above the pipe; the crushed gravel shall be continuous from weephole to weephole, or in the case of a footing drain pipe, laid throughout the full length of the pipe. Geotextile fabric shall be MIRAFI 140N or similar.

h) The backfill material for retaining walls shall be properly compacted in accordance with the Site Preparation and Grading section to this report. Also, surface drainage shall be designed to minimize surface water runoff from entering the backfill area. In non-pavement areas, the top 12 inches of backfill material shall be fine-grained, cohesive soil.

7.7 Slab-on-Grade

The onsite clayey soil was found to have a moderate shrink-swell potential when allowed to air-dry. Concrete floor slabs-on-grade should be constructed with a minimum of 12-inches of non-expansive granular fill beneath the slabs. Any granular cushion or capillary barrier may be considered as part of the 12-inch thickness. The thickness of granular fill for exterior slabs such as sidewalks may be reduced to a minimum of 6-inches.

It is recommended that concrete floor slabs that have moisture sensitive floor covering be constructed using a vapor retarder and a capillary moisture barrier of 4-inches of clean gravel cushion material such as #3-fine

gravel (ASTM Designation No. 67).

For design of slabs, a modulus of subgrade reaction of 100 pci may be used for the on-site soil or properly compacted structural fill.

The subgrade clayey soil should be kept moist by intermittent sprinkling of water to maintain the in-situ moisture content until non-expansive fill have been placed over the soil. Preparation of the subgrade shall be in accordance with the Site Preparation and Grading section to this report.

7.8 Pavement Design

For design of pavement areas, the recommended pavement sections are as follows:

Gross Vehicle Weight (lbs.)	Representative Vehicle Type	Flexible Pavement			Rigid Pavement	
		AC	Base	Select Borrow	Concrete	Base
10,000 or less	cars, SUVs, pick-up trucks, delivery vehicle	2"	6"	0	5"	6"
10,001 to 32,000	cargo van, delivery truck, small bus	2.5"	6"	6"	6"	6"
over 32,000	semi-tractor trailer, concrete mixer, dump truck, garbage truck, fire truck, loader	3"	6"	12"	6"	8"

The top 6 inches of pavement subgrade, subbase, and base course gravel shall be compacted to at least 95 percent of the maximum dry density (ASTM D1557).

All material quality and compaction requirements for the pavement section shall be in accordance with the Hawaii State Standard Specifications for Road and Bridge Construction, dated 2005.

7.9 Slopes

The maximum recommended slope gradients for cut and fill slopes are 2 horizontal to 1 vertical (2H:1V)

Where cut and fill slopes are greater than 15-feet in vertical height, terraces or benches shall be provided at vertical height intervals of 15-feet except that where only one bench is required, it shall be at the midpoint. The terrace or bench shall be a minimum of eight feet wide and shall be provided with drainage provisions to control erosion on the slope face and bench surface.

Exposed slopes shall be covered as soon as practical after construction to minimize erosion.

Fill slopes shall be constructed by either overfilling and cutting back to compacted soil, or the slope shall be track-rolled.

7.10 Site Preparation and Grading

It is recommended that the site be prepared in the following manner:

a) Clearing and Grubbing:
In all areas to receive fill and in structural areas, all vegetation, weeds, roots, stumps, debris, soft soil, old fill, and other deleterious material shall be removed and disposed of off-site.

b) Preparation of Ground to Receive Fill:
The exposed surface shall then be scarified to a depth of 6 inches, moisture conditioned to near optimum moisture (ASTM D1557) and then compacted to the degree of compaction specified below. If soft spots are encountered, the soft areas shall be removed to firm material and the resulting depression shall be filled with properly compacted fill.

c) Types of Fill and Backfill Material:
Structural fill and backfill shall be described as material placed beneath buildings and extending a horizontal distance of 3 feet beyond the edge of the building line. Non-structural fill shall be described as material placed beyond 3 feet from the building line.

d) Material Quality:
Fill and backfill material shall consist of soil which is free of organics and debris. The maximum size particle for fill and backfill material shall be as follows:

Structural Fill	
Top 2 feet below finished subgrade (FSG)	3"
Below 2 feet from FSG	6"
Non-structural fill and Pavement areas	
Top 2 feet from FSG	3"
2 to 6 feet from FSG	6"
Below 6 feet from FSG	12"

Imported structural fill shall have a Unified Soil Classification of either GW, GM, SW, or SM. The plasticity index of the fine portion as determined by the ASTM D4318 test shall be less than 15.

The on-site clayey soil should not be used as fill and backfill material within 12-inches from finished subgrade elevation under building slabs. It may be used as fill below 12-inches from finished subgrade elevations provided the soil is placed at a moisture content of between optimum moisture and 3 percent above optimum moisture, and the degree of compaction shall be between 90 and 95 percent of the maximum dry density. The maximum dry density and optimum moisture shall be determined by the ASTM D1557 test procedure.

e) Placement of Fill and Backfill:
Each layer of fill and backfill material shall be placed in lifts not exceeding the following (loose thickness):

Structural Fill (including pavement areas)	
Top 2 feet below finished subgrade (FSG)	8"
Below 2 feet from FSG	12"
Non-structural fill	
Top 6 feet from FSG	12"
Below 6 feet from FSG	*

*The loose thickness of this layer shall not exceed 1.5 times the largest size particle; this is predicated upon proper compaction of each lift.

Prior to placing of fill and backfill material, the material shall be aerated or moistened to near optimum moisture content (ASTM D1557 test procedure).

Where fill is placed on existing ground that is steeper than 5 horizontal to 1 vertical, the existing ground surface shall be benched into firm soil as the fill is placed.

f) Degree of Compaction:
Each layer of fill and backfill shall be thoroughly compacted from edge to edge using conventional compaction equipment designed for the purpose. The minimum degree of compaction for each layer (as determined by the ASTM D1557 test procedure) shall be as follows:

Structural Fill (under and 3 feet beyond the edge of buildings)	95 %
Non-structural fill	* 90 %

*Where compaction tests are not practical due to the size of the material, each layer shall be compacted by track rolling until it does not weave or creep under the weight of the track rolling equipment (D-8 dozer or larger).

It is particularly important to see that all fill and backfill soils are properly compacted in order for the design parameters to remain applicable.

g) Preparation of Footing Excavations:
Footing excavations shall be cleaned of loose material and soils disturbed by the excavation prior to placing of steel or pouring of concrete. Any soft soil encountered at the bottom of the footing excavation shall be removed to firm material. The resulting depression shall then be backfilled with properly compacted structural fill.

h) Site Drainage:
During construction, drainage shall be provided to minimize ponding of water adjacent to or on foundation and pavement areas. Ponded areas shall be drained immediately. Any subgrade soil that has become soft due to ponding shall be removed to firm material and replaced with compacted structural fill.

8.0 INSPECTION

During the progress of construction, so as to evaluate compliance with the design concepts, specifications and recommendations contained in this report, it is recommended that a representative from Shinsato Engineering be present to observe the following operations:

1) Site preparation and grading including field density tests for soil compaction.

2) Foundation excavations to verify that suitable bearing material has been encountered at the bottom of foundation excavations.

3) Any special inspection services that may apply.

9.0 REMARKS

The conclusions and recommendations contained herein are based on the findings and observations made at the test pit locations. If conditions are encountered during construction which appear to differ from those disclosed by the explorations, this office shall be notified so as to consider the need for modifications.

This report has been prepared for the exclusive use of Highridge Costa Development Company, LLC and their respective design consultants. It shall not be used by or transferred to any other party or to another project without the consent and/or thorough review by this facility. Should the project be delayed beyond the period of one year from the date of this report, the report shall be reviewed relative to possible changed conditions.

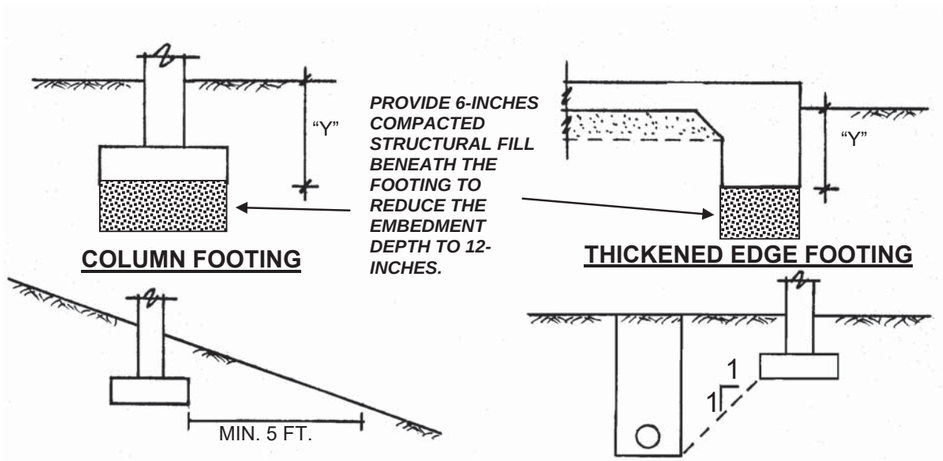
Samples obtained in this investigation will deteriorate with time and will be unsuitable for further laboratory tests within one (1) month from the date of this report. Unless otherwise advised, the samples will be discarded at that time.

- o 0 o -

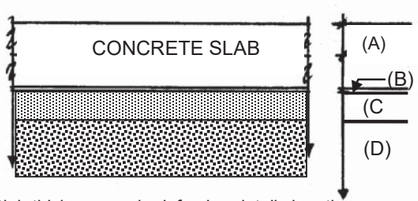
The following are included and complete this report:

	Plate
Foundation Design Details	GE-1.0
Vicinity Map	A-1
Plot Plans	A2.1 and A2.2
Logs of Test Pits	TP1 through TP16
Results of Laboratory Tests	L-1 and L-2

- "Y" = min. 18-inches to bottom of footing. This may be reduced to 12-inches by providing 6-inches of compacted structural fill beneath the footing.
- Allowable soil bearing pressure = 2,500 psf for footings bearing on firm on-site soil and /or compacted structural fill.
- Remove any soft soil found at bottom of the footing trench and replace with compacted structural fill.
- Reinforcing details to be provided by others.
- Site Class (2006 and 2012 IBC): D (stiff soil profile)

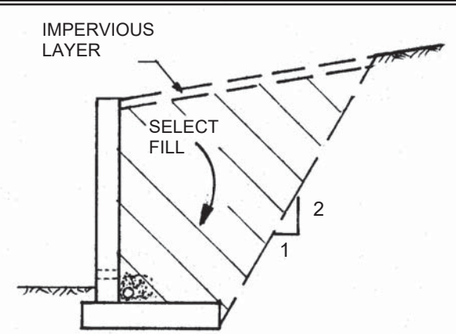


FOOTING EMBEDMENT DEPTH DETAILS



(A) Slab thickness and reinforcing details by others.
(B) Vapor retarder
(C) Capillary clean gravel fill such as #3-fine; detail by others.
(D) If the subgrade soil consists of the on-site elastic SILT, over excavate 12-inches of the elastic SILT and replace it with compacted structural fill beneath interior type floor slabs; any capillary gravel fill may be considered as a part of the 12-inch thickness); Provide 8-inches for exterior slabs.

SLAB-ON-GRADE

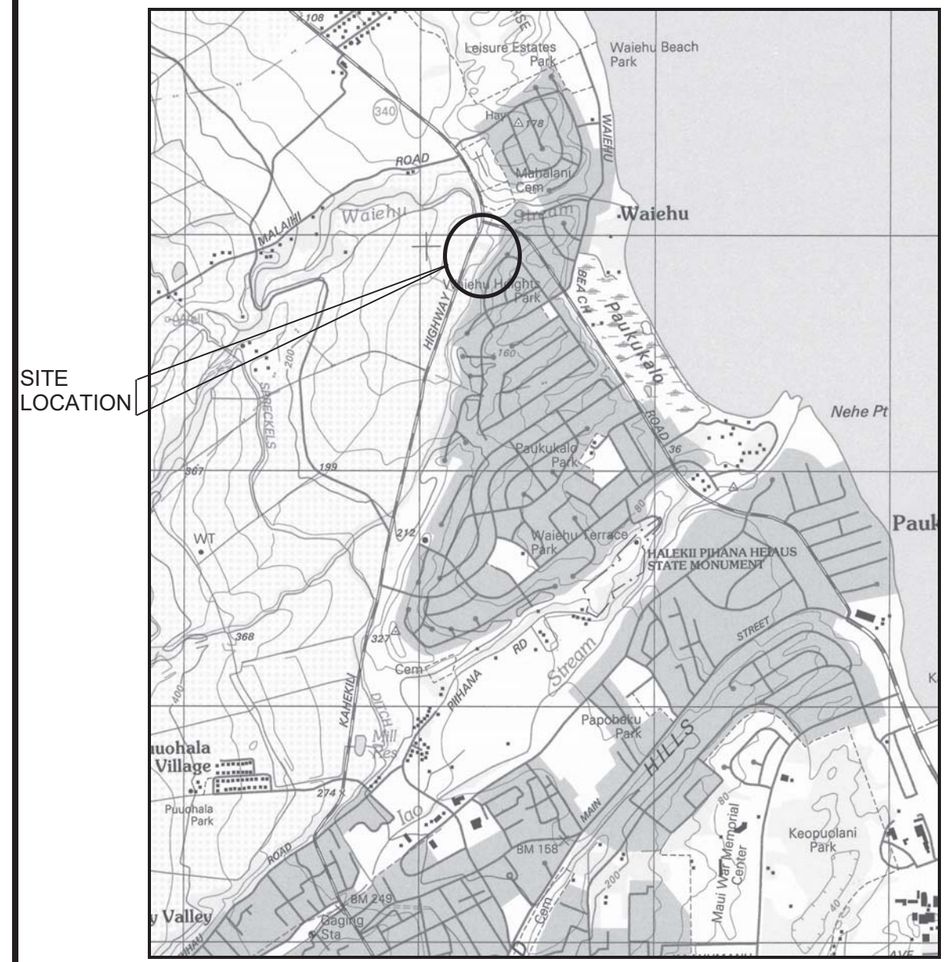


Provide backfill drainage using weepholes or a footing drain; Cap the top 12-inches of backfill with an impervious layer (clayey soil, concrete AC, etc.)
If the on-site clayey soil is used as backfill material in lieu of select (granular) fill, design the wall for a higher active earth pressure.

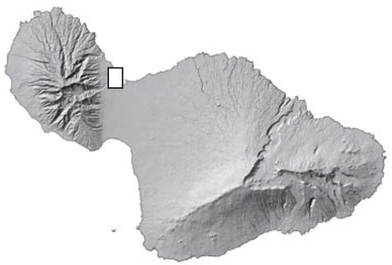
RETAINING WALL BACKFILL

Project: WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HI Project No. 20-0094	***SHINSATO ENGINEERING, INC.*** *Consulting Geotechnical Engineers* *98-747 Kuahao Pl. Pearl City, HI 96782*	**PLATE GE-1.0**

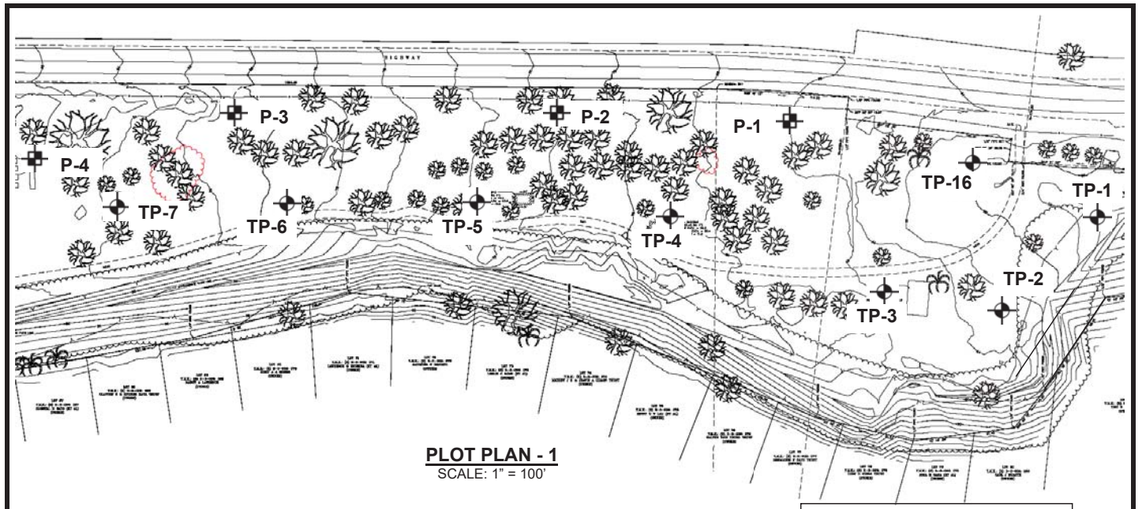
VICINITY MAP



REFERENCE:
USGS TOPOGRAPHIC MAP
WAILUKU QUADRANGLE
DATED 1997
SCALE: 1"=2000'

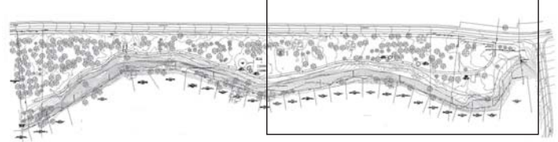


Project: WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HAWAII Project No.: 20-0094	*Shinsato Engineering, Inc.* *Consulting Geotechnical Engineers* 98-747 Kuahao Pl. #E, Pearl City, HI 96782	**PLATE A1**



PLOT PLAN - 1
SCALE: 1" = 100'

LOCATION PLOT PLAN -1



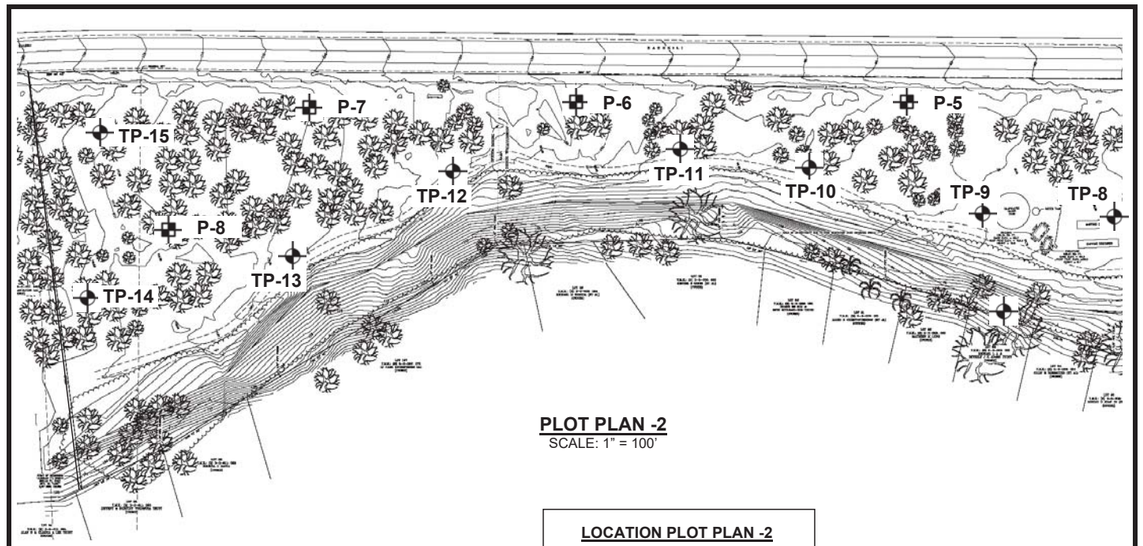
OVERALL SITE PLAN
NOT TO SCALE

LEGEND:

TEST PIT LOCATION

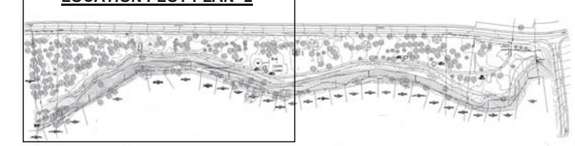
PERCOLATION TEST LOCATION

Project:	WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HAWAII	*Shinsato Engineering, Inc.* *Consulting Geotechnical Engineers* 98-747 Kuahao Pl. #E, Pearl City, HI 96782	**PLATE** **A2.1**
Project No.:	20-0094		



PLOT PLAN -2
SCALE: 1" = 100'

LOCATION PLOT PLAN -2



OVERALL SITE PLAN
NOT TO SCALE

LEGEND:

TEST PIT LOCATION

PERCOLATION TEST LOCATION

Project:	WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HAWAII	*Shinsato Engineering, Inc.* *Consulting Geotechnical Engineers* 98-747 Kuahao Pl. #E, Pearl City, HI 96782	**PLATE** **A2.2**
Project No.:	20-0094		

LOG OF TEST PIT NO. 1

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT; with cobbles, gravel and sand, some organic debris with roots		brown	slightly moist	medium stiff		8.8		
2		SM	silty SAND; mild organic odor		gray brown	very moist	loose - medium dense				
3									32.3		
6							medium dense				
8			END OF TEST PIT								

Project:	WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HAWAII	**SHINSATO ENGINEERING, INC.** CONSULTING GEOTECHNICAL ENGINEERS 98-747 Kuahao Place, #E, Pearl City, HI 96782	**PLATE TP1**
Project No.:	20-0094		

LOG OF TEST PIT NO. 2

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; with gravel, some cobbles		light brown	slightly moist	loose - medium dense				
2			--few boulders						10.7		
4			--less fines, few cemented areas						4.2		
5							medium dense				
6			--with boulders								
7			--more boulders, with cobbles, gravel				dense				
			END OF TEST PIT								

Project:	WAIEHU APARTMENTS KAHEKILI HIGHWAY, MAUI, HAWAII	**SHINSATO ENGINEERING, INC.** CONSULTING GEOTECHNICAL ENGINEERS 98-747 Kuahao Place, #E, Pearl City, HI 96782	**PLATE TP2**
Project No.:	20-0094		

LOG OF TEST PIT NO. 3

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; with gravel, some metallic debris		light brown	slightly moist	loose				
		SP	SAND; --no debris, with fines		tan						
1				▼					5.7		
2											
3		SM	silty SAND, few gravel; old water lines		brown	moist	medium dense				
4											
5											
6											
7			END OF TEST PIT								
8											
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

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PLATE TP3

LOG OF TEST PIT NO. 4

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT; with sand, few gravel		light brown	slightly moist	medium stiff				
1											
2											
3				▼					19.8		
4											
5											
6											
7			END OF TEST PIT								
8											
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
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PLATE TP4

LOG OF TEST PIT NO. 5

EQUIPMENT USED: **CASE 580M Backhoe**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT; with sand, few gravel		light brown	slightly moist	medium stiff				
1											
2			--small black irrigation hose								
3											
4											
5											
6											
7			--with cobbles								
8		MH	elastic SILT; with sand, few gravel								
9			END OF TEST PIT								
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

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PLATE TP5

LOG OF TEST PIT NO. 6

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT; with sand, few gravel		light brown	slightly moist	medium stiff				
1											
2											
3											
4											
5											
6											
7		SM	silty SAND				loose to medium dense		18.3		
8			END OF TEST PIT								
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

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PLATE TP6

LOG OF TEST PIT NO. 7

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with sand, few gravel		light brown	slightly moist	medium stiff				
5		**SP-SM**	SAND; with fines		tan		loose				
6		**SM**	silty SAND;		light brown		medium dense				
7			--small layer of gravel	▼					16.2		
8			END OF TEST PIT								
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

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PLATE TP7

LOG OF TEST PIT NO. 8

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 9, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **9**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with sand, few gravel		light brown	slightly moist	medium stiff				
4		**GP-GM**	GRAVEL; with sand and fines		light gray		loose				
5		**SM**	silty SAND; few gravel		tan		loose - medium dense				
9			END OF TEST PIT								
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

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PLATE TP8

LOG OF TEST PIT NO. 9

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with sand, some gravel, few cobbles		light brown	slightly moist	medium stiff		12.1		
1											
2		**SP-SM**	SAND; some gravel and cobbles, trace fines		tan		medium dense				
3									6.1		
4											
5											
6											
7											
8			END OF TEST PIT								
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
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98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP9

LOG OF TEST PIT NO. 10

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with sand, some gravel		brown	slightly moist	medium stiff				
1									13.5		
2											
3		**SM**	silty SAND; some gravel, few cobbles		light brown		loose - medium dense				
4									16.3		
5											
6											
7											
8			END OF TEST PIT								
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
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98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP10

LOG OF TEST PIT NO. 11

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with gravel and sand, few cobbles		brown	slightly moist	medium stiff				
1									15.7		
2											
3		**SP-SM**	SAND; with gravel and fines, few cobbles		tan		loose - medium dense				
4											
5		**MH**	SILT; with gravel and sand		light brown		medium stiff				
6											
7											
8											
9			END OF TEST PIT								
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
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PLATE TP11

LOG OF TEST PIT NO. 12

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **7.5**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**GM**	silty GRAVEL; with sand and cobbles, few boulders		tan	slightly moist	medium dense				
1											
2											
3											
4											
5											
6		**SP-SM**	SAND; with gravel and fines, few cobbles								
7											
8			END OF TEST PIT								
9											
10											
11											
12											
13											
14											
15											

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
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PLATE TP12

LOG OF TEST PIT NO. 13

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	SILT; with gravel and sand; few cobbles		light brown	slightly moist	medium stiff				
2		**SM**	silty SAND		tan		loose - medium dense				
4				▼					5.4		
8			END OF TEST PIT								

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS
98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP13

LOG OF TEST PIT NO. 14

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		**MH**	elastic SILT; with gravel and sand, few cobbles		light brown	slightly moist	medium stiff				
2				▼					14.7		
8			END OF TEST PIT								

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS
98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP14

LOG OF TEST PIT NO. 15

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT;		light brown	slightly moist	medium stiff				
2		GP-GM	GRAVEL; with sand and fines, some cobbles		tan		medium dense				
3									10.5		
5		SP-SM	SAND; with gravel and fines, some cobbles								
7									10.4		
8			END OF TEST PIT								

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS
98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP15

LOG OF TEST PIT NO. 16

EQUIPMENT USED: **CASE 580M BACKHOE**
DATE EXCAVATED: **November 10, 2020**

ELEVATION: **Unknown**
DEPTH OF TEST PIT (FT.): **8**
DEPTH TO GROUNDWATER (FT.): **Unknown**

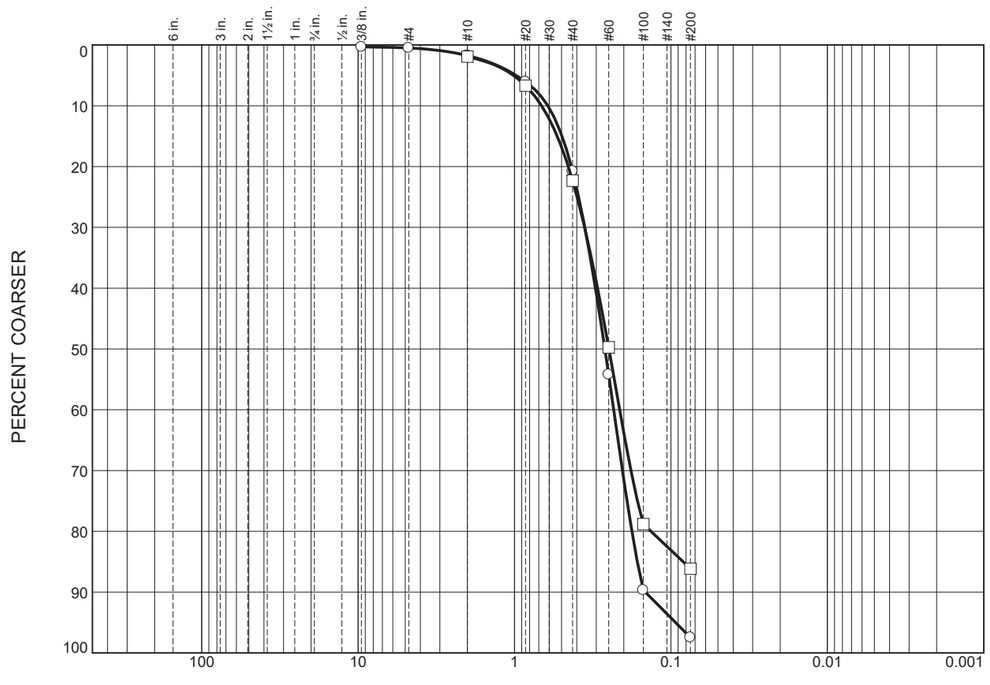
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		MH	elastic SILT; with gravel and sand, some cobbles		light brown	slightly moist	medium stiff				
1									20.8		
3			--no cobble, few gravel						26.5		
5		SM	silty SAND;		brown	moist	medium dense				
6									28.3		
8			END OF TEST PIT								

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII
Project No.: 20-0094

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS
98-747 Kuahao Place, #E, Pearl City, HI 96782

PLATE TP16

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○				1.2	19.1	76.7	2.5	
□					20.4	63.8	13.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	3	1	1.0	SAND	SP
□	13	1	4.0	silty SAND	SM

SHINSATO ENGINEERING, INC.

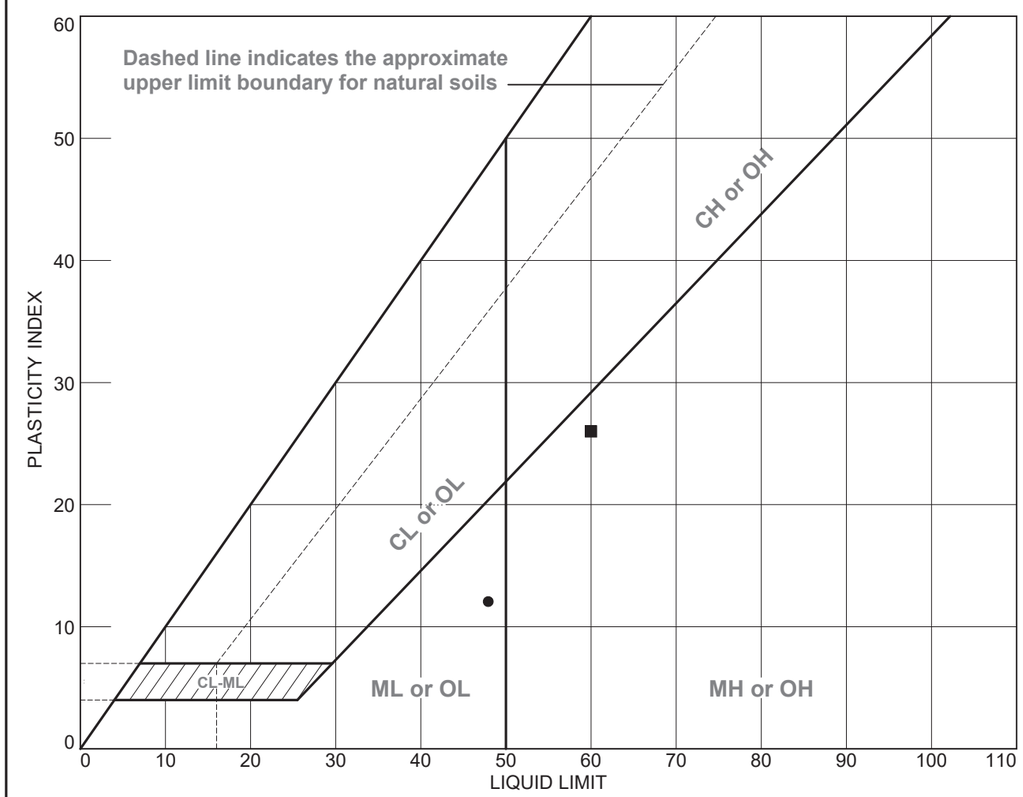
Pearl City, HI

Client:

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII

Project No.: 20-0094 **Figure** L1

ATTERBERG LIMITS



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	1	2	3.0	32.3	36	48	12	SM
■	16	2	3.0	26.5	34	60	26	MH

SHINSATO ENGINEERING, INC.

Pearl City, HI

Client:

Project: WAIEHU APARTMENTS
KAHEKILI HIGHWAY, MAUI, HAWAII

Project No.: 20-0094 **Figure** L-2

APPROVED JURISDICTIONAL DETERMINATION (DECEMBER 23, 2008)

APPENDIX D

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

REPLY TO
ATTENTION OF:

September 2, 2009

Regulatory Branch

File Number: POH-2008-00317

Matthew Slepin, Senior Associate
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Maui, Hawai'i 96793

Dear Mr. Slepin:

This letter is in response to your request, dated August 10, 2009, for our review and comments of the Draft Environmental Assessment (DEA) for the proposed MEO Best "Ke Kahua" Farm Project located at Waiehu, Maui, Hawai'i (TMK 233001016).

An approved jurisdictional determination was issued by the Honolulu District Corps of Engineers on December 23, 2008, indicating the proposed project site consisted entirely of uplands and contained no waters of the United States. The DEA does not provide any new information regarding water resources in the project site nor has the site location changed. Thus the December 23, 2008 approved jurisdictional determination stands, and has an expiration date of December 23, 2013. Please note that under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344), Department of Army (DA) authorization is required for any activities that result in the discharge (placement) of dredge and/ or fill material into waters of the U.S. and Section 10 of the Rivers and Harbors Act of 1899 requires that a Department of Army (DA) permit be obtained for structures or work in or affecting navigable waters of the U.S. (33 U.S.C. 403).

Thank you for the opportunity to comment. If you have any questions, please contact Ms. Meris Bantilan-Smith, of my Regulatory staff at 808-438-7023 (FAX: 808-438-4060) or by electronic mail at Meris.Bantilan-Smith@usace.army.mil. Please include File No. POH-2008-317 in any future correspondence regarding this project. Please be advised you can provide comments on your experience with the Corps' Honolulu District Regulatory Branch by accessing our web-based customer survey form at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

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

Copy Furnished:
Dept. of Housing and Human Concerns, Attn. Ms. Jo-Ann Riado, 220 Main Street, Suite 546, Wailuku, Hawai'i 96739

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

REPLY TO
ATTENTION OF:

December 23, 2008

Regulatory Branch

File Number POH-2008-317

Mr. Mathew M. Slepin
Chris Hart & Partners, Inc.
115 North Market Street
Wailuku, Hawaii 96793

Dear Mr. Slepin:

We have received your December 5, 2008, request for early consultation comments for the proposed Maui Economic Opportunity "Ke Kahua" Agricultural Farm. The site is 11.476 acres located within a portion of TMK (2) 3-3-001:016, at Latitude 20.915° N. and Longitude -156.499° W. in Waiehu, Maui Island, Hawaii. Based on the information you submitted, it appears the subject parcel consists entirely of uplands, and the proposed project will not involve the placement and/or discharge of dredged and/or fill material into waters of the U.S., including adjacent wetlands, subject to our jurisdiction; therefore, **a DA permit will not be required.** This determination does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Section 404 of the Clean Water Act requires that a Department of the Army (DA) permit be obtained for the discharge of dredged and/or fill material into waters of the U.S., including jurisdictional wetlands (33 U.S.C. 1344). The Corps defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Section 10 of the Rivers and Harbors Act of 1899 requires that a DA permit be obtained for structures or work in or affecting navigable waters of the U.S. (33 U.S.C. 403). Section 10 waters are those waters subject to the ebb and flow of the tide extending shoreward to the mean high water mark.

This approved jurisdictional determination is valid for a period of five (5) years from the date of this letter, unless new information supporting a revision is provided to us before the expiration date.

Should you have any questions regarding this approved jurisdictional determination, please contact Ms. Joy Anamizu of my staff at (808) 438-7023 or at joy.n.anamizu@usace.army.mil. For additional information about our Regulatory Program, visit our web site at http://www.poh.usace.army.mil/EC-R/EC-R.htm. The file number assigned POH-2008-317 should be referred to in future correspondence with us.

Sincerely,

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

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 23-Dec-2008

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Honolulu District, POH-2008-00317-JNA-JD1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State :	HI - Hawaii
County/parish/borough:	Maui
City:	Waiehu
Lat:	20.9146
Long:	-156.49868
Universal Transverse Mercator	Folder UTM List *UTM list determined by folder location* NAD83 / UTM zone 34S Waters UTM List *UTM list determined by waters location* NAD83 / UTM zone 34S
Name of nearest waterbody:	Waiehu Stream
Name of nearest Traditional Navigable Water (TNW):	Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC):	Waiehu (2020000)

☑ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc¿) are associated with the action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION:

☑ Office Determination Date: 23-Dec-2008

☐ Field Determination Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION

There [ ] "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There [ ] "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. Waters of the U.S.
a. Indicate presence of waters of U.S. in review area:[1]

Water Name	Water Type(s) Present

Ke Kahua Ag Farm TMK233001016 (por. of) (Uplands)	Uplands

b. Identify (estimate) size of waters of the U.S. in the review area:

Area: (m²)
Linear: (m)

c. Limits (boundaries) of jurisdiction:

based on: [ ]
OHWM Elevation: (if known)

2. Non-regulated waters/wetlands:[3]

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

1.TNW
Not Applicable.

2. Wetland Adjacent to TNW
Not Applicable.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: [ ]
Drainage area: [ ]
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics
(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☐ Tributary flows through [ ] tributaries before entering TNW.

:Number of tributaries

Project waters are [ ] river miles from TNW.
Project waters are [ ] river miles from RPW.
Project Waters are [ ] aerial (straight) miles from TNW.
Project waters are [ ] aerial(straight) miles from RPW.

☐ Project waters cross or serve as state boundaries.

Explain:

Identify flow route to TNW:[5]

Tributary Stream Order, if known:
Not Applicable.

(b) General Tributary Characteristics:
Tributary is:
Not Applicable.

Tributary properties with respect to top of bank (estimate):
Not Applicable.

Primary tributary substrate composition:
Not Applicable.

Tributary (conditions, stability, presence, geometry, gradient):
Not Applicable.

(c) Flow:
Not Applicable.

Surface Flow is:
Not Applicable.

Subsurface Flow:
Not Applicable.

Tributary has:
Not Applicable.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction:

High Tide Line indicated by:
Not Applicable.

Mean High Water Mark indicated by:
Not Applicable.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality;general watershed characteristics, etc.).
Not Applicable.

(iv) Biological Characteristics. Channel supports:
Not Applicable.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Not Applicable.

(b) General Flow Relationship with Non-TNW:
Flow is:
Not Applicable.

Surface flow is:
Not Applicable.

Subsurface flow:
Not Applicable.

(c) Wetland Adjacency Determination with Non-TNW:
Not Applicable.

(d) Proximity (Relationship) to TNW:
Not Applicable.

(ii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Not Applicable.

(iii) Biological Characteristics. Wetland supports:
Not Applicable.

3. Characteristics of all wetlands adjacent to the tributary (if any):
All wetlands being considered in the cumulative analysis:
Not Applicable.

Summarize overall biological, chemical and physical functions being performed:
Not Applicable.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Significant Nexus: Not Applicable

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE:

1. TNWs and Adjacent Wetlands:
Not Applicable.

2. RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

3. Non-RPWs that flow directly or indirectly into TNWs:[8]
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.
Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:
Not Applicable.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs:
Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:
Not Applicable.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional wetlands in the review area:
Not Applicable.

7. Impoundments of jurisdictional waters:[9]
Not Applicable.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS:[10]
Not Applicable.

Identify water body and summarize rationale supporting determination:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

F. NON-JURISDICTIONAL WATERS. INCLUDING WETLANDS

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements:

☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce:

☐ Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based soley on the "Migratory Bird Rule" (MBR):

☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (Explain):

☑ Other (Explain):

The review area, portion of TMK 233001016, consist entirely of uplands and is absent of waters of the U.S.

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (ie., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment:
Not Applicable.

Provide acreage estimates for non-jurisdictional waters in the review area, that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction.
Not Applicable.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD
(listed items shall be included in case file and, where checked and requested, appropriately reference below):

Data Reviewed	Source Label	Source Description
--Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant	Figure 1. Location Map/Figure 2. Concept. Site Plan	Figures submitted with letter: a) Figure 1. Location Map; and b) Figure 2. Conceptual Site Plan.
--U.S. Geological Survey map(s).	POH-2008-317 USGS + TMK + NWI Layer	TIG eGIS maps
--National wetlands inventory map(s).	POH-2008-317 - TMK NWI wetlands	TIG eGIS maps
--Photographs	-	-
----Aerial	POH-2008-317 - Satellite Imagery 04-06	TIG eGIS maps

B. ADDITIONAL COMMENTS TO SUPPORT JD:
Not Applicable.

---

[1]-Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2]-For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3]-Supporting documentation is presented in Section III.F.
[4]-Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5]-Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6]-A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]-Ibid.
[8]-See Footnote #3.
[9] -To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10]-Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

POH-2008-317

Tue Dec 23 09:56:11 UTC-1000 2008

Map Width = 1829 METERS

Map Height = 1220 METERS

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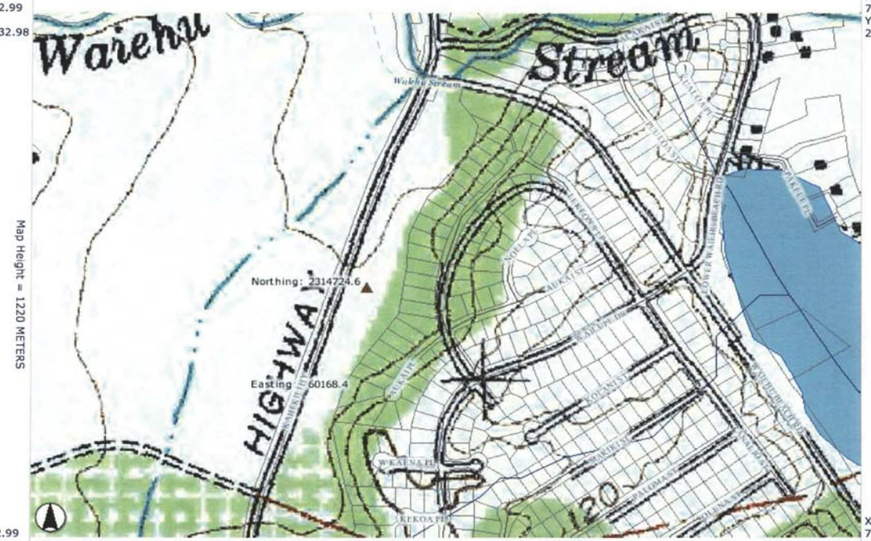
Y: 2315132.98

X: 760855.10
Y: 2315132.98



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Y: 2314357.94

X: 760855.10
Y: 2314357.94

Comment 1: TIG's eGIS map
Comment 2: USGS + TMK + NWI wetlands

POH-2008-317

Tue Dec 23 09:57:52 UTC-1000 2008

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Map Height = 1220 METERS

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X: 760855.10
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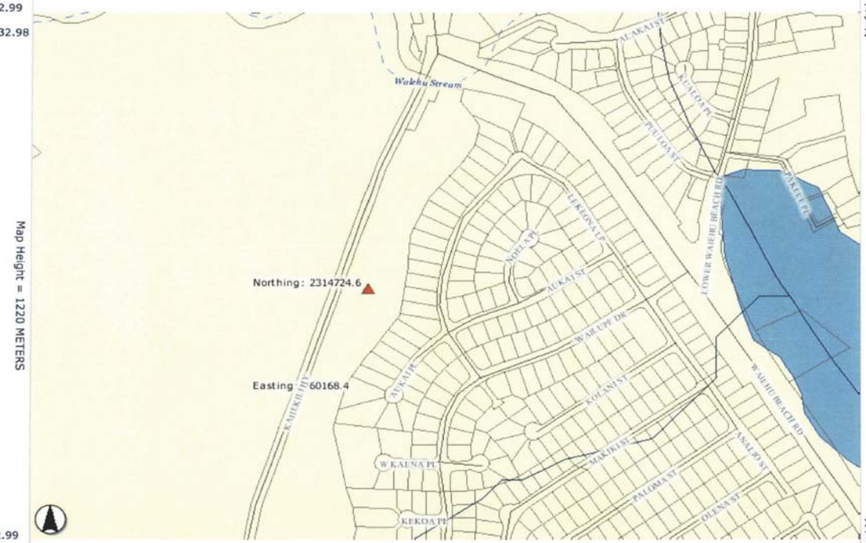

X: 759692.99
Y: 2314357.94

X: 760855.10
Y: 2314357.94

Comment 1: TIG's eGIS map
Comment 2: TMK + NWI wetlands

POH-2008-317

Tue Dec 23 10:00:07 UTC-1000 2008

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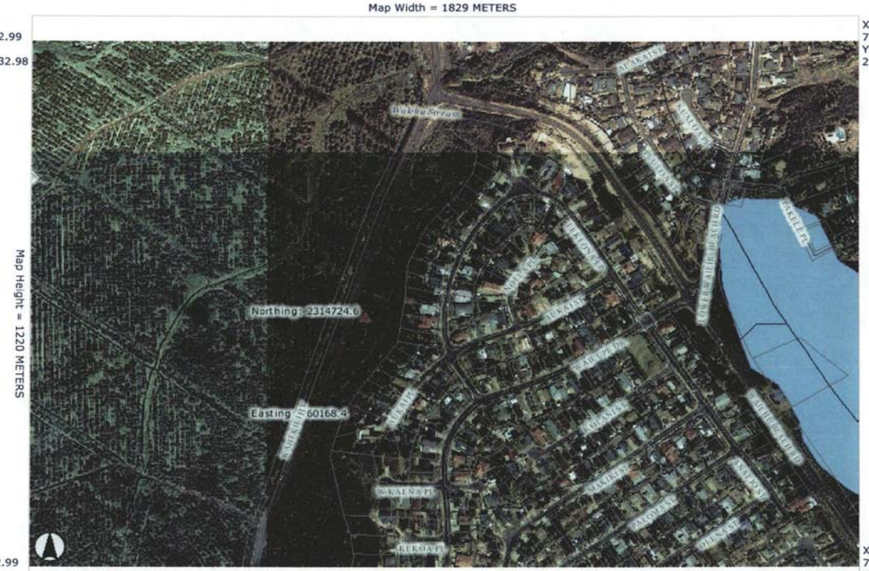

X: 759692.99
Y: 2314357.94

X: 760855.10
Y: 2314357.94

Comment 1: TIG's eGIS map
Comment 2: satellite imagery 2004-2006

BOTANICAL AND FAUNA SURVEY

APPENDIX E

BOTANICAL AND FAUNA SURVEY

for the

HALE MAHAOLU KE KAHUA AFFORDABLE HOUSING COMMUNITY

WAIEHU, MAUI, HAWAII

by

ROBERT W. HOBDY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
April 2020

Prepared for:
Highridge Costa Development Company

HALE MAHAOLU KE KAHUA AFFORDABLE HOUSING COMMUNITY

BOTANICAL AND FAUNA SURVEY

INTRODUCTION

The Hale Mahaolu Ke Kahua Affordable Housing Community project lies on 13.248 acres of old agricultural land TMK (2) 3-3-001:016 in Waiehu, West Maui along Kahekili Highway. The project area is a narrow strip of land stretching 0.5 miles between the east side of Kahekili Highway and the base of the sand dune on the west side of Waiehu Heights Subdivision (see Figure 1). This biological resource study was initiated in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The entire project area lies in the lee of a hundred foot tall lithified sand dune just south of Waiehu Stream at an elevation of about 160 feet above sea level. The area is on old agricultural land that was under sugar cultivation for over 100 years, and for the next 25 years the area has been a macadamia nut orchard. Today these mature trees cover the property. The soils are entirely of the Iao silty clay series, 0-3% slopes which are deep, well-drained alluvial soils (Foote et al, 1972). Rainfall averages 25 to 30 inches per year with the bulk falling during the winter months (Armstrong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Hale Mahaolu Ke Kahua Affordable Housing Community Project which was conducted in April 2020.

The objectives of the survey were to:

1. Document what plant and animal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure that all parts of the project area were covered. Areas most likely to harbor native or rare plants such as gullies were more intensively examined. Notes were made on plant species, distribution and abundance as well as on terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation on the property consists of a forest of macadamia nut trees (*Macadamia integrifolia*) with dense stands of Guinea grass (*Megathyrsus maximus*) along the margins. Other common species were koa haole (*Leucaena leucocephala*) and straggler daisy (*Calyptocarpus vialis*)

A total of 56 plant species were recorded during two site visits to the property. Of these only popolo (*Solanum americanum*) was a naturally occurring native Hawaiian plant, while an additional 3 native species: hao (*Rauvolfia sandwicensis*), `a`ali`i (*Dodonaea viscosa*) and keahi (*Sideroxylum polynesicum*) had been recently planted as part of a landscape plan on the northern end of the property. Also planted were 5 species of Polynesian introductions: `ulu (*Artocarpus altilis*), niu (*Cocos nucifera*), noni, (*Morinda citrifolia*), kukui (*Aleurites moluccana*) and milo (*Thespesia populnea*). The remaining 48 plant species were a mix of non-native former crop plants, ornamentals and weed species.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project area consists primarily of non-native species. One common and widespread indigenous species, pōpolo occurs naturally on forest margins, and three additional native species have been planted in the landscape. None of these species are federally listed as Threatened or Endangered under the Endangered Species Act (USFWS, 1999), nor are any of them candidates for such status.

An Endangered plant, the creeping naupaka (*Scaevola coriacea*), is known to inhabit road cuts along Waiehu Beach Road on lithified sand dunes about 1,000 feet to the east of the northern tip of this property with a larger population occurring about 3,000 feet to the north on another sand dune. None of this preferred habitat occurs within the project area and no creeping naupaka were found during the survey within the project area. No special plant habitats were identified here either.

Because of the above existing conditions there is little of botanical concern on this property, and the proposed project is not expected to have a significant negative impact on the botanical resources in this part of Maui.

The only recommendation that is offered, is that there are a number of native plant species that might be incorporated into the landscape design that would lend a distinctive accent to the project. Ideas for appropriate species for this habitat can be found in the Maui County Planting Plan or can be obtained from nursery growers who specialize in native plants.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within two groups: Monocots and Dicots. Taxonomy and nomenclature of the plants are in accordance with Wagner et al. (1999) and Staples & Herbst (2005).

For each species, the following information is provided:

1. Scientific name with author citation

2. Common English or Hawaiian name.

3. Bio-geographical status. The following symbols are used:

   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and, also to one or more other geographic area(s).

   Polynesian = those plants brought to the islands by the Polynesians in the course of their migrations.

   non-native = all those plants brought to the islands intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   abundant = forming a major part of the vegetation within the project area.

   common = widely scattered throughout the area or locally abundant within a portion of it.

   uncommon = scattered sparsely throughout the area or occurring in a few small patches.

   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
ARECACEAE (Palm Family)			
Cocos nucifera L.	niu, coconut palm	Polynesian	rare
CYPERACEAE (Sedge Family)			
Cyperus gracilis R.Br.	McCoy sedge	non-native	uncommon
MUSACEAE (Banana Family)			
Musa acuminata x balbisiana Colla	banana	non-native	uncommon
POACEAE (Grass Family)			
Axonopus compressus (Sw.) P. Beauv.	broad-leaved carpetgrass	non-native	rare
Cenchrus purpureus (Schum.) Morrone	Napier grass	non-native	rare
Chloris barbata (L.) Sw.	swollen fingergrass	non-native	rare
Cynodon dactylon (L.) Pers.	Bermuda grass	non-native	rare
Digitaria ciliaris (Retz.) Koeler	Henry's crabgrass	non-native	uncommon
Digitaria insularis (L.) Mez ex Ekman	sourgrass	non-native	rare
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
DICOTS			
ACANTHACEAE (Acanthus Family)			
Asystasia gangetica (L.) T. Anderson	Chinese violet	non-native	uncommon
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	rare
APOCYNACEAE (Dogbane Family)			
Rauvolfia sandwicensis A. DC.	hao	endemic	rare
ASTERACEAE (Sunflower Family)			
Ageratum conyzoides L.	maile hohono	non-native	uncommon
Calyptocarpus vialis Less.	straggler daisy	non-native	common
Gamochaeta purpurea (L.) Cabrera	purple cudweed	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	uncommon
Synedrella nodiflora (L.) Gaertn.	nodeweed	non-native	uncommon
Tridax procumbens L.	coat buttons	non-native	rare
BIGNONIACEAE (Bignonia Family)			
Spathodea campanulata P. Beauv.	African tulip tree	non-native	rare
BORAGINACEAE (Borage Family)			
Carmona retusa (Vahl) Masam.	Fukien tea	non-native	rare
BRASSICACEAE (Mustard Family)			
Lepidium virginicum L.	pepperwort	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
CARICACEAE (Papaya Family)			
Carica papaya L	papaya	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea obscura (L.) Ker Gawl.	obscure morning glory	non-native	rare
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	rare
EUPHORBIACEAE (Spurge Family)			
Aleurites moluccana (L.) Willd.	kukui	Polynesian	rare
Codiaeum variegatum (L.) Blume	croton	non-native	rare
Euphorbia hirta L.	hairy spurge	non-native	rare
Ricinus communis L.	castor bean	non-native	uncommon
FABACEAE (Pea Family)			
Caesalpinia pulcherrima (L.) Sw.	`ōhai ali`i	non-native	uncommon
Canavalia cathartica Thouars	maunaloa	non-native	uncommon
Desmodium triflorum (L.) DC.	three-flowered beggarweed	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	common
Macroptilium atropurpureum	siratro	non-native	uncommon
Neonotonia wightii (Wight & Arnott) Lackey	glycine	non-native	uncommon
Samanea saman (Jacq.) Merr.	monkeypod	non-native	rare
LOGANIACEAE (Logania Family)			
Fagraea berteroana Benth.	puakenikeni	non-native	rare
MALVACEAE (Mallow Family)			
Hibiscus rosa-sinensis L.	Chinese hibiscus	non-native	rare
Malvastrum coromandelianum (L.) Garcke	false mallow	non-native	uncommon
Thespesia populnea (L.) Sol. ex Correa	milo	Polynesian	rare
MORACEAE (Mulberry Family)			
Artocarpus altilis (L.) Fosberg	`ulu, breadfruit	Polynesian	rare
Ficus microcarpus L. fil.	Chinese banyan	non-native	rare
MORINGACEAE (Drumstick Family)			
Moringa oleifera Lamarck	horseradish tree	non-native	rare
MYRTACEAE (Myrtle Family)			
Psidium guajava L.	common guava	non-native	uncommon
Syzygium cumini (L.) Skeels	Java plum	non-native	rare
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	scarlet spiderling	non-native	uncommon

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
PAPAVERACEAE (Poppy Family)			
Argemone mexicana L.	Mexican poppy	non-native	rare
PHYLLANTHACEAE (Phyllanthus Family)			
Phyllanthus debilis Klein ex Willd.	niruri	non-native	rare
Phyllanthus tenella Roxb.	long-stalked phyllanthus	non-native	rare
PROTEACEAE (Protea Family)			
Macadamia integrifolia Maiden & Betche	macadamia nut	non-native	common
RUBIACEAE (Coffee Family)			
Gardenia taitensis A. P. DeCandolle	Tahitian gardenia	non-native	rare
Morinda citrifolia L.	noni	Polyneisan	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	`a`ali`i	indigenous	rare
SAPOTACEAE (Sapodilla Family)			
Sideroxylum polyneisicum (Hillebr.) Anderb.	keahi	indigenous	rare
SCROPHULARIACEAE (Snapdragon Family)			
Buddleia asiatica Lour.	dogtail	non-native	rare
SOLANACEAE (Nightshade Family)			
Solanum americanum Mill.	pōpolo	indigenous	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. In addition, an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

Mammals

No mammal species were observed during two site visits to the property.

While not seen during the survey, rats (*Rattus* spp.), mice (*Mus domesticus*), Mongoose (*Herpestes auropunctatus*), feral cats (*Felis catus*) and domestic dogs (*Canis familiaris*) would be expected to occur within this type of habitat. Rats and mice feed on seeds, fruits and fallen macadamia nuts, while mongoose and cats are predators of these rodents and birds.

A special effort was made to look for any occurrence of the native Hawaiian hoary bat by making an evening survey on the property. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent. In addition, a bat detection device (Batbox IIID) was employed set to the frequency of 27,000 hertz which this bat species uses for echolocation when searching for nocturnal flying insect pray. No bats were detected.

BIRDS

Birdlife was moderate in species diversity in this mostly forested habitat. Eleven species were observed during two site visits. Taxonomy and nomenclature follow American Onithologists' Union (2020). Two species were common. The zebra dove (*Geopelia striata*) and the common chicken (*Gallus gallus*). Less common were the northern cardinal (*Cardinalis cardinalis*), spotted dove (*Streptopelia chinensis*), house finch (*Carpodacus mexicanus*) and common myna (*Acridotheres tristis*). Five species were of rare occurrence. One indigenous native bird was seen, kōlea or Pacific golden plover (*Pluvialis fulva*), which is a common migratory species that breeds in the arctic and overwinters in Hawaii and other Pacific islands.

INSECTS

Insect life was moderate in diversity. Just eight species were observed during two site visits. Taxonomy and nomenclature follow Nishida et al (1992). Two species were common, the beet webworm moth (*Spoladea recurvalis*) and the southern house mosquito (*Culex quinquefasciatus*). Three insects were less common, the Asian spiny-backed spider (*Gasteracantha mammosa*), the dung fly (*Musca sorbens*) and the cabbage butterfly (*Pieris rapae*). Three others were of rare occurrence. One indigenous native dragonfly was seen, the pinao or globe skimmer (*Pantala flavescens*), which is a common species in Hawaii and in many other tropical parts of the world.

DISCUSSION AND RECOMMENDATIONS

Most of the fauna observed are common and widespread non-native species. Just two common native species were observed here, the kōlea bird and the pinao dragonfly. Neither of these are of any particular environmental interest or concern. No federally listed Threatened or Endangered mammal, birds or insect species were recorded during the course of the survey and no special fauna habitats were identified.

While no protected seabirds, the `ua`u (*Pterodroma sandwichensis*) and `a`o (*Puffinus newelli*), were found on the property. They are known to overfly the area at dawn and dusk to their burrows high in the mountains between the months of March and November. In late fall the young birds fledge from their burrows to take their first tentative flight out to sea. These inexperienced birds are easily confused and distracted by bright lights and often crash to the ground where they are particularly vulnerable to being run over by vehicles or killed by predators. It is recommended that any significant outdoor lighting such as streetlights or flood lights that are incorporated into the project design be shielded to direct the light downward so that it is not visible from above.

As a result of the above findings, the proposed changes in land use are not expected to have a significant negative impact on the fauna resources in this part of Maui.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within three groups: Mammals, Birds and Insects. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.

   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).

   non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

   migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.

4. Abundance of each species within the project area:

   abundant = many flocks or individuals seen throughout the area at all times of day .

   common = a few flocks or well scattered individuals throughout the area.

   uncommon = only one flock or several individuals seen within the project area.

   rare = only one or two seen within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MAMMALS			
none seen			
BIRDS			
ARDEIDAE (Heron Family)			
Bubulcus ibis L.	cattle egret	non-native	rare
CARDINALIDAE (Cardinal Family)			
Cardinalis cardinalis L.	northern cardinal	non-native	uncommon
CHARADRIIDAE (Plover Family)			
Pluvialis fulva Gmelin	Pacific golden-plover	indigenous	rare
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	common
Streptopelia chinensis Scopoli	spotted dove	non-native	uncommon
ESTRILDIDAE (Estrildid Finch Family)			
Lonchura malacca L.	chestnut mannikin	non-native	rare
Padda oryzivora L.	Java sparrow	non-native	rare
FRINGILIDAE (Cardueline Finch Family)			
Carpodacus mexicanus Muller	house finch	non-native	uncommon
PHASIANIDAE (Pheasant Family)			
Francolinus pondicerianus Gmelin	gray francolin	non-native	rare
Gallus gallus L.	common chicken	non-native	common
STURNIDAE (Starling Family)			
Acridotheres tristis L.	common myna	non-native	uncommon

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order ARANAE - true spiders			
ARANEIDAE (Orb Weaver Family)			
Gasteracantha mammosa Koch	Asian spiny-backed spider	non-native	uncommon
Order DIPTERA - flies			
CULICIDAE (Mosquito Family)			
Culex albopictus Skuse	day mosquito	non-native	rare
Culex quinquefasciatus Say	southern house mosquito	non-native	common
MUSCIDAE (Housefly Family)			
Musca sorbens Wiedemann	dung fly	non-native	uncommon
Order HEMIPTERA - true bugs			
CIXIIDAE (Cixciid Planthopper Family)			
Pentastiridius leporinus L.	lacewing planthopper	non-native	rare
Order LEPIDOPTERA - butterflies, moths			
CRAMBIDAE (Grass Moth Family)			
Spoladea recurvalis Fabricius	beet webworm moth	non-native	common
PIERIDAE (White & Sulfer Butterfly Family)			
Pieris rapae L.	cabbage butterfly	non-native	uncommon
Order ODONATA - dragonflies, damselflies			
LIBELLULIDAE (Skipper Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer	non-native	rare

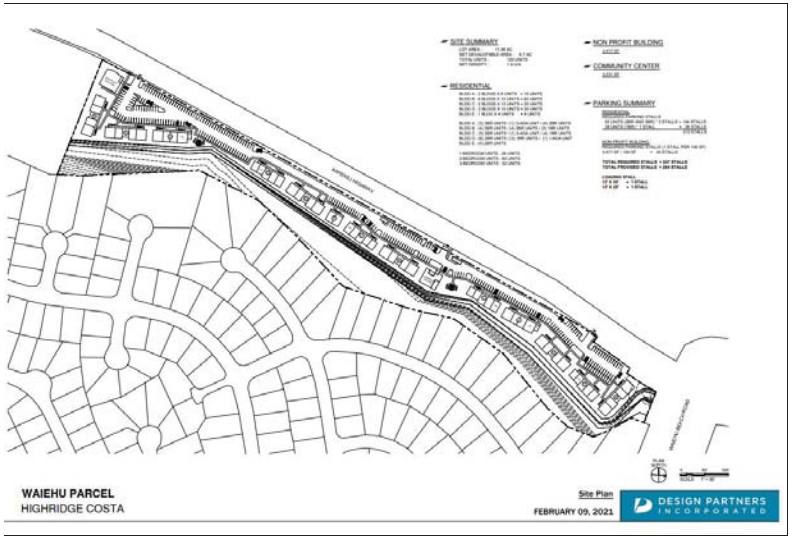

FIGURE 1. Project Map

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REQUEST FOR STATE HISTORIC PRESERVATION DIVISION LETTER OF DETERMINATION

APPENDIX

F

MICHAEL P. VICTORINO
Mayor

LORI TSUHAKO
Director

LINDA R. MUNSELL
Deputy Director

DEPARTMENT OF HOUSING
& HUMAN CONCERNS
COUNTY OF MAUI
2200 MAIN STREET, SUITE 546
WAILUKU, MAUI, HAWAI'I 96793
PHONE: (808) 270-7805

October 15, 2020

Dr. Alan S. Downer, Administrator
Department of Land and Natural Resources
State Historic Preservation Division
Kakuhihewa Bldg., Suite 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Dr. Downer:

SUBJECT: Request for State Historic Preservation Division (SHPD) Letter of Determination (pursuant to Hawaii Administrative Rules [HAR] § 13-275-3) for the Waiehu Affordable Housing Development Project, Waiehu Ahupua'a, Wailuku District, Maui, TMK: [2] 3-3-001:106

The County of Maui Department of Housing and Human Concerns (DHHC) is submitting the subject project for review under Hawai'i Revised Statutes 6E-8.

Project Description
The 100% affordable housing project will involve the construction of 120 residential units including 30 1-bedroom units, 58 2-bedroom units, and 32 3-bedroom units as well as a 3,500 ft² non-profit building, a 3,000 ft² community center, two parking stalls per each residential unit (250 total stalls), and 35 additional stalls for the non-profit building. The project is being developed in cooperation with Maui Economic Opportunity, Inc. (MEO) and Hale Mahaolu. The project will focus on providing housing for Maui residents earning 60% or less of the area median income. Project-related ground disturbance will include excavation for structural footings, parking lots, pathways, entryways, and associated utility connections and infrastructure. This work will occur throughout the flat portion of the project area along Kahekili Highway. There are no plans for ground disturbance of the sand dune slope that defines the eastern boundary of the project area.

Identification of Historic Properties
No historic properties have been identified within the project area. The project area was the subject of an archaeological inventory survey including subsurface testing with negative findings (Shefcheck and Dega 2008). The archaeological inventory survey (termed an archaeological assessment due to negative findings) was reviewed and accepted by the SHPD on 13 June 2008 (Log No.: 2008.2334; Doc. No.: 0806PC23). The archaeological inventory survey recommended archaeological monitoring for ground altering activities on the subject property.

Evaluation of Significance
No historic properties have been identified within the project area, therefore there has been no assessment of significance.

Determination of Effects to Significant Historic Properties
While no buried historic properties were identified within the project area during the subsurface testing sample conducted by Shefcheck and Dega (2008), previous archaeological studies in the vicinity have documented the potential for buried cultural deposits and human burials in this region. The DHHC proposes additional mitigation in order to provide the SHPD with sufficient information to make a project effect determination for this project.

Mitigation Commitments
The DHHC proposes on-site archaeological monitoring for all project-related ground disturbance related to the Waiehu Affordable Housing Development Project. Included in this submittal is a draft archaeological monitoring plan for review and acceptance by the SHPD.

A cultural impact assessment is also being prepared for the subject project to identify potential impacts to on-going cultural practices within the project area. The cultural impact assessment will be included in the project's environmental assessment.

Sincerely,

LORI TSHAKO, LSW, ACSW
Director of Housing and Human Concerns

Enclosures:
1. SHPD HRS 6E Form
2. TMK Map
3. Project Concept Plan
4. Archaeological Assessment Report (Shefcheck and Dega 2008)
5. SHPD Review Letter of Shefcheck and Dega (2008)
6. SHPD Fee Form
7. Draft Archaeological Monitoring Plan (Yates et al. 2020)

ACCEPTANCE LETTER FROM STATE HISTORIC PRESERVATION DIVISION

APPENDIX

F-1

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

LAURA H. THIELEN
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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

June 13, 2008

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813

LOG NO: 2008.2334
DOC NO: 0806PC23
Archaeology

Dear Dr. Dega:

SUBJECT: Chapter 6E-42 Historic Preservation Review of a Revised Archaeological Assessment for Approximately 11.75 Acres Located in Waiehu Waiehu Ahupua'a, Wailuku District, Island of Maui, Hawai'i TMK: (2) 3-3-001: por. 016

Thank you for the opportunity to review this revised report, which our staff received on June 12, 2008 (Shefcheck and Dega 2008): *An Archaeological Assessment of Approximately 11.75 Acres in Waiehu*...Scientific Consultant Services, Inc.

The report was first reviewed by SHPD staff on May 20 of 2008, resulting in two requested revisions (SHPD LOG NO: 2007.4178; DOC NO: 0805PC32). The most recent version of the report was reviewed in hardcopy format to confirm completion of previously requested revisions and suggestions.

The report now contains the required information as specified in HAR §13-276-5 regarding the contents of inventory survey level work conducted in general, and is acceptable.

Should you have any questions or comments regarding this review, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon, Archaeologist and Acting Archaeology Branch Chief
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

ARCHAEOLOGICAL ASSESSMENT

APPENDIX F-2

0306PC23

SCS Project Number 889-2

AN ARCHAEOLOGICAL ASSESSMENT OF APPROXIMATELY 11.75 ACRES LOCATED IN WAIEHU AHUPUA`A, WAILUKU DISTRICT, ISLAND OF MAUI, HAWAI`I [TMK: (2) 3-3-001: por. 016]

Prepared by:
Donna M. Shefcheck, B.A.
and
Michael F. Dega, Ph.D.
Revised June 2008

Prepared for,
Maui Economic Opportunity, Inc.
99 Mahalani Street
Wailuku, HI 96793

SCIENTIFIC CONSULTANT SERVICES Inc.

711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813

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ABSTRACT

An Archaeological Inventory Survey, inclusive of pedestrian survey and representative testing, was conducted on approximately 11.5 acres of undeveloped land in Waiehu Heights, Waiehu Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-3-001: 016 (por.)]. This property is located at the border of the Waiehu Heights Subdivision and is known as Lot 1C of the Paukukalo Large-Lot Subdivision. The lot is currently vacant, but may have been used in the past for sand mining (Hawaiian Cement) and stockpiling of excess materials during the construction of the Waiehu Heights Subdivision itself. Modern disturbance to the project area ground surface includes extensive grubbing and grading, and the presence of macadamia nut trees indicates that it was at one time part of a larger macadamia nut farm. The proposed undertaking is to develop the subject property into an affordable housing residential subdivision.

No archaeological sites were identified during the Inventory survey. As such, the current report is being written as an Archaeological Assessment. While the current project yielded only negative results, sandy substrate was documented in the southern half of the project parcel. It remains possible that subsurface archaeological sites such as burials and/or habitation deposits do occur within the project area. Given the high number of burials and other culturally significant subsurface deposits in the surrounding area, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities. As such, Archaeological Monitoring was recommended for all construction related ground altering activities on the subject property.

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INTRODUCTION

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey on approximately 11.5 acres of land in the Paukukalo Large Lot Subdivision (Lot 1-C), Waiehu Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-3-001: 016 (por.)] (Figures 1, 2 and 3). This property is located in between the existing Waiehu Heights Subdivision and Kahekili Highway. The general area was previously mined for sand by Hawaiian Cement and used as a stockpiling area for excess materials during the construction of the Waiehu Heights Subdivision (Dagher and Dega 2006). The parcel is currently vacant and undeveloped.

The current Inventory Survey yielded only negative results after both full pedestrian survey and representative testing. This document (an Archaeological Assessment Report follows an Archaeological Inventory Survey during which no historic sites or cultural materials are identified) includes historic background research and settlement pattern analysis prior to fieldwork and the results of systematic pedestrian survey and representative mechanical testing. Fieldwork was conducted October 29 through November 2, 2007 by SCS archaeologist David Perzinski, B.A. under the overall direction of Michael Dega, Ph.D. (Principal Investigator).

The Archaeological Assessment Survey was conducted in accordance with the State of Hawaii Department of Land and Natural Resources Historic Preservation Division (SHPD), as outlined in Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, and State Historic Preservation Rules in order to determine the presence/absence of archaeological sites and features in surface and subsurface contexts through complete systematic survey and representative subsurface testing. The ultimate goals were to determine the presence/absence of historical sites, to provide adequate recordation and documentation of all historic sites present, to determine the significance of these sites, and to provide recommendations to the SHPD concerning site significance and mitigation in lieu of future land use in the project area.

ENVIRONMENTAL SETTING

LOCATION

The current project area is an approximately 11.5 acre property located in Waiehu Ahupua`a, Wailuku District, Island of Maui [TMK (2) 3-3-01: 016 (por.)] (see Figures 1 and 2). The project area is roughly rectangular in shape, with its long axis oriented approximately North-South. Kahekili Highway bounds the area to the east, to the west are existing residential homes, to the south open, undeveloped land, and to the north lies Waiehu

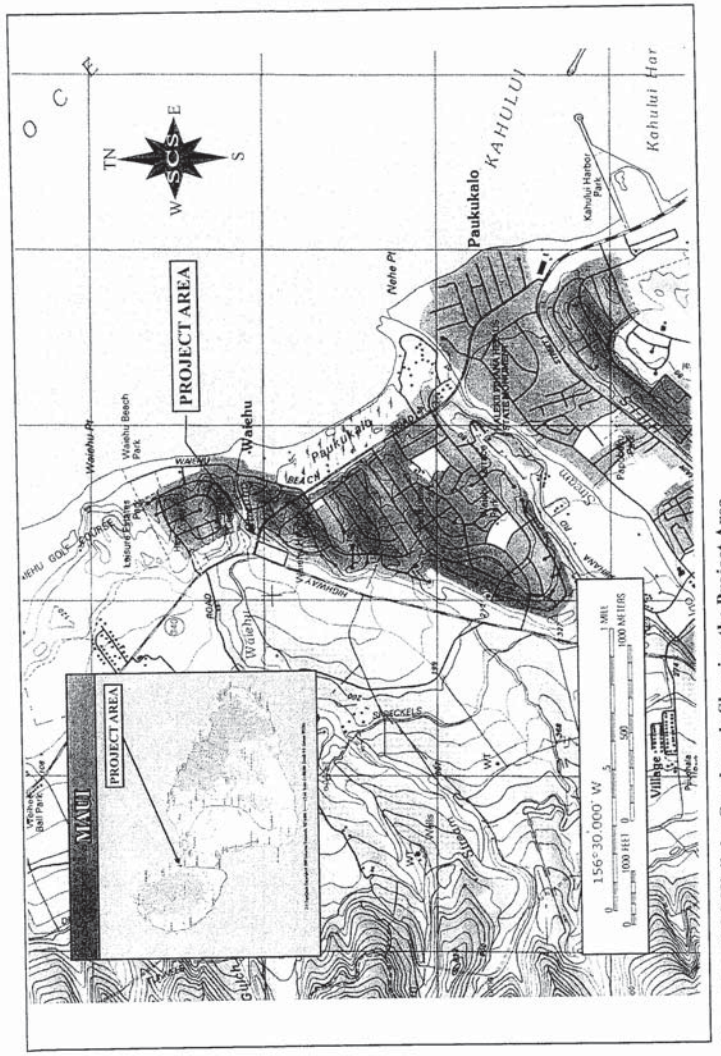

Figure 1: USGS Wailuku Quadrangle Showing the Project Area.

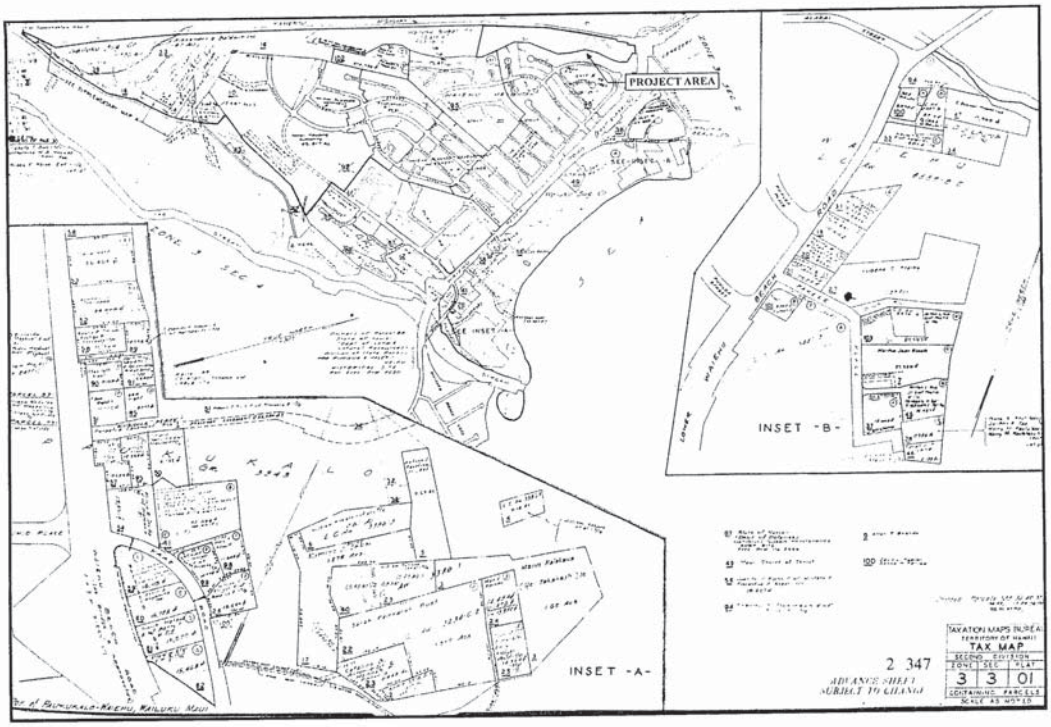

Figure 2: Tax Map Key [TMK] Showing the Project Area.

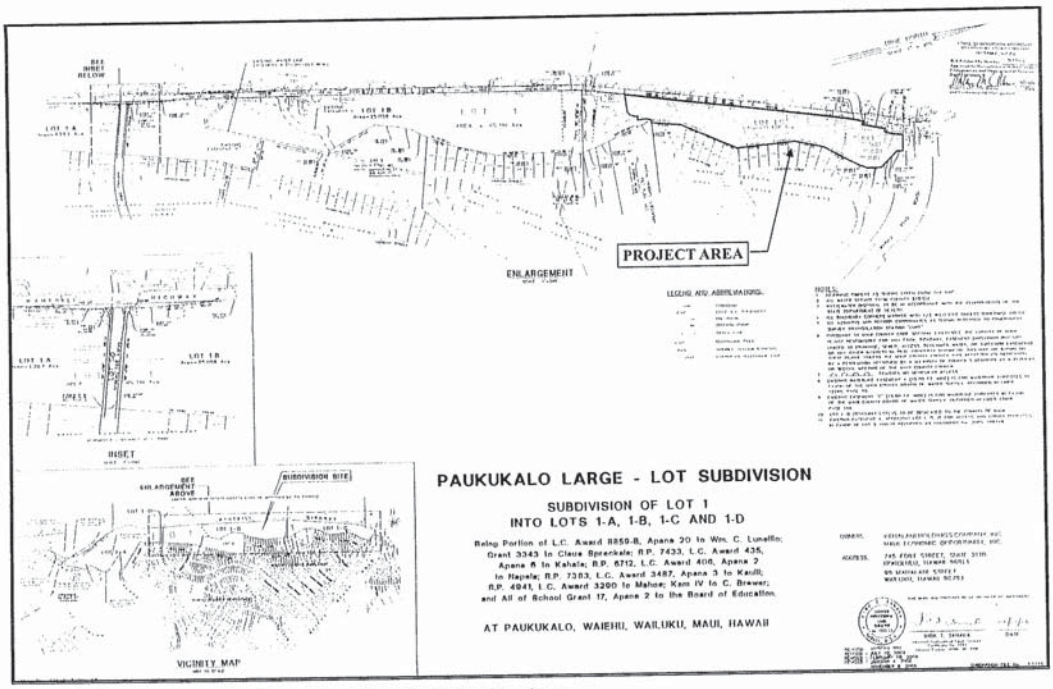

Figure 3: Development Plan View Map Showing the Project Area.

Beach Road. The lot is located approximately 140 feet amsl (above mean sea level) and approximately 2 kilometers from the shore of Paukukalo Beach. Several geographic landmarks dot the surrounding area. As there is a lot of rainfall in Waiehu, it goes without saying that there are many streams, ditches and drainages in the general vicinity of the project area. The most notable of these are Iao Stream, to the south of the project parcel, and Waiehu Stream and Spreckels Ditch to the west. A large coral reef fringes the coastline creating shallow fishing waters and protected inshore pools ideal for marine collecting. Traditional occupation of the area, believed to have been dense and continuous throughout Hawaiian history, is denoted geographically by Haleki`i and Pihana Heiau, which lie south of the project area on the banks of `Īao Stream.

Historic grubbing and grading has nearly leveled the study parcel and an old access road runs through center, paralleling Kahekili Highway. The western portion of the site is within a pre-existing macadamia nut orchard and contains a grove of macadamia nut trees (*Macadamia integrifolia*), dense cane grass and sparse *koa haole* (*Leucaena leucocephala*). A large amount of modern trash (appliances, car parts, glass jars, etc.) is scattered throughout the project area.

According to Foote *et al*. (1972) the project area is located in the Puuone Sand (PZUE) deposit. In general, this soil series occurs in the lower uplands of the island of Maui with elevation ranging from 50 to 350 feet above mean sea level (amsl). These soils are comprised of somewhat over-drained soils, which have been formed from materials originating in coral and marine shell. The PZUE soil association is found in the south half of the project area. The north half consists of Iao clay (IcB), a soil type that is found on alluvial fans and valley bottoms.

TRADITIONAL AND HISTORIC SETTING

Archaeological settlement pattern data indicates that initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas between the A.D. 4th and 11th centuries of the main islands, with populations eventually settling into drier leeward areas at later periods (Kirch 1985). Coastal settlement was still dominant, but populations began exploiting and living in the upland *kula* zones. Greater population expansion to inland areas did not occur until the c. A.D. 12th century but continued through the 16th century. Large scale or intensive agricultural endeavors were implemented in association with habitation. Coastal lands were used for settlement and taro was cultivated in near-coastal reaches and in the uplands.

THE TRADITIONAL PERIOD

According to W.D. Alexander (in Strerling 1998:91) the *ahupua`a* of Waiehu and Waihe`e were independent lands which did not belong to a particular district (*moku*). Thus, they were referred to as Na Poko. It was only during modern times that these lands were divided into a district. In reference to the origination and meaning of the name Waiehu, Sterling quotes Cheever (in Sterling 1998:63) who states that the name Waiehu translates as "…where the combatants smoked with dust and perspiration…" and refers to a battle or battles which occurred in the area. Pukui *et al.* (1974:221) offer another interpretation of Waiehu as meaning "water spray". This area is also known for having strong winds. The winds of Waiehu are said to be "Makani-hoo`eha-ili, the winds that hurt the skin" (Rebecca Nuuhiwa, Audio Collection in Sterling 1998:62). Although Pukui (*ibid*) interprets the meaning of Makani-hoo`eha-ili as "love disturbance" and the rains of Waiehu have been called "the fine mist" [Ka wai Kilioopu o Waihee] (Hyde in Sterling 1998:5).

Traditionally, the entire area from Wailuku Valley north to Waihe`e Valley was part of an old land division named Na Wai Eha ('The Four Streams'), referring to several great valleys draining the slopes of West Maui. This was said to be the most expansive area of continuous *kalo* (*taro*) pond-field agriculture in the Hawaiian Islands.

> Waiehu is the second valley of the famous Na Wai Eha of western Maui, and it is watered by twin streams. The cane fields now extend throughout this region, continuously from Waihe`e on the lower slopes; but above Waiehu and Puakala from the upper roads following the irrigation ditches well toward the upper limits of the cane, a few old plantations still persisted in 1934. Some were used for raising wet taro, some for truck gardening. However, except for these few patches the old terraces of the upper slopes are entirely ploughed under (Handy and Handy 1972:496–7).

Before the historic era, it is highly likely that much of Waiehu Ahupua`a was extensively modified by terraces and irrigation ditches, from just mauka the near-coastal sand dunes to the high upper valleys. The present project area is situated *makai* of the probable lower limits of this extensive *lo`i* system. Later in time, much of these uplands were transformed into commercial sugar cane fields, which resulted in the destruction of innumerable terraces, irrigation ditches, and associated features.

We can infer from Walker's discussion in Sterling (1998:66) regarding the sandy ground in neighboring Waihe`e Ahupua`a being frequently used as a burial site that the same may be true for the sandy soils of Waiehu Ahupua`a:

> The long sandy ridge near the shore at Waihee was another favorite burial ground. The erosion of the sand banks frequently exposes burials, but the bones are quickly disturbed and scattered so that their original position of burial cannot be determined. Modern graveyards occupy several sites along the crest of this ridge.

KNOWN *HEIAU* IN THE VICINITY

A large number of *heiau* were recorded by Thrum (in Sterling 1998) and Walker (1931) between Waihe`e and Wailuku which attest the importance of this area during traditional times. All of the documented *heiau* in Waiehu Ahupua`a, are located inland and *mauka* of the project area. The relatively large number and variety of named *heiau*, which included a *luakini heiau* (high chief-sacrificial shrine) in Paukūkalo built by Kahekili, indicates a substantial settled population in the region. Most of these *heiau* were completely or almost completely destroyed by the early 20th century.

Documented *heiau* in Waiehu Ahupua`a include:

- Halelau Heiau (Walker Site 37), located well inland (*mauka*) of the coast—apparently destroyed by a more recent cemetery.
- Malumaluakua Heiau (Walker Site 39), located at the head of the Waiehu Gulch, well inland (mauka) of the coast—possibly a sacrificial shrine, although there was no stone construction (e.g., walls and/or platforms) present, which Walker suggested may have been a local variant: "In this region a *heiau* seems to mean merely a scared spot not marked necessarily by either walls or platforms of stone" (Walker 1931:142).
- Kukuikomo Heiau (Walker Site 40), located on the ridge between North and South Waiehu Gulches, well inland (mauka) of the coast—another possible example of a shrine lacking observable rock architecture.
- Puukoa Heiau (Walker Site 41), located "[n]ear pond on ridge south of Waiehu Camp. Destroyed." (Walker 1931:144)

In addition, Poaiwa Pu`uhonua (a place of refuge) was located in Waiehu Ahupua`a (Thrum in Sterling 1998:12). Walker also documented Pihani and Haleki`i Heiau within Wailuku Ahupua`a (southeast of the current project area), on the north side of `Īao Valley near the mouth of `Īao Stream (*ibid.* 31–144). In more recent decades, the archaeological significance of these important *heiau* has been determined through testing (Yent 1983), restoration, and preservation.

HISTORIC SETTING OF THE PROJECT AREA AND ENVIRONS

LAND TENURE

The land tenure system in prehistoric Hawai`i was rooted in a different epistemological framework than the subsequent colonially-imposed framework that is understood today as land ownership. The idea of holding land was not synonymous with owning it, but is described as closer to a trusteeship between the *ali`i nui* (ruling chiefs) of the island and the traditional Hawaiian *akua* (gods) Lono and Kane (Handy and Handy 1972:41). Each island was divided into *moku* (districts) that were solely geographical subdivisions. The number of these *moku* depended upon the size of each island. Moku were partitioned into smaller landholding units known as *ahupua`a* that were governed by *ali`i* or designated *konohiki*. The *ahupua`a* varied in size, but ideally encompassed land from the mountain to the sea, providing the chiefs and *maka`ainana* (people who cultivated the land) with the opportunity to recover both terrestrial and marine resources. All persons from chiefs to commoners were entitled to portions of these resources (Chinen 1961:5).

The prehistoric/traditional period in the Hawaiian Islands came to an end with the arrival of Captain Cook on Kaua`i in 1778. The years to follow would drastically change the political, agricultural, and social relationships and patterns of the Hawaiian Kingdom. Destabilization of Hawaiian society was further intensified by the profound reformation of traditional land systems. In 1848, the Māhele curtailed communal access to land. The Māhele system led to the introduction and implementation of privatization that required both chiefs and commoners to retain private land title (Kame`eleihiwa 1992). If properly informed of the procedures, Hawaiians were permitted to claim lands on which they had worked or lived.

> While LCA (Land Court Awards) establish historic land utilization in Hawai`i (during the Māhele), documented testimony from many land recipients have also demonstrated continuous generational occupation of the land. Settlement patterns illustrated in the LCA records highlight the multi-functional land use practices related to habitation and agriculture and perhaps the clear connection of these strategies. By mid-century, the fledgling [Hawaiian] Kingdom undertook the single most significant inducement to cultural change, the Great Māhele or division of lands between the king, chiefs, and government, establishing land ownership on a Western-style, fee-simple basis. From this single act, an entire restructuring of the ancient social, economic, and political order followed [Kirch 1985:309].

Under the Māhele and the first Land Commission of the Trust Territory of Hawai`i, lands were allocated in three ways. A third of all lands became Crown Lands belonging to the *ali`i*, a

third was distributed to the chiefs, and a third was awarded to the general populace, which were represented by a large portion of foreigners as well as Hawaiians during this time. The first Land Commission was formed in 1845, during which time all individuals holding land were now required by new Western notions of law to submit their claims or forfeit their land.

The subject parcel is part of a large land claim awarded to William Lunalilo (LCA 8559B*M). This land claim included land parcels throughout Maui, Hawai`i Island, Oahu, Molokai and Kaua`i (Appendix A). Some of these lands were subsequently granted to the government.

HISTORIC ERA

According to Dorrance and Morgan (2000), the entire Na Wai Eha area from Wailuku Valley north to Waihe`e Valley, including Waiehu, was a major sugar cane cultivation zone from the lower slopes of the West Maui highlands to the near-coast area. The destruction of pre-Contact and early historic sites by commercial sugar cane operations was widespread and highly effective, as probably hundreds (if not thousands) of rock formations (e.g., habitations, agricultural features, *heiau*, burials, and other types of sites) were ploughed to create fields.

Commercial sugar cane cultivation in the neighboring Waihe`e Valley began in 1862 when Captain J. Hobron acquired land from T.H. Hobron to build the Waihe`e Sugar Mill (Donham 1989). By 1865, the Waihee Sugar Company was producing over 700 tons of sugar and 45,000 gallons of molasses per year. Production continued into the early 20th century. The Waihee Dairy and Farm, located along the coast, was established in 1919. The dairy closed in 1967. Sugar cane production was widespread throughout this region by the late 19th century to early 20th century. As a result of growth in the sugar cane industry, two irrigation ditches (Spreckels Ditch and the Waihe`e Ditch) were constructed in the late 19th century to early 20th century to channel water south from the Waihe`e Stream to nearby fields.

PREVIOUS ARCHAEOLOGY

As the project area is situated just *mauka* (west) of Paukukalo, south of Waihe`e Ahupua`a, and north of Wailuku Ahupua`a, these areas are broadly relevant to a review of previous archaeological research. The northern terminus of Wailuku Ahupua`a, which borders Waiehu Ahupua`a to the south, is relevant since a significant number of important sites have been identified. Cordy *et al.* (1978) have proposed a general settlement model for the area that includes temporary habitation and wetland agriculture in the upper valleys and elevations. Permanent habitation associated with *heiau* and burials are said to be found in the lower valleys

and at the coast. Cordy et al. (1978) suggest that the coast and lower valleys were first settled by A.D. 300 to 600, although thus far the earliest radiocarbon dates are significantly later than this. Bordner (1983) stated that the sand dunes of Waiehu and environs were a prime location for burials, and, in general, that extreme caution should be taken in developing these areas. As described above, Walker (1931) recorded many religious shrines within Waiehu Ahupua`a the vicinity of the project area, as well as villages and burial grounds in coastal settings just north of the project area.

The current study stands to gain more insight into the project area's historical and traditional land use via an examination of previous archaeology in the northeastern reaches of Wailuku District (Figure 4) (Table 1). Previous archaeological research in the eastern portion of Wailuku, Waiehu, and Waihe`e Ahupua`a is more relevant to the current study than research in areas to the south or west due to a shared topography, climate, land use, and settlement pattern.

Research at the State Historic Preservation Division (SHPD) indicated that the 1973 statewide inventory of known historic sites provided documentation on several burial sites in what is now the Waiehu Golf Course. The following descriptions are based on original site files available at the SHPD (in Kapolei). Site 50-50-04-1185 (designated the Waiehu Dune burials on original feature forms) was a burial site containing the remains of at least 33 human burials. The site is located at the top of the consolidated sand dune immediately west of the fairway of the fifth hole, at the Waiehu Municipal Golf Course, and the burials were exposed by natural, aeolian (wind) erosion. Some of the burials were associated traditional artifacts and midden. According to Donham (2003), this site has been preserved to prevent further erosion.

Site 50-50-04-1188 (designated the 'Golf Course Burials' on the original feature forms; designated Ma-D10-13 in B.P. Bishop Museum files) was a burial site consisting of "human skeletal remains eroding out of a sand bank along the northwest side of the service road in the Waiehu Municipal Golf Course. Human remains were found in three places along a 14-m stretch of the sand bank located about 65 m northwest of the maintenance building near the middle of the golf course" (SHPD 1973). The remains were reported as "fragmentary" (SHPD 1973).

The earliest archaeological endeavors in the Wailuku-Waiehu environs were undertaken by Thrum (1917), Stokes (1918), and Walker (1931). Although their archaeological finds do not directly pertain to the current project area, their data allows for a deeper understanding of the traditional use of the Wailuku-Waiehu area.

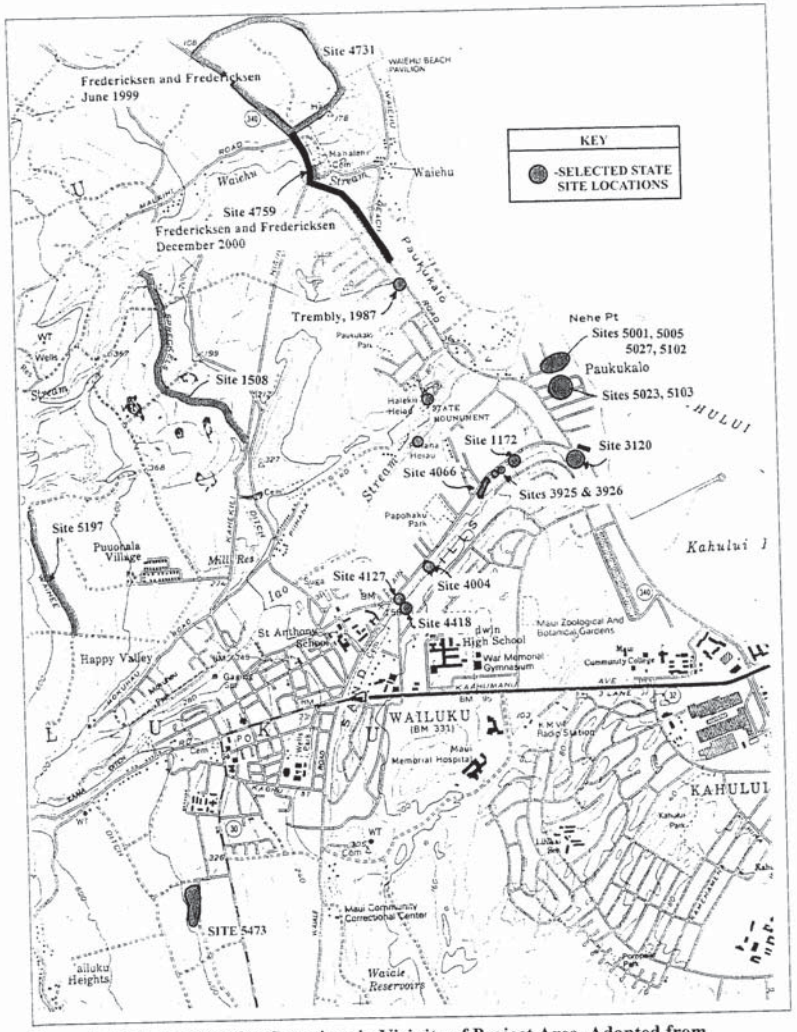

Figure 4: Selected State Site Locations in Vicinity of Project Area. Adapted from Fredericksen and Fredericksen 2002: Map 5.

Table 1: Selected Archaeological Research in the Vicinity of the Project Area.

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua'a	Nature of Work	Findings/Site #
2006	Fortini, W.R. and M.F. Dega	Residential Construction at 955 Puuloa Street, Waiehu TMK: 3-3-10:12	Monitoring	No new sites.
2006	Dagher, C. and M. Dega	Residential Development at TMK: 3-3-001:102 and 016	Assessment	No new sites.
2005	Monahan, C.	Waiehu Golf Course (Maintenance Building Project) TMK: 3-2-13: 06 With Addendum Added	Inventory Survey	Test units and backhoe trenches found nothing of archaeological significance on 1.5 acres. Addendum discusses two additional areas of subsurface testing in and near project area. Two new sites identified (50-50-04-5661, subsurface possible platform probably dating to late 18th or early 19th century, and 50-50-04-5662, subsurface asphalt road/cart path remnant dating to or around 1930).
2004	Wilson, J and M.F. Dega	240.087 Acres Located in Waiehu and Wailuku TMK: 3-3-02:001 por	Inventory Survey	1 previously identified site (50-50-07-1508, Spreckels Ditch) & 6 new sites (50-50-04-5522 through -5527) Sites include plantation-era sites, isolated lithic and marine shell finds, historic complex. C-14 data
2004	Fredericksen , D. and E.	Phase II of the Paukukalo 8-inch Waterline Replacement along Lilihua Place, Wailuku	Inventory Survey	Relocated previously identified site (50-50-04-5005, pre-Contact near coastal habitation site with associated human burials. Site utilized into early post-Contact period. Includes C-14 data
2003	Dr. Melissa Kirkendall, SHPD Maui Island Archaeologist, personal communication	Waiehu	Monitoring	In June 2003 Archaeological Services Hawaii, LLC conducted archaeological monitoring on the current project area during sand mining operations performed by Hawaiian Cement. During the monitoring activities human skeletal remains were identified
2003	Fredericksen, E.	Portion of Land in Waiehu, Waiehu Ahupua'a, Wailuku District TMK: 3-2-20: Por 47, Lot 9A	Monitoring	No new sites.
2003	Dega, M.F.	Kehalani Mauka Subdivision, in Wailuku near Waikapu TMK: 3-5-001:001	Inventory Survey	8 historic sites documented on 349 acres, two of which were previously recorded (50-50-04-5473, -5474, -5197, -5489, -5490, -5491, -5492, -5493), including a reservoir, ditches, historic-modern roadways, historic artifact scatter, plantation-era clearing mounds
2003	Donham, T.K.	Residential Construction at 1376 Kakae Place, Waiehu. TMK: 3-2-20:64	Archaeological Assessment	Negative results: no evidence of cultural material; monitoring not recommended

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua'a	Nature of Work	Findings/Site #
2002	Fredericksen, E. and D.	Puuohala Mauka Residential Subdivision, Wailuku Ahupua'a TMK: 3-3-2:001	Inventory Survey	4 sites, two previously unrecorded: a plantation-era boulder/retaining wall/platform (-5195), and coral/shell surface midden scatter (-5196); also the known historic Waihee Ditch (-5197) and Spreckels Ditch (-1508)
2000	Fredericksen, D. and E.	Waiehu Kou Residential Sewer Line Corridor TMK: 3-2-3	Inventory Survey	Habitation site with 3 burials (-4759)
1997	Fredericksen, E.	North Waihee Water Source Project, Phases I and II, along Kahekili Highway through both Waihee and Waiehu Ahupua'a. (Area *mauka* of highway to water tank.)	Monitoring	No cultural deposits: Area under sugarcane cultivation for more than a century
1996	Dixon, B.	Inadvertent Discovery of Human Skeletal Remains at 741 Kuhio Place, Wailuku TMK: 3-3-06:47	Field Inspection	Site 50-50-04-1812, human skeletal remains representing single individual. Remains partially removed in 1985.
1996	Jones, B., J. Pantaleo, and A. Sinoto	North Waihee Wells Waterline Project	Inventory Survey	5 Sites: rock terrace (-3196); rock terrace along Waihee Stream (-3199); 3 surface scatters of artifacts, midden, and *'ili 'ili* stones (-3197); 533 m long wall (-3198); Waihee Bridge foundation (-4097)
1993	Griffin, A.	Inadvertent Burial Discovery	Field Inspection	Site 50-50-04-3139, human skeletal remains representing 2 individuals
1992	Donham, T.	Waiehu Golf Course	Data Recovery	2 flexed burials were removed from eroding sand dune (-1189)
1992	Donham, T.	Waiehu Kou I Residential Development	Data Recovery	Burial (-2917) found in storm drain line excavation and re-interred 3.3 mbs
1992	Folk, W. and H. Hammatt	Waiehu Beach lots TMK: 3-2-13:05	Inventory Survey	Surface survey and 9 backhoe trenches produce no cultural material other than 2 buried charcoal lenses (-3115) ranging from A.D. 1300s–1600s
1991	Griffin, A.	Archaeological Assessment of a 3.1 Acre Parcel Proposed Phase 4 Residential Lots, Paukukalo TMK: 3-3-06:52 por	Field Inspection	Identified 2 new sites (2 caves and surface shell midden and artifact scatter. Determined area significant and important to understanding sociopolitical history of Maui. Recommended relocating development site.
1990a	Kennedy, J.	Portion of the Piihana District, Piihana TMK: 3-3-1:16 Por.	Subsurface Testing	No new sites.
1990b	Kennedy, J.	TMK: 3-4-30:11 Subdivision "C" Located at Paukukalo	Inventory Survey	No new sites.
1989	Donham, T.	Waihee Golf Club	Inventory Survey	270-acre project area found 88 sites with 195 components, including structures, surface midden, lithic scatters, agricultural and residential complexes, ceremonial features, 4 cemeteries, and 4 isolated human graves. Dates from A.D. 960–1330 to modern times.
1990c	Kennedy, J.	Survey and Subsurface Testing for Proposed Grading Project TMK: 3-3-01:16 por.	Archaeological Survey	No new sites.

Year	Author	Project / Location within Waiehu, Paukukalo, or Wailuku Ahupua'a	Nature of Work	Findings/Site #
1988	Clark, D. and J.F. Baliki	Waihee Midden Site	Inventory Survey	Coastal dune site: 4 fire hearths, 4 fire floors, an *imu*, a rock alignment, and artifact clusters. One date of A.D. 1010–1150 from 2.0 mbs.
1987	Trembly, D.	Waiehu Planned Development	Monitoring	Remains of 6 individuals displaced by construction along Waiehu Beach Road
1983–1984	Yent, M.	Halekii-Piihana State Monument: Phase I, Waiehu	Survey, Test Coring	Halekii (-4592): *ili-ili* stones, shell, charcoal. No evidence of cultural deposit earlier than construction date. Piihana (-4592): ili-ili stones, shell, human and pig bone, human burial left in situ.
1983	Bordner, R.	Waiehu housing Development, Environmental TMK: 3-3-01:10, 92	Survey, Excavation	Historic military features only.
1978	Cordy, R.	Waihee Stream Hydroelectric power project	Survey	Numerous sites. Formulated model for predicting general location for 6 functional sites types: temporary and permanent habitation sites, dryland and wetland agriculture, burials, and *heiau*
1978	Kelly, M., Y. Sinoto, and R. Cordy	Waiehu Heights Subdivision	Survey, Data Recovery	Over 20 historic coffin burials exposed during bulldozer activity in dune area
1931	Walker, W.	*Archaeology of Maui*	Island-wide investigation	Among other records, documents 5 *heiau* in Waiehu and 13 *heiau* in Waihuku
1918	Stokes, J.F.G.	". . . Heiau of Maui."	Island-wide investigation	Among other records, documents *heiau* in Wailuku District
1917	Thrum, T.G.	"Maui's Heiau . . ."	Island-wide investigation	Description of Wailuku's Piihana Heiau, among other records

(Table1: Adapted from Fredericksen and Fredericksen 2000:12–13, 2002:12–13).

EXPECTED FINDINGS

Based on traditional Hawaiian settlement patterns, previous archaeological research, and historical activities in the project area, expected findings for this Inventory Survey were as follows:

1. There was a relatively high probability of finding pre-Contact (and possibly early Historic Period) Native Hawaiian burials due to the project area is being located in the Puuone Sand deposit which is known to be a traditional internment site for Native Hawaiian burials. There was also a relatively high probability of finding redeposited (i.e., previously disturbed) human skeletal remains, given that previous use of the project area involved ground disturbing activities including, sand mining by Hawaiian Cement and stockpiling of excess materials during the construction of the Waiehu Heights Subdivision.

2. There was a relatively high probability of finding subsurface evidence of traditional Native Hawaiian and/or early historic activities including: hearths, postholes, midden deposits, and other occupation debris (e.g., stone tool waste, discarded fishing gear).

3. There was essentially no expectation of finding any historically-significant sites or features on the present ground surface due to the fact that the ground surface has been extensively grubbed and graded.

METHODOLGY

FIELD METHODOLOGY

Multiple tasks were completed during this project. First, systematic pedestrian survey of the entire project area was conducted by SCS archaeologist David Perzinski in order to identify and document any and all Historic and/or Traditional archaeological features, and assess the nature and extent of landscape modification. Survey also allowed for assessing areas amenable for testing. Following pedestrian survey, 17 stratigraphic trenches of various distances were mechanically excavated to basal strata throughout the project area (Figure 5). Written and photographic documentation of stratigraphy occurred during all trenching activities. None of the excavated sediments were screened as no artifacts or cultural deposits were encountered during excavation work. Representative stratigraphic profiles were completed following the termination of each trench.

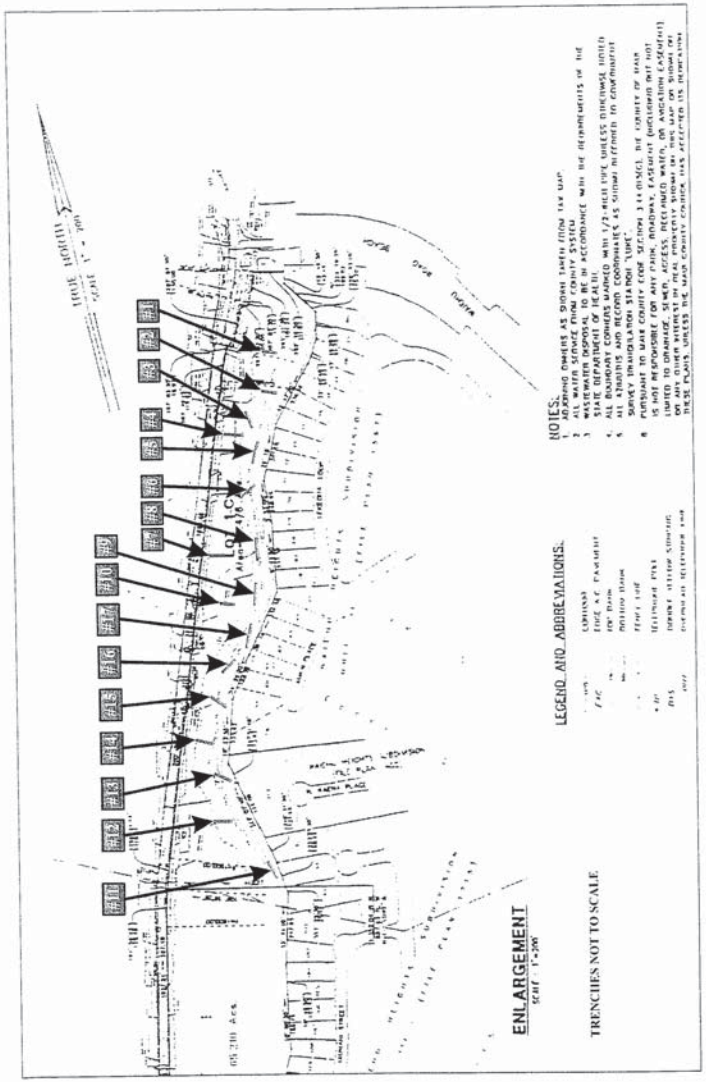

Figure 5: Tax Map Key Showing Location of Stratigraphic Trenches.

LABORATORY METHODOLOGY

Due to the negative results of this project, laboratory work was primarily limited to stratigraphic profile and map drafting as well as report production. All field notes from this project are being curated at the SCS laboratory in Honolulu.

RESULTS

No archaeological features or deposits were identified either on the ground surface or in subsurface contexts during the current project. The absence of sites on the surface may be attributed partly to previous grubbing of the landscape during sand mining (Dagher and Dega 2006) and the general lack of surface sites in this area. The excavation sample, while fairly intensive, also failed to yield cultural materials. It is possible that cultural deposits do occur in subsurface contexts as 100% of the parcel was not tested, as is the case with archaeological sampling.

Two stratigraphic profiles are representative of the project area as a whole (Figure 6). On the north side of the project area, subsurface deposits consisted of two layers. Layer I (0-40 cmbs) is a dry; very dark grayish brown (10 YR 3/2); silt loam. This deposit is weak, fine to medium granular structure with no plasticity, no cementation, and contains abundant roots and rootlets. The lower boundary is clear and smooth. Layer II (40-BOE) was a dry, brown (10 YR 4/3) slightly hard silt, with medium platy structure, no plasticity and no cementation.

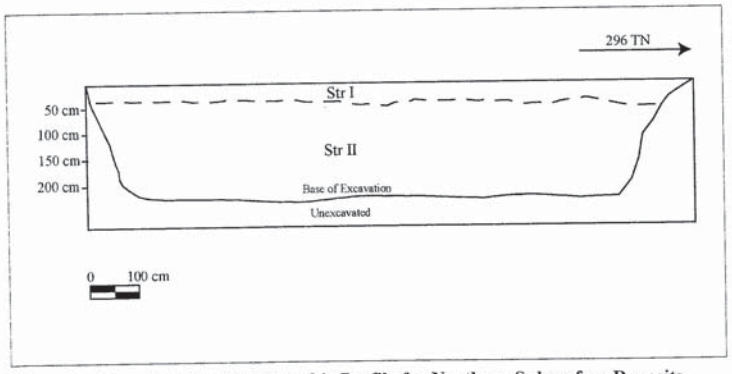

Figure 6: Representative Stratigraphic Profile for Northern Subsurface Deposits.

In the southern portion of the project area three strata were documented (Figure 7). Layer I (0-10 cmbs) consists of a dry, very dark grayish brown silt loam similar to that found in Layer I in the northern half of the project area. Also like its counterpart in the northern section, Layer II (10-120 cmbs) is a brown (10 YR 4/3), slightly hard silt, medium platy structure with no plasticity and no cementation. The lower boundary of this layer is abrupt and wavy. Layer III (120 cmbs to BOE) consists of pale brown (10 YR 6/3) loose silty sand with no structure, no plasticity, and contains few waterworn pebbles and cobbles.

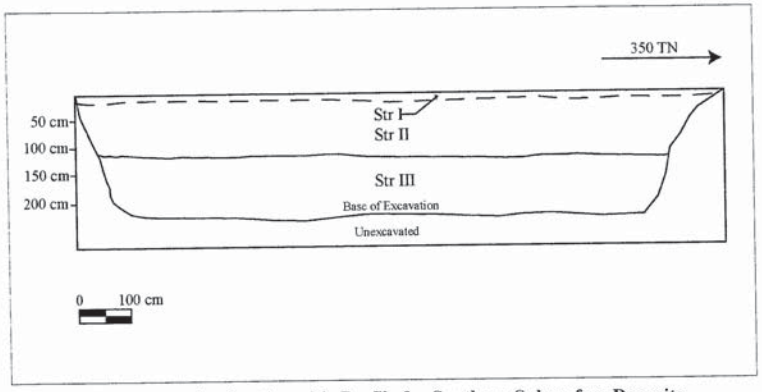

Figure 7: Representative Stratigraphic Profile for Southern Subsurface Deposits.

RECOMMENDATIONS

Although no significant sites or cultural materials were identified during this project, trenching showed that original sand (Puuone Sand) deposit are present in the southern half of the project area, particularly below 120 cmbs, a finding that is consistent with the Foote *et al.* (1972) soil survey map. The presence of sandy matrix and the high number of burials and other culturally significant subsurface deposits in the surrounding area suggest the likelihood for the discovery of archaeological sites, such as burials and/or habitation sites, in the subsurface deposits of the project area. Thus, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities.

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APPENDIX A

Waihona `Aina

Review Cart & Checkout

DOCUMENT DELIVERY Change password Log out

Mahele Database Documents
Number: 08559B*M

Claim Number:	**08559B*M**		
Claimant:	**Lunalilo, William C.**		
Other claimant:	Kanaina, Charles for King		
Other name:			
Island:	**Maui**		
District:	**Lahaina, Kaanapali, Wailuk**		
Ahupuaa:	**Polanui, Kalimaohe, Kuholilea, Aki, Paeohi, Waianae, Honolua, Pepee, Waiehu 2, Kaapahu**		
Ili:	**Luaehu, Ahikuli**		
Apana:	**13**	Awarded:	**1**
Loi:		FR:	
Plus:		NR:	
Mala Taro:		FT:	**82v16**
Kula:		NT:	
House lot:	**1**	RP:	**5637, 5639, 5699-2, 7664,**
Kihapai/Pakanu:		Number of Royal Patents:	**13**
Salt lands:		Koele/Poalima:	**No**
Wauke:		Loko:	**No**
Olona:		Lokoia:	**No**
Noni:		Fishing Rights:	**No**
Hala:		Sea/Shore/Dunes:	**No**
Sweet Potatoes:		Auwai/Ditch:	**No**
Irish Potatoes:		Other Edifice:	**No**
Bananas:		Spring/Well:	**No**
Breadfruit:		Pigpen:	**No**
Coconut:		Road/Path:	**Yes**
Coffee:		Burial/Graveyard:	**No**
Oranges:		Wall/Fence:	**No**
Bitter Melon/Gourd:		Stream/Muliwai/River:	**No**

Sugar Cane:		Pali:	**No**
Tobacco:		Disease:	**No**
Koa/Kou Trees:		Claimant Died:	**No**
Other Plants:		Other Trees:	
Other Mammals:	**No**	Miscellaneous:	**government road**

No. 8559B*M, (W.C. Lunalilo) C. Kanaina
F.T. 551-552v3

W.H. Uana, sworn, says he knows the house lot of Lunalilo, in Kaluaaha, Molokai. It is bounded:

Mauka by the public road
On the Halawa side by a fish pond of the government called "Neaupala"
Makai by the sea beach
On Kaluaakoi side by a government fish pond called "Kaluaaha."

This lot formerly was ordered to be enclosed by Hoapili wahine and Kekauluohe when Eseta Kipa was Governess of Molokai. The people of Kekauluohi's lands erected a stone house on this lot in the year 1835. It is now in possession of Lunalilo as heir of Kekauluohi.

E. Kipa, sworn says, she knows the lot. I was Governess of Molokai under Hoapili wahine & Kekauluohi in former times, and by their orders enclosed this lot and built a stone house on it with the labor of the people of their own lands. When the government sold the land of "Kaluaaha" to the Missionaries, I heard Kalolou come and ask permission from Kanaina to live in the stone house, which permission she got.

(A. Paki sets up a claim for this lot as heir of Kalaolou.)

L. Haalelea, sworn says, he knows the house lot claimed by Lunalilo in Kailua, Hawaii. It is bounded:

On Kiholo side by the church lots
Makai by the public road
On Keauhou side by a road leading mauka
Mauka by some house lots.

It is enclosed by a wall. This lot I have heard belonged formerly to Keaho, the father of Mahuka. I have heard that when Keaho died he left this lot to Kekauluohi, and I have recently seen a letter from Mahuka to W.C. Lunalilo requesting him to allow Mahuka to retain charge of this lot under Lunalilo. In 1843 I was at Kailua & Kekauluohi was there. I then saw the later Governor Adams give her some money which he said was rent received for this same lot. Part of this lot is claimed by the heir of W.P. Leleiohoku. There is a fence remaining though and dividing the lot into two parts.

F.T. 82-84v16 and N.T. 82-84v16
No. 8559B, William C. Lunalilo

Polea, sworn says, he knows the lots claimed by William C. Lunalilo, at Lahaina, Maui.

The first called Luaehu, is bounded as follows:
Mauka by Kaiheekai and Hiram's land
Olowalu by King's land
Makai by Sea beach
Kaanapali by Polea and M.J. Nouliau [Nowlien].

The second in Pakala is bounded as follows:
Mauka by Public street
Olowalu by Kaiheekai's land
Makai by H.S. Swinton's and others' land

Kaanapali by Public road.

The third lot called Hawaikaekea is also bounded as follows:
Mauka by Kalaleikio's land
Olowalu by Public road
Makai by Alaloa Kahiko street
Kaanapali by Daniela Ii's land.

This lot is disputed by Maunahina the wife of George Shaw, whose claim in right of her father. She has already got an award for a part of this lot.

The fourth lot in Paunau is bounded as follows:
Mauka by Keaweiheuhu's and Kahula's land
Olowalu by Keaweluaole's land
Makai by Old road
Kaanapali by Street leading to Lahainaluna.

The fifth lot called Loinui is bounded as follows:
Mauka by Keaweluaole; Kauhi and Kalolou's land
Olowalu by Mr. Baldwins
Makai by Old road
Kaanapali by Kamakinui's land.

The sixth lot in Aki is bounded as follows:
Mauka by Kaweka's land
Olowalu by Wahie's land
Makai by Main road
Kaanapali by M.I. Nowlein's land.

The seventh lot in Puunoa is bounded as follows:
Mauka by Main road
Olowalu by Iosua Kaeo
Makai by Iosua Kaeo
Kaanapali by King's land.

The eighth lot in Kelawea is bounded as follows:
Mauka by Lahainaluna
Olowalu by Road from the beach
Makai by Keleikini and Kahookano's lands
Kaanapali by A stream.

All these lots have descended to William C. Lunalilo from his mother, Kekauluohi, and are now in the hands of his lunas. The lot in "Pakala" is disputed by Paki and others.

N.T. 185-187v10
No. 8559B, William Charles Kanaina, [for Lunalilo], Honolulu, 24 April 1850

COPY
Greetings to you Highness, John Young, the Minister of Interior.
My desire is to have the government claim separated from my lands; therefore I hereby give some of my land for the government to have forever and the same shall apply to mine. Here are the names of my lands:

Kawela ahupuaa, Hamakua, Hawaii.
Waikaekoe ahupuaa, Hamakua, Hawaii.
Makapala ahupuaa, Kohala, Hawaii.
Kehena ahupuaa, Kohala, Hawaii.
Puhau ili of Iole, Kohala, Hawaii.

Puakoa ili of Waimea, Kohala, Hawaii.
Honuainonui ahupuaa, Kona, Hawaii.
Puapuanui ahupuaa, Kona, Hawaii.
Lehuulanui ahupuaa, Kona, Hawaii.
Kawainui ahupuaa, Kona, Hawaii.
Lanihaunui ahupuaa, Kona, Hawaii.
Pakiniili ahupuaa, Kau, Hawaii.
Hanuapo ahupuaa, Kau, Hawaii.
Kahanalea ahupuaa, Puna, Hawaii.
Keahialaka ahupuaa, Puna, Hawaii.
Keaau ahupuaa, Puna, Hawaii.
Makahanaloa ahupuaa, Hilo, Hawaii.
Pepekeo ahupuaa, Hilo, Hawaii.

Kaapuhu ahupuaa, Kipahulu, Maui.
2 Waiehu, Puali, West Maui.
Ahipuli [Ahikuli] ili for Waiehu, West Maui.
Pepee ili for Wailuku, West Maui.
Honolua ahupuaa, Kaanapali, Maui.
Kalimaohe ahupuaa, Lahaina, Maui.
Polanui ahupuaa, Lahaina, Maui.
Kuholilea ahupuaa, Lahaina, Maui.

Waialua ahupuaa, Kona, Molokai.
Kawela ahupuaa, Kona, Molokai.

Pau ili for Waikiki in Manoa, Kona, Oahu.
Kamoku ili for Waikiki in Manoa, Kona, Oahu.
Kaluaokau ili for Waikiki in Manoa, Kona, Oahu.
Kapahulu ili for Waikiki in Manoa, Kona, Oahu.
Kaalaea ahupuaa, Koolaupoko, Oahu.
Kapaka ahupuaa, Koolauloa, Oahu.
Laiewai ahupuaa, Koolauloa, Oahu.
Laiemaloo ahupuaa, koolauloa. Oahu.
Pahipahialua, Koolauloa, Oahu.

Kahili, Koolauloa [sic], Koolau, Kauai.
Kalihiwai, Koolauloa [sic], Koolau, Kauai.
Pilauwai, Koolauloa [sic], Koolau, Kauai.
Manuahi ili, Kona, Kauai.
Waipouli ahupuaa, Puna, Kauai.

These lands listed above shall be for me fee simple forever, it would not be right for the government to claim my land.

The following lands, I shall give to the government fee simple forever.
Kapulena ahupuaa, Hamakua, Hawaii.
Kukuihaele ahupuaa, Hamakua, Hawaii.
Auau ahupuaa, Kohala, Hawaii.
Keopuhuikahi ahupuaa, Kona, Hawaii.
Papaakoko ili of Honokohau, Kona, Hawaii.
Ninole ahupuaa, Kau Hawaii.
Laepaoo ahupuaa, Puna, Hawaii.
Koae 1 ahupuaa, Puna, Hawaii.
Koae 2 ahupuaa, Puna, Hawaii.
Laeapuki ahupuaa, Puna, Hawaii.
Kaiuiiki ahupuaa, Hilo, Hawaii.
Kahuku ahupuaa, Hilo, Hawaii.

(apana 24); Land Patent 8397; Kuholilea Lahaina; 2 ap.; 184. 5 Acs; (apana 26); R.P. 5637; Paunau Lahaina; 1 ap.; 2 roods 24 perkas (apana 4); R.P. 5639; Aki Lahaina; 1 ap.; 16 perkas (apana 6); no R.P.; Paeohi Lahaina; 1 ap.; 1 Ac. 52 rods; R.P. 5699; Loiniu (Luaehu Waianae) Lahaina; 2 ap.; 2.75 Acs 37 rods; Land Patent S-8597; Kaapahu Kipahulu; 1 ap.; (ahupuaa, apana 19);1480 Acres; no R.P. Ahikuli Waiehu (apana 21); Land Patents 8537; Waiehu Wailuku; Por. apana 20; .205 Ac; Land Patent 8546; Waiehu Wailuku, Portion Apana 20, .41 Ac.; Land Patent S-8654; 2 Waiehu Wailuku, Por. apana 20; 27,797 square feet;(Hawaii) R.P. 478; Pakiniiki Kau; 1 ap.; 2357 Acs; Makanaloa Hilo; 2 ap.; 7600 Acs; R.P. 7049; Honuapo Kau; 1 ap.; ahupuaa 2200 Acs; Honuaino nui; 1 ap.; 262 Acs; R.P. 7454; Kawainui iki Kona; 1 ap.; 380 Acs; R.P. 7455; Lehuula nui; 1 ap.; 290 Acs; Lehuula nui; 1 ap.; 2840 Acs; Puapuaanui Kona; 1 ap.; 370 Acs; R.P. 7680; Kahena 2 N. Kohala; 1 ap.; (ap.4); ahupuaa; Puako S. Kohala; 1 ap.; Iliaina (Ap.6); Kahaualea Puna; 1 ap.; 26,000; Keahialaka Puna; 1 ap.; 5562 Acs; Pepeekeo Hilo; Keaau Puna; 1 ap.; 64.275 Acs; Kawela Hamakua; R.P. 7434 Honuainonui N. Kona; R.P. 7456; Lanihau Nui Kona; Land Patent 8452; Waikoekoe Hamakua; no R.P.; Makapala Kohala; R.P. 7192 Makanaloa Hilo; 2 ap.; 7600 Acs; (Molokai) R.P. 7655; Waialua; R.P. 7656 Kawela; (Oahu); R.P.; 7635; Kamoku Waikiki; Land Patents 8193, 8311 & 8416; Pau Waikiki; Land Patent 8124 & 8165 (see Kapahulu award); Land Patent 8124; Kapahulu Kona; 1 ap.; 31.50 Acs; Land Patent 8165; Kapahulu Kona; 2 ap.; 2,184.44 Acs; R.P. 7652; Kalauakou Waikiki; R.P. 7531; Kaalaea Koolaupoko; R.P. 7494; Laie-wai Koolauloa; Laie-maloo Koolauloa; R.P. 5688; Pahipahialua Koolauloa; no R.P.; Kapaka Koolauloa; (Kauai) Land Patent 8173; Kalihiwai Halelea; no R.P. Manuahi Hanapepe; Land Patent 8323; Kahili Koolau; R.P. 7060; Pilaa Koolau; R.P. 7373; Waipouli Puna; See 8559 to C. Kanaina who is awarded a property at Ukumehame under 8559B; see also Award 277]

ARCHAEOLOGICAL MONITORING PLAN

APPENDIX

G

Draft

Archaeological Monitoring Plan for the Hale Mahaolu Ke Kahua Housing Community in Waiehu, Waiehu Ahupuaʻa, Wailuku District, Maui Island, TMK: [2] 3-3-001:106

Prepared for
Waiehu Housing LP

Prepared by
Angela L. Yates, B.S.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.
Wailuku, Hawaiʻi
(Job Code: WAIEHU 5)

April 2021

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Management Summary

Reference	Archaeological Monitoring Plan for the Hale Mahaolu Ke Kahua Housing Community in Waiehu, Waiehu Ahupuaʻa, Wailuku District, Maui Island, TMK: [2] 3-3-001:106 (Yates and Hammatt 2020)
Date	April 2021
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: WAIEHU 5
Investigation Permit Number	CSH will likely complete the archaeological monitoring fieldwork under archaeological fieldwork permit number 20-07, issued by the Hawaiʻi State Historic Preservation Division (SHPD) per Hawaiʻi Administrative Rules (HAR) §13-13-282.
Agencies	SHPD; County of Maui Department of Housing and Human Concerns (DHHC)
Land Jurisdiction	Maui Economic Opportunity, Inc. (MEO)
Project Funding	MEO; County of Maui
Project Location	The project area comprises TMK: [2] 3-3-001:106 in Waiehu Ahupuaʻa within Wailuku District on Maui Island. It is bounded west by Kahekili Highway, north by Waiehu Beach Road, and east by the Waiehu Heights Subdivision. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	The 100% affordable housing project will involve the construction of 120 residential units, including 28 1-bedroom units, 60 2-bedroom units, and 32 3-bedroom units as well as a 3,477 ft² non-profit building, a 3,231 ft² clubhouse, and 264 total parking stalls.
Project Acreage	The project area is 11.476 acres (4.644 hectares).
Project-Related Disturbance	Project-related ground disturbance will include excavation for structural footings, parking lots, pathways, entryways, and associated utility connections and infrastructure. This work will occur throughout the flat portion of the project area along Kahekili Highway. No ground disturbance is planned for the sand dune slope that defines the eastern boundary of the project area.
Historic Preservation Regulatory Context	This archaeological monitoring plan (AMP) is intended to support the proposed project's historic preservation review under Hawaiʻi Revised Statutes (HRS) §6E-8 and HAR §13-13-275. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups. In consultation with the SHPD, this document fulfills the requirements of HAR §13-13-279-4.

	In 1983, Archaeological Consultants of Hawaii, Inc. (ACH) conducted an archaeological walk-through reconnaissance survey (Kennedy 1989) that included the southern portion of the current project area. No historic properties were identified within the current project area; however, SIHP # -50-50-04-2985, a small rock mound interpreted as a potential burial, was documented near the southeast corner of the project area on the top of the slope of the adjacent sand dune. In 2007, Scientific Consultant Services, Inc. (SCS) conducted an archaeological inventory survey (AIS) with subsurface testing of the entire current project area (Shefcheck and Dega 2008). No historic properties were identified; therefore, the results were presented as an archaeological assessment (AA). Due to the presence of pu‘uone sand observed in the southern portion of the project area and previously identified burials and other subsurface cultural deposits in the vicinity, precautionary archaeological monitoring was recommended during all project-related ground disturbance. The AA report was reviewed and accepted by the SHPD in a letter dated 13 June 2008 (LOG NO.: 2008.2334, DOC. NO.: 0806PC23; Appendix A).
Historic Properties Potentially Affected	No historic properties have been identified within the project area. One historic property, SIHP # 50-50-04-2985, has been previously identified as a small rock mound possibly marking a human burial on a sandy ridge (Kennedy 1989) near the project area’s southeastern corner. The project area was once part of a larger macadamia nut farm was also previously used for growing commercial sugarcane. Shefcheck and Dega (2008:ii) note that the project area may have been used in the past for sand mining by Hawaiian Cement and stockpiling of excess materials during the construction of Waiehu Heights Subdivision. The project area also appears to have supported a recent small-scale agricultural operation. Despite these prior ground disturbances, potential still exists for encountering subsurface pre-Contact and/or historic cultural deposits, including human burials, especially within the southern and eastern portions of the project area that have been documented to include sand deposits.
Monitoring Recommendations	On-site archaeological monitoring shall be conducted for all project-related ground disturbance. One archaeological monitor will be assigned to each piece of ground-disturbing equipment in operation at all times and in all locations throughout the project area. Any departure from this will occur only after consultation with and written concurrence from the SHPD.

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Section 1 Introduction

1.1 Project Background

At the request of Waiehu Housing, LP and on behalf of Maui Economic Opportunity, Inc. (MEO) and the Maui County Department of Housing and Human Concerns (DHHC), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this archaeological monitoring plan (AMP) for the Hale Mahaolu Ke Kahua Housing Community, Waiehu Ahupua‘a, Wailuku District, Maui Island, TMK: [2] 3-3-001:106. The project area is bounded west by Kahekili Highway, north by Waiehu Beach Road, and east by Waiehu Heights Subdivision. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2) and a 2017 aerial photograph (Figure 3).

The 100% affordable housing project will involve the construction of 120 residential units, including 28 1-bedroom units, 60 2-bedroom units, and 32 3-bedroom units as well as a 3,477 ft² non-profit building, a 3,231 ft² clubhouse, and 264 total parking stalls (Figure 4). Project-related ground disturbance will include excavation for structural footings, parking lots, pathways, entryways, and associated utility connections and infrastructure. This work will occur throughout the flat portion of the project area along Kahekili Highway. No ground disturbance is planned for the sand dune slope that defines the eastern boundary of the project area.

1.2 Historic Preservation Regulatory Context

In 1983, Archaeological Consultants of Hawaii, Inc. (ACH) conducted an archaeological walk-through reconnaissance survey (Kennedy 1989) that included a southern portion of the current project area. No historic properties were identified within the current project area; however, SIHP # 50-50-04-2985, a small rock mound interpreted as a potential burial site, was documented near the southeast corner of the project area on the top of the slope of the adjacent sand dune.

In 2007, Scientific Consultant Services, Inc. (SCS) conducted an archaeological inventory survey (AIS) for the current project, which included a pedestrian survey of the entire project area and subsurface testing of 17 mechanically-excavated trenches (Shefcheck and Dega 2008). No historic properties were identified. Due to the presence of pu‘uone sand observed in the southern portion of the project area and “the high number of burials and other culturally significant subsurface deposits in the surrounding area,” archaeological monitoring was recommended “as a precautionary measure during all construction related ground altering activities” (Shefcheck and Dega 2008:18). Since the AIS concluded with no significant findings, the report was submitted to the SHPD as an archaeological assessment, which the SHPD reviewed and accepted in a letter dated 13 June 2008 (LOG NO.: 2008.2334, DOC. NO.: 0806PC23; see Appendix A).

This AMP is intended to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) §6E-8 and Hawai‘i Administrative Rules (HAR) §13-13-275. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups. In consultation with the SHPD, this document fulfills the requirements of HAR §13-13-279-4.

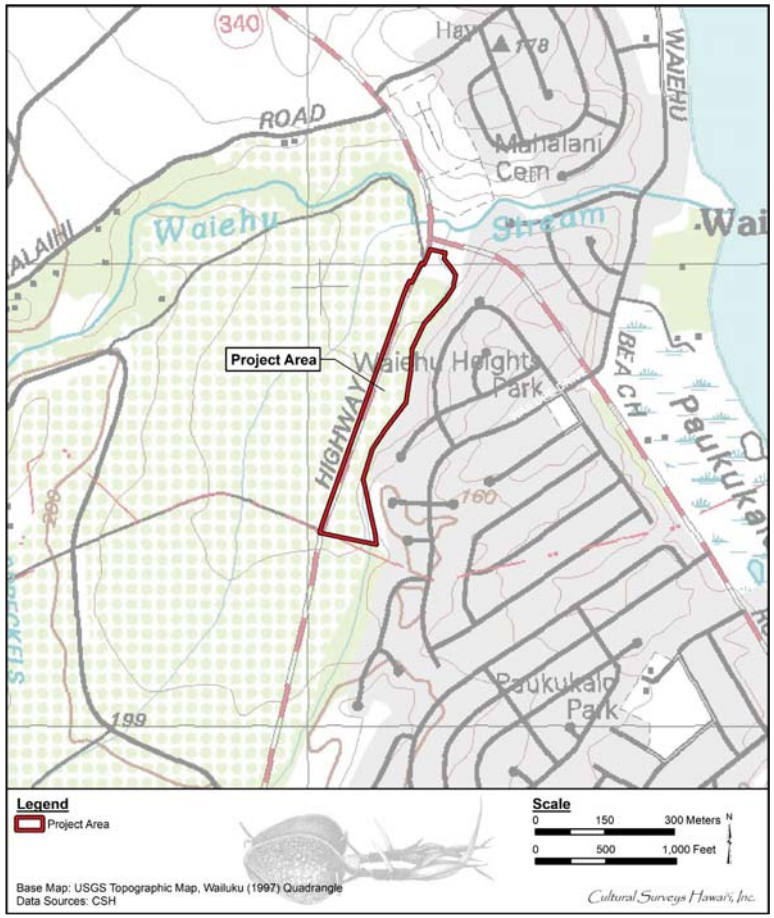

Figure 1. Portion of the 1997 Wailuku USGS 7.5-minute topographic quadrangle showing the location of the project area (U.S. Geological Survey 1997)

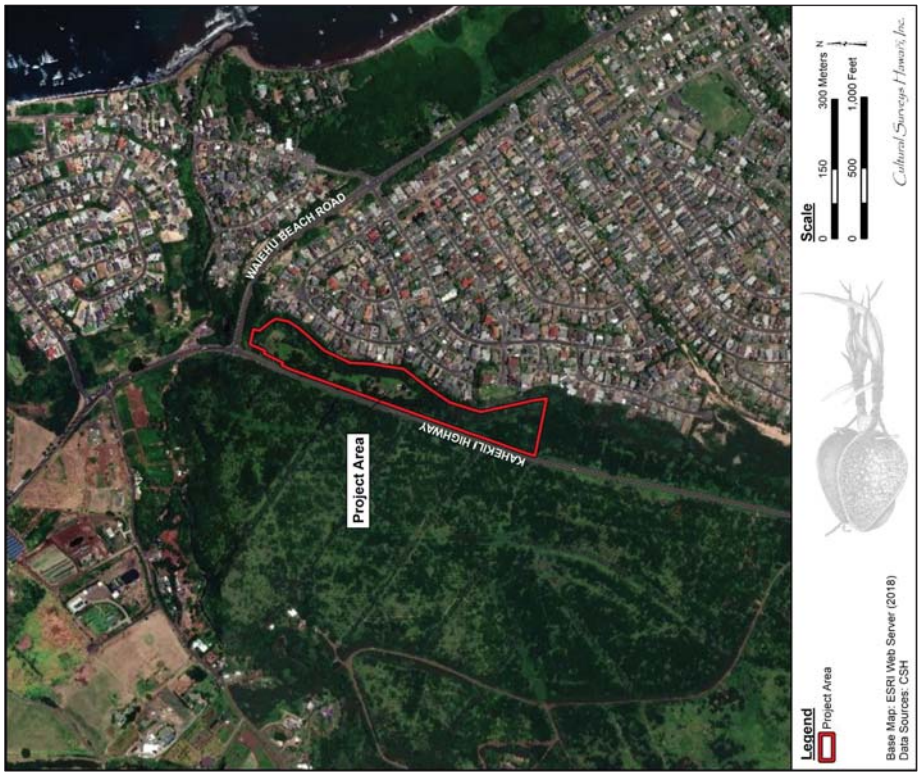

Figure 3. Aerial photograph of the project area (Esri 2018)

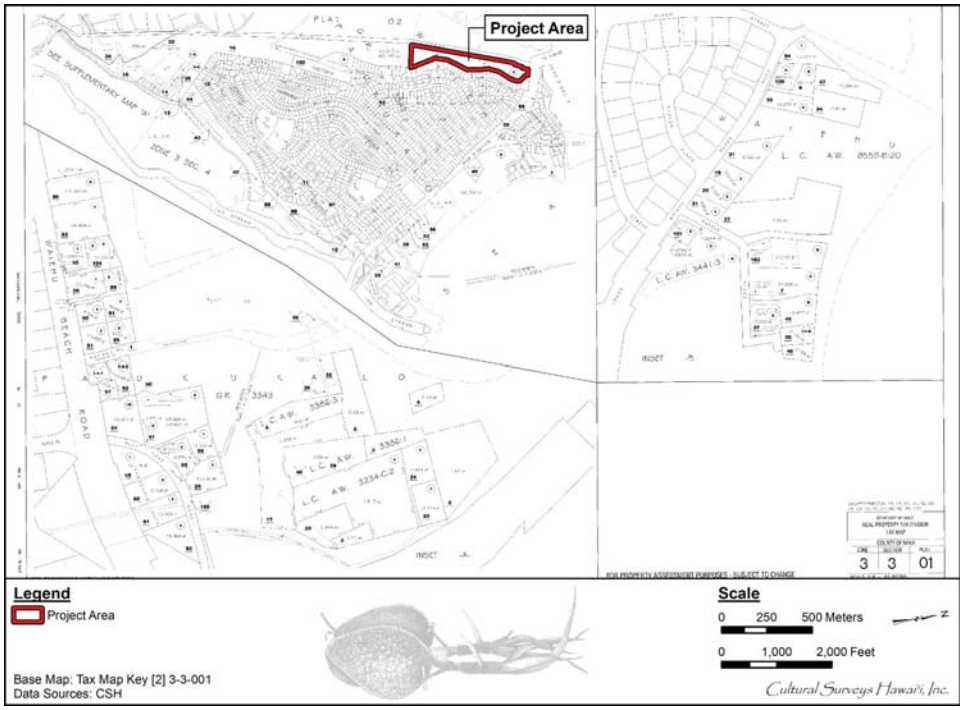

Figure 2. Tax Map Key (TMK) [2] 3-3-001 showing the project area (Hawaii TMK Service 2014)

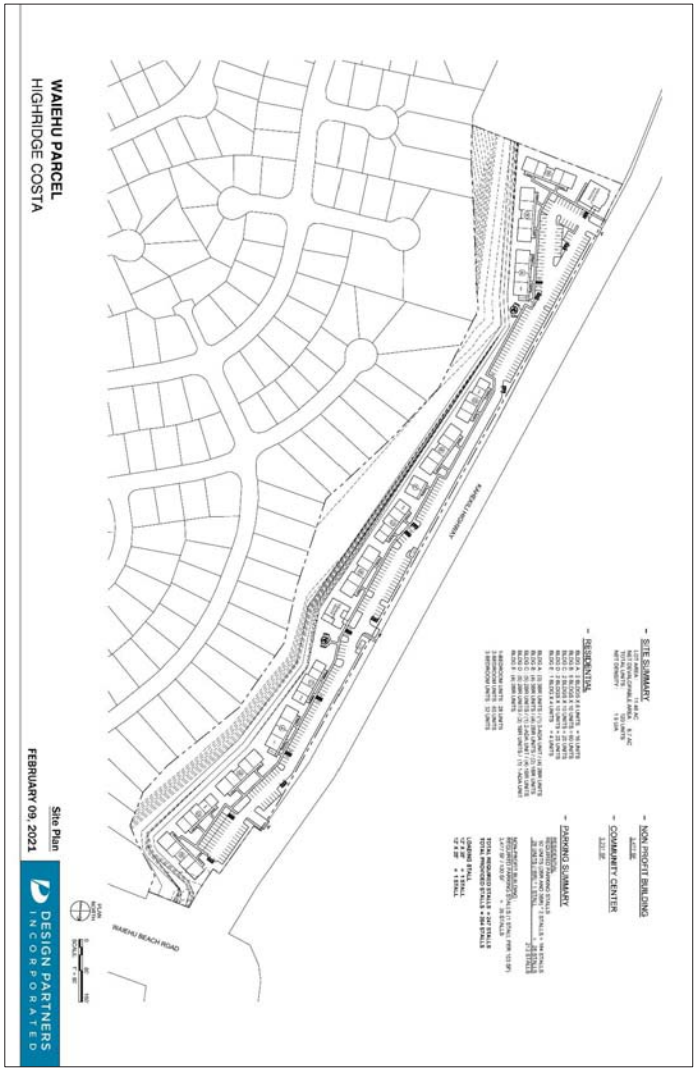

Figure 4. Concept site plan for current project (Design Partners Incorporated 2021)

1.3 Environmental Setting

1.3.1 Natural Environment

The current project area is situated approximately 0.6 kilometer (km) to 0.8 km (approximately 0.4 mile to 0.5 mile) west of the nearest coastline at about 20 meters (m) to 38 m (approximately 65 feet [ft] to 125 ft) above mean sea level (AMSL). The terrain of the project area gently slopes upward from north to south. Waiehu Stream flows eastward/ *makai* (seaward) approximately 60 m (197 ft) north of the project area, while a tributary across Kahekili Highway runs roughly parallel to the project area's western border before merging with Waiehu Stream northwest of the project area (Figure 5).

The majority of the project area overlies alluvium. Most alluvial deposits in Waiehu derive from igneous rocks of the Wailuku Volcanic Series, the oldest exposed lavas of West Maui Mountain. The Wailuku Volcanic Series consists primarily of thin *pahoehoe* and *a'a* lava flows of basaltic lavas that are considered to be of late Pliocene to early Pleistocene age, approximately 1.3 million years old. The Wailuku Volcanic Series was followed by the Honolua Volcanic Series during the Pleistocene epoch with little apparent break in time. A considerable number of vents along the north and northeast rift zones of West Maui produced lava flows during this latter series of volcanic activity, covering the older Wailuku Series lavas on the northeast flank just north and south of Waiehu Valley (Macdonald et al. 1983). The end of the Honolua Volcanic Series on West Maui was followed by a long period of erosion, during which the deep valleys formed and most of the older alluvium and colluvium that chokes the heads of these valleys was deposited.

The northeastern boundary of the project area extends along the edge of a lithified sand dune. The lithified calcerous sand dune that borders the project area is part of an inland dune system that extends across the Maui isthmus, with some dunes reaching up to 60 meters in height (Macdonald 1983:388). These dunes were formed by windblown sand from large beaches exposed during a stand of the sea likely 12 m lower than the present sea level on the northern coast of Maui (Macdonald et al. 1983:388).

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), the project area's soils consist of Iao silty clay, 0 to 3 percent slopes (IaA), Iao cobbly silty clay, 3 to 7 percent slopes (IbB), and Puuone sand, 7 to 30 percent slopes (PZUE) (Figure 6). Most soils across the project area are composed of Iao silty clay, 0 to 3 percent slopes, while some of the southern portion of the project area contains Iao Cobbly silty clay, 3 to 7 percent slopes. Puuone sand, 7 to 30 percent slopes comprises soils within a southern portion of the project area as well as soils extending along and *makai* from the project area's eastern boundary.

In general, the Iao Series is described as follows:

> This series consists of well-drained soils on valley fill and alluvial fans. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from 100 to 500 feet. The mean annual soil temperature is. 74° F. Iao soils are geographically associated with Paia, Pulehu, and Wailuku soils.

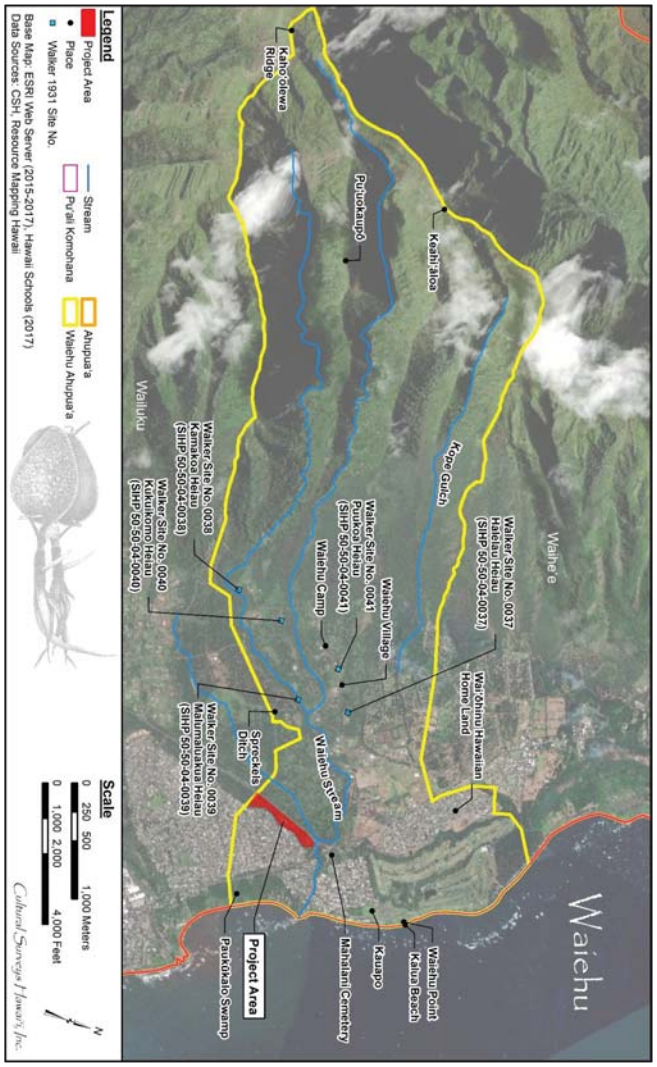

Figure 5. Aerial imagery showing the project area within Waiehu Ahupuaʻa and locations of streams and other *wahi pana* (i.e., notable places) within the *ahupuaʻa*, including *heiau* previously identified by Walker (1931)

> These soils are used for sugarcane. Small acreages are used for pasture and homesites. The natural vegetation consists of bermudagrass, feather fingergrass, koa haole, lantana, and Natal redtop. [Foote et al. 1972:46]

In addition, Iao silty clay, 0 to 3 percent slopes is described as soil on which "runoff is slow and the erosion hazard is no more than slight" (Foote et al. 1972:46-47). "[E]xcept for the texture of the surface layer and the content of cobblestones," Iao Cobbly silty clay, 3 to 7 percent slopes is described as having "a profile like that of Iao clay, 3 to 7 percent slopes" (i.e., dark-brown approximately 15-in thick surface layer; approximately 45-in thick very dark brown, dark-brown, and very dark grayish-brown subsoil; moderately slow permeability; medium runoff; and slight to moderate erosion hazard [Foot et al. 1972:46]).

The Puuone Series is generally described as follows:

> This series consists or somewhat excessively drained soils on low uplands on the island of Maul. These soils developed in material derived from coral and seashells. They are moderately sloping to moderately steep. Elevations range from 50 to 350 feet. The annual rainfall amounts to 20 to 30 inches, most of which occurs in winter. The mean annual soil temperature is 75° F. Puuone soils are geographically associated with lao and Jaucas soils.
>
> These soils are used for pasture and homesites. The natural vegetation consists or bermudagrass, kiawe, and lantana. [Foote et al. 1972:117]

Puuone sand, 7 to 30 percent slopes is more specifically described by the following:

> This soil is on sandhills near the ocean. Included in mapping were small areas or lao and Jaucas soils. Also included were small areas where the cemented layer is less than 20 inches below the surface.
>
> In a representative profile the surface layer is grayish-brown, calcareous sand about 20 inches thick. This is underlain by grayish-brown, cemented sand. The soil is moderately alkaline in the surface layer.
>
> Permeability is rapid above the cemented layer. Runoff is slow, and the hazard or wind erosion is moderate to severe. The available water capacity is about 0.7 inches per root in the surface layer and subsoil. In places roots penetrate to the cemented layer. [Foote et al. 1972:117]

In 2014, the average annual air temperature for the project area was between 21.36°C (70.45°F) in February and 25.39°C (77.70°F) in August with an average annual air temperature of 23.41°C (74.14°F) (Giambelluca et al. 2014). The vicinity of the project area received a mean annual rainfall of 617.1 mm (24.30 inches) between 1978 and 2007, according to the University of Hawai'i 2011 *Rainfall Atlas of Hawaii* (Giambelluca et al. 2013). The mean monthly rainfall varied between 9.4 mm (0.37 in) in June to 112.8 mm (4.44 in) in January.

The project area was once part of a larger macadamia nut farm. During the AIS conducted in 2007, vegetation at the project area included "a grove of macadamia nut trees (*Macadamia integrifolia*), dense cane grass, and sparse *koa haole* (*Leucaena leucocephala*)" (Shefcheck and Dega 2008:5). The current vegetation is likely similar to that noted in 2007. The southern end and eastern edge of the parcel appear the most densely vegetated.

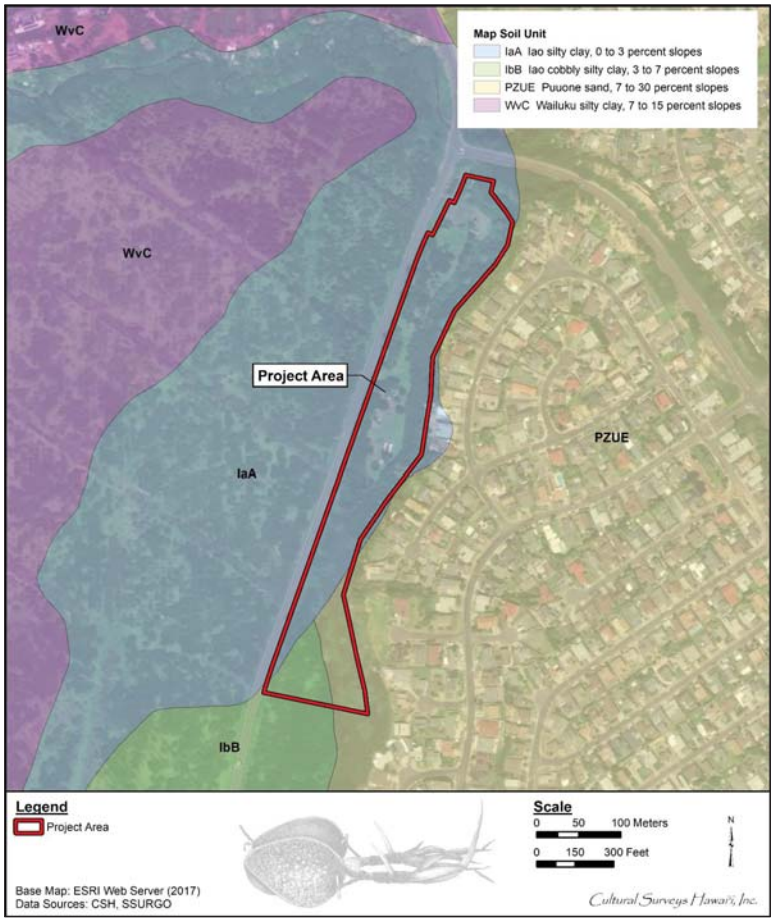

Figure 6. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001)

1.3.2 Built Environment

The current project area consists of mostly undeveloped lands stretching along a portion of the eastern side of Kahekili Highway. The project area appears to contain some remnant structures and ground modifications from a former small-scale agricultural operation. The northern portion of the project area is bounded by Waiehu Beach Road. Waiehu Heights Subdivision, consisting of over 200 housing structures and associated infrastructure (e.g., asphalt paved roads, sidewalks, and various utility features), borders the eastern boundary of the project area. Additional residential lots and subdivisions are developed in Waiehu within the vicinity of the project area, mostly concentrated *makai* of Kahekili Highway. Directly across Kahekili Highway, west of the project area, is a large expanse of land planted in macadamia nut trees.

Section 2 Background Research

2.1 Traditional and Historical Background

The current project area is located within Waiehu Ahupua‘a, one of four *ahupua‘a* that traditionally comprised the *‘okana* or sub-district (Moffat and Fitzpatrick 1995:23) known as Nā Wai ‘Ehā, or the Four Waters (Handy et al. 1991:496). Geographically and culturally, Nā Wai ‘Ehā consisted of four deep valley streams that watered four distinct areas of taro land that spread out fanwise to the shoreline (Handy et al. 1995: 272). These areas included the *ahupua‘a* of Waikapū, Wailuku, Waihe‘e and Wai‘ehu, which all share the corresponding name of the stream running through each region:

> There are in this region four streams in succession from the different gorges of the mountain, significantly named, it is thought, from the events of battles which have transpired upon them. *Waikapu* The *water* where the *conch* was blown, and the engagement began. *Waiehu* The *water* where the combatants *smoked with dust and perspiration.* Wailuku The *water of destruction*, where the battle began to be fierce and fatal. Waihee The *water* of total *rout and defeat*, where the army melted away. [Cheever 1851:85-86]

The *ahupua‘a* of Waiehu and Waihe‘e shared many traditions. Because of this connection, the adjacent *ahupua‘a* of Waihe‘e is included in this review, as the richness of accounts for Waihe‘e may offer insights into the less documented traditional background of Waiehu.

2.1.1 Traditional Accounts

Waihe‘e is rich in traditional accounts, some of which include mention of Waiehu. Examples of *mo‘olelo* (traditional stories) recount activities of the gods Kāne and Kanaloa, the goddess Haumea, the demigod Maui, and Pele’s sister, Hi‘iaka.

In their early travels, the gods Kāne and Kanaloa visited Waihe‘e and created a spring, as described in the 12 January 1867 account by *Ka Nūpepa Kū‘oko‘a*, “Those two broke through the rock so that water flowed out, sweet, flowing water, at Waihe‘e… They did such in this way throughout these islands (Kamakau 1991:112).

Two Hawaiian language accounts relate legends of the goddess Haumea at Waihe‘e. According to Kamakau (1991), the goddess Haumea safely delivered a child to Mulei‘ula, daughter of ‘Olopana, ruling chief of Kahikikū in return for a precious tree of exceedingly beautiful flowers. Haumea flew off with the tree to Waihe‘e, where the tree was planted. Shortly thereafter, the tree was chopped down and washed out into the ocean. The wood of this tree eventually became three famous deities: a branch became Mākālei, the wish fulfilling tree of Kailua, O‘ahu; the trunk became Kāho‘one‘enu‘u, the god of the chiefs of O‘ahu; and a shelf made from another branch became Kūkeolo‘ewa, a god for the chiefs of Maui. The coming of the parent tree to Waihe‘e is recounted by *Ka Nūpepa Kū‘oko‘a* on 22 June 1865 as follows:

> Haumea grasped up the branches and the earth at the base of the tree and flew up into the sky past the pillars of Kahiki until she arrived at Hawai‘i. She made a circuit around the island but found no place to set up the tree. She went up to Maui and made a circuit and set the tree down at Waihe‘e. “Pu‘ukuma” was the name of that place. She left the tree and went to drink water, the water of Kāne. When she came back, she went to lift the tree but the roots of the tree had crept down and held fast. She built a wall around the growing tree from Pihana to the Kaho‘omano Cape. Secure within these walls until the present time [1865] protected from the winds without. “Kekili‘o‘opu” was the name of the wind within. Haumea took the two blossoms Kanikawī, and Kanikawā and returned to Nu‘umehalani.
>
> There was a certain man named ‘A‘a‘alā‘au from the sea of Nakohola who cut wood and came to where this tree was standing. “Ka! Here is a tree close by”. He chopped at the tree until it fell down and then he returned home. That night a fierce storm began that blew for twenty days and nights. New rushing streams were created. The wall surrounding the tree was broken up; parts washed up into mounds and parts washed into the streams. The tree washed out into the ocean and after six months washed ashore at Niukākahi in Waiehu. [Kamakau 1991:7-8]

A narrative by Westervelt (1963) of “The God of Pākākā Temple” appears to be based on the Kamakau (1991) account. He offers different details, but whether these are traditional variants or his own details are unclear. The portion of his account pertaining to Waihe‘e follows:

> She [Haumea] crossed over to the island of Maui and came to the “four rivers.” There she found the ‘awa of the gods and prepared it for drinking, but needed fresh water to mix with it.
>
> She laid her tree on the ground at Pu‘u-kume by the Waihe‘e Stream and went down after the water. When she returned the tree had rooted. While she looked it began to stand up and send forth branches. She built a stone wall around it, to protect it from the winds. When it blossomed, Haumea returned to her divine home in Nu‘umealani, the land of mists and shadows where the gods dwelt.
>
> By and by a man took his stone axe and went out to cut a tree, perhaps to make a god. He saw a new tree, short and beautiful, and after hours of labor cut it down. The night was coming on, so he left it as it fell and went home.
>
> That night a fierce and mighty storm came down from the mountains. Blood-red were the streams of water pouring down into the valleys. During twenty nights and twenty days the angry rain punished the land above and around Waihe‘e. The river was more than a rushing torrent. It built up hills and dug ravines. The branches were broken off and carried with the trunk of the tree far out into the ocean. [Westervelt 1963:49]

Sterling (1998:66) relates the 12 April 1911 *Ke Au Hou* account of the coming of this tree, named “Kalauokehahuli,” to Waihe‘e and reports it as still seen in the twentieth century:

> Regarding this flight of the aforementioned tree, it was planted at Pu‘ukumu at Waihe‘e Maui and grew there and grows to the present [1911] and if you ask the native sons and daughters they can point it out. [Sterling 1998:66]

In “A Legend of Maui” it was at Pe‘eloko at Waihe‘e that the demi-god Māui secured the coconut husk from which he made a snare to catch the sun to slow its traverse through the sky so that his mother could dry her tapa. Fornander (1919:538-539) translates this as follows:

> So he came along to Pe‘eloko at Waihe‘e and threw down a lot of coconuts; he secured plenty of husk and with it he went off to snare the sun. [Fornander 1919: Volume V, Part III; 538-539]

Thrum (1907:31) relates a similar account of Māui’s manufacturing a strong cord to snare the sun from the fiber of coconuts of “Paeloko, at Waihe‘e” but notes this was after “he cut down all the cocoanut trees.” This translation appears to be the most correct, emphasizing the *luku* (destruction) of the coconut trees while acquiring the sennit. Destruction of coconut trees was a quintessential declaration of war, and the act captures oedipal themes of the Māui saga.

In the story of Hi‘iaka’s traveling of the archipelago to fetch Lohiau for her sister Pele, she traverses the north side of West Maui. Hi‘iaka caught the soul (*kino wailua*) of the inhospitable ruling chief Kaulahea (*aka* ‘Olepau): “She went close up to the great stone Pahalele that still [c. 1915] lies in the road near Waihe‘e and… dashed the captive soul against the rock” (Emerson 1993:80-81). Hi‘iaka chanted a *kau* while capturing the soul of Kaulahea:

> Waihe‘e crouches in the cold blast
> Of the raging Kili‘o‘opu.
> This atom soul I plucked from the grave,
> From a fastness desolate now:
> The spirit flits from Olepau,
> Goes down the steep to destruction,
> To the somber caverns of Milu.
> [Emerson 1993:81]

Kamakau (1991) relates the landing of two groups of foreigners (the Ka-maunu-a-niho mā and the Kukanaloa mā) at Waihe‘e in the ancient past. These events are placed by Members of the Waihe‘e Community (Nā pulapula kanu o ka `āina o Waihe‘e) and Kepā Maly (1994) as circa AD 1100-1200 and AD 1350 to 1530, respectively. Regarding the Ka-maunu-a-niho mā, Kamakau (1991) provides the following description:

> Kalananu‘unuikūamamao, Humu, and Kamaunuaniho are said to have come from Kahiki and to have landed at Kahāhāwai at Waihe‘e, Maui, and to have lived inland of Wailua… They were all called by foreign names because they were all from foreign lands, not the foreign land of Borabora but the foreign lands called Keōlewa, Haenakulaina and Kauaniani. Where were these lands? The land of Ke‘enuiakāne perhaps. [Kamakau 1991:111]

In “The Apotheosis of Pele,” Kalākaua (1888) mentions the arrival of a party of immigrants or adventurers “from the southern islands” “a half century or more before the landing of the Pele family in Puna.” A party including the chiefs Kalana and Huma and the beautiful Kamaunui, along with their relatives and followers “finally settled in Waihe‘e, a spot noted for its beauty and natural advantages” (Kalākaua 1888:142). Hina, the daughter of Huma and Kamaunui, married the O‘ahu chief ‘Olopana.

Kamakau (1991) recounts the following from the 12 January 1867 account by Ka Nūpepa Kū‘oko‘a:

> It is said that the Kukanaloa mā landed in Waihe‘e from Kealaikahiki; Kiwi was the spot where they came ashore, and Kahawai the place where they panted and stammered. There were many of them on the ship Konaliloha, but only two of them became famous -Kukanaloa and Bete, who was known in Waihe`e as Pele‘ie. The two became [the ruling chief] Kaka‘alaneo’s… some of the descendants are living to this day [1867]. [Kamakau 1991:114]

The chant “*Kupuna haole mai kahiki*” refers to Kukanaloa as the foreign ancestor. An interesting aspect of the legend is that the *haole* were named *Kanikawī* and *Kanikawā* “for the beautiful flowers of Haumea - or perhaps for the birdlike sound of their speech, like that of the *lale* bird of the mountains” (Kamakau 1991:114). The tradition of these flowers of Haumea was particularly tied to Waihe‘e.

Kamakau (1991:149) recounts that the ruling chief of Maui, Hua-a-Pohukaina (also known as Hua-a-Kapua‘i-manakū) spent his last days in Waihe‘e: “In his old age he got sick and returned landing at Ki‘ikewe at Waihe‘e and died at Niua, and his remains are at ‘Īao.”

Kamakau (1961:22) places the ruling chiefs Lono-a-Pi‘ilani and Kiha-a-Pi‘ilani farming and squabbling in Waihe‘e Ahupua‘a. Fornander (1969:99) relates that in a “final battle” between the two, Lono-a Pi‘i [lani] was killed at Waihe‘e. In the “Legend of Kihapi‘ilani,” a fraternal quarrel leads to Kihapi‘ilani abandoning his home at Waihe‘e.

> Kihapi‘ilani lived with his brother, Lonoapi‘i, in Waihe‘e. One day two calabashes of salted *nehu* were brought to Lonoapi‘i, which he gave out to everybody except Kihapi‘ilani. That being the only fish to be had, Kihapi‘ilani reached over and took some out of the calabash. This action displeased Lonoapi‘i so much that he took up the calabash and threw the fish and brine into the face of Kihapi‘ilani. At this Kihapi‘ilani rose up and went away from the place, accompanied only by his immediate attendant, until they came to Kula, where they made their home. They took to farming… [Fornander 1919, Volume V, Part I: 176-177]

A battle that broke out at Waihe‘e circa 1765 was also traced to the distribution of food in a translation provided by Kamakau (1961:83) of a 8 December 1866 *Ka Nūpepa Kū‘oko`a* entry:

> In the year AD 1765 strife arose within a royal family among the children of Kekaulike Kalaniku‘ihonoikamoku. Kahekili was living at Pihana at Paukūkalo and Wailuku with his chiefs, his favorites, his friends and his warriors of Kaniu‘ula and Kepo‘ouahi. The chiefs of Wailuku enjoyed themselves in the surfs of Kehu and Ka‘akau. The chiefs of Waiehu and Napoko enjoyed the surfs of Niukūkahi and ‘A‘awa. The chiefs of Waihe‘e enjoyed the surfs of Pala‘ie and Kahahawai. The source of the domestic strife was a certain man of the armed forces named Kahanana who was on Ke‘eaumoku’s side and lived at Ka‘apoko, an *‘ili* of land in the *ahupua‘a* of Waihe‘e.

> This man went every day to farm and in the evening returned to his house. His wife broiled the taro leaves. The chiefs distributed fish to all the people but omitted him and his wife. In former times Waihe‘e was a land of fish, of *maomao* fish, *a‘ua‘u* fish, octopus, and *‘ōhua* [the “fry” or young of various fish] as well as runs of *nehu* [an anchovy-like fish (*Stolephorus purpureus*)] and *pīhā* [a herring-like fish (*Spratelloides delicatulus*)]. It was common for the chiefs to deny those two a portion. Kahanana said “The chiefs enjoy eating poi and *laulau*, baked food, and fish. Delicious is the food of those chiefs and their women because the *pōhuehue* vine had not been smitten to cause rough sea in the harbor where the waves crest so that the surfers could not be seen [anger rises in the heart and will be avenged]. Then Kahanana put on his feather cloak and his helmet and went to Niukūkahi and killed people, he killed a man and seized and killed two other men. That’s how the strife started, the strife between the two sides lasted day and night. They attacked back and forth with dead on both sides. “Kalae‘‘ Ili ‘ili‘ili” was the name of that battle. [Kamakau 1961:83]

In “The Prophesies of Keaulumoku,” Kalākaua (1888:356) presents the following account of the same event:

> [Ke‘eaumoku] began to cast about for the means of raising himself again to the dignity of a landed chief. His eyes soon fell upon the comely Nāmāhana, widow of Kamehamehanui. To her belonged the fair and fertile lands of Waihe‘e… Kahekili was naturally enraged at the union, and was about to manifest his displeasure in a manner dangerous to Ke‘eaumoku, when Nāmāhana retired with her new husband to her estates at Waiheāe… Kahekili’s first impulse was to follow and slay them both; but as Nāmāhana was popular with the nobility… he discretely concluded to leave to the future the punishment of the offending couple.
>
> Taking up his residence at Waiheāe, Keāeaumoku enlarged and beautified his grounds and buildings and established a petty court of princely etiquette and appointments. He was fond of display, and soon attracted to Waihe‘e many of the more accomplished young chiefs of the island… he had carefully trained bands of musicians and dancers, and his entertainments were frequent and bountiful…
>
> Kahekili resorted to strategy. He induced Kahanana, a resolute warrior and subordinate land-holder of Waihe‘e, to embroil Ke‘eaumoku in a difficulty with his own people. To this end Kahanana complained - probably without cause - that he had been frequently neglected by the servants of Ke‘eaumoku in the distribution of fish… many of his friends stood prepared to espouse his quarrel… he armed himself for battle and, the following night, killed three of Ke‘eaumoku’s laborers… and a general fight resulted. …Ke‘eaumoku and his party were overpowered and compelled to seek safety in flight. [Kalākaua 1888:356]

2.1.2 Settlement and Subsistence

The current project area is located adjacent to a lithified dune system, historically known as the Sand Hills (Figure 7). On-going traditional, historical, and archaeological research have documented knowledge and evidence of the use of the dune system for burial. Research and archaeological testing conducted for the current project area indicate that the project area is predominately located within alluvial sediment that has been deposited along the backside of the lithified dune.

Traditional accounts suggest that the project area, which is located in proximity to freshwater sources (see Figure 5) and on alluvial sediment (see Figure 6), was likely part of a large and very productive agricultural system. Handy and Handy (1972) describe that “From Waihe‘e to Wailuku Valley, in ancient times was the largest continuous area of wet-taro cultivation in the islands…” (Handy and Handy 1972:496). This region includes Waiehu Ahupua‘a, which is situated between the *ahupua‘a* of Waihe‘e and Wailuku. A high degree of wetland taro cultivation within Waihe‘e, and likewise, Waiehu, provides evidence that a substantial population would have been established in the region during the pre-Contact period. According to Cordy (1981), the settlement of Waihe‘e represented one of two population concentrations on Maui:

> The Kaupo, Kipahulu, Hana, Koolau, and Hamakua districts of northeast Maui form a wet, fertile contiguous area that would have been a dominant population center early in Maui's settlement. On West Maui, the large valleys of Waihee and Wailuku would have been another fertile focus, and to the southwest, the permanent streams of Lahaina and Olowalu would have been conceivably another early population area. [Cordy 1981:198-199]

While traditions do not disclose the size of the Waiehu and Waihe‘e populations or their disposition within these *ahupua‘a*, they do associate Waiehu and Waihe‘e Ahupua‘a and the district of Wailuku (i.e., West Maui) with notable *ali’i*, suggesting that Waiehu and Waihe‘e shared in the district’s importance as a center of political power and substantial population in the pre-Contact and early contact periods. Several *heiau* (sacred temples) recorded in the Waihe‘e region, including five previously identified by Walker (1931) in Waiehu (see Figure 5), strongly indicate the traditional importance of the *ahupua‘a* (Cordy 1978:62). According to a native informant, “the heiaus near Waiehu were all built by Kahekili to Kane, and men and pigs were laid on the lele” (Walker 1931:142).

2.1.3 Early Historic Period

Kamakau (1961:313) presents a recording of events at Waihe‘e ca. 1811 from a 19 September 1868 entry in *Ka Nūpepa Ku‘oko‘a*:

> Any captive fit for death could be spared if Ka‘ahumanu granted life. Ka‘ahumanu’s lands also became places of refuge. Namely, Pu‘unau at Lahaina, Waipukua at Waihe‘e, Kalua‘aha at Molokai, and such. All of Ka‘ahumanu’s lands became places of refuge and places of pardon. If a man killed another, and was not caught by the deceased’s friends out for his blood, he could go straight to a land of

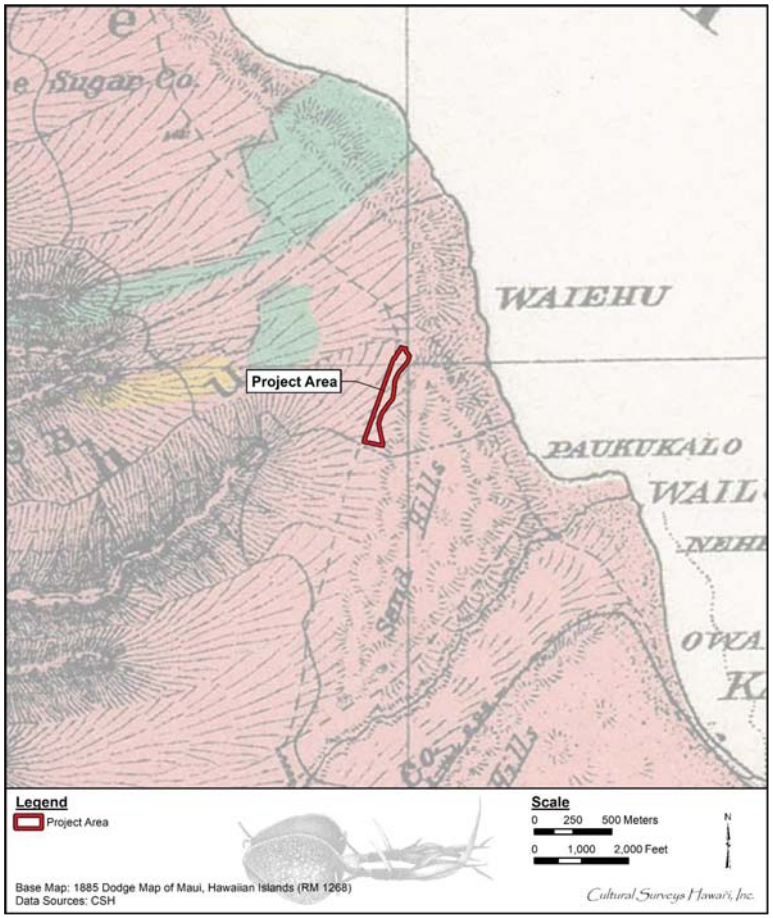

Figure 7. Portion of a Dodge (1885) map of Maui showing the project area extending along the edge of a portion of the northeastern extent of the Sand Hills

> refuge and escape with his life. Thus it was with a certain blind man before the return to Hawai‘i Island event known as the “Kanī‘aukani” (Lit. The sounding coconut midrib - a kind of “jew’s harp”) when Kamehameha was still living on O‘ahu in the year 1811. Someone stole fish from a fishpond called Koiahi near Kiao at Waihe‘e under the jurisdiction of Alapa‘i Malo-iki who was also known as Alapa‘i Kupalupalumano. The thief who stole fish from the fish pond was named Paki. He was brought before Alapa‘i, tried, and was found to have committed the offense of stealing fish from the chiefs for which his eyes were scooped out in accordance with the law. The edict of Kamehameha was not to kill men for this crime but to scoop out the eyes. The blind man lived with a certain canoe carver of Paukākalo on the right side of Waihe‘e. One evening, the blind man chewed ‘awa for the canoe carving kahuna. The canoe carving kahuna drank but the treacherous blindman did not drink any ‘awa. When the canoe carving kahuna was drunk on the ‘awa, the blindman felt with his hands the adze on top of the canoe and took the sharp adze and groped his way to the head of the canoe carving kahuna who was fast asleep because the intoxication of the ‘awa had become extraordinary. He groped and found his neck and cut off his head. He then crawled off about half a mile to the place of refuge named Kukuipuka, the land of Kūka‘ilimoku, the god of Kamehameha. [Kamakau 1961:313]

The earliest census on Maui taken by Protestant missionaries in 1831 recorded a population of 827 in Waihe‘e Valley (Schmitt 1973:18). That population was evidently substantial enough to warrant the establishment of a church at Waihe‘e as:

> …an outstation of the mother church in Wailuku. About 1830 Reverend Jonathan Green built a pole and thatch meeting house on the site. Rueben Tinker joined Jonathan Green in 1832 and together they made plans for the establishment of a permanent church in Waihee. Records indicate that between 100 and 300 Hawaiians attended these early meetings. [Gowans et al. 1993:127]

Waihe‘e Church (Figure 8) was constructed from 1848 to 1858 and is still standing today (Figure 9). Waihe‘e Church was assigned SIHP # 50-50-04-1619 and entered the National Register of Historic Places (NHRP) in 1994 as NRHP # 94000384 (Penkiunas 1992). Residents of Waiehu may have attended this church, which is located approximately 2.16 km (1.34 mi) north of Waiehu Village area. A resident would have traveled approximately 3.5 km (2.2 mi) on a trip to the church via government roads in the late 1800s.

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

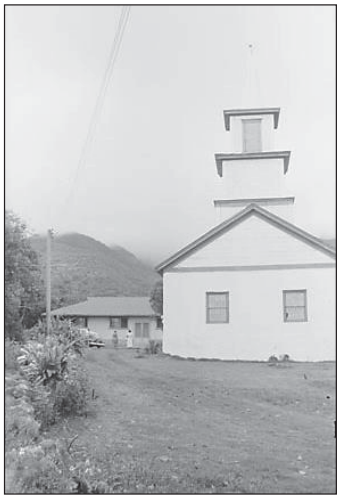

Figure 8. Historic Waihe‘e Church (Hawaiian Mission Houses Digital Archive accessed 2018) prior to 1987, when the bell tower was removed due to water and termite damage (Penkiunas 1992)

Figure 9. Waihe‘e Church in 2010 (Bradshaw 2010)

2.1.4 The Māhele and the Kuleana Act

The Organic Acts of 1845 and 1846 initiated the process of the Māhele (the division of Hawai‘ian lands) which introduced private property into Hawaiian Society (Alexander 1899). By decree of the Māhele in 1848, land titles were awarded to the *ali‘i* (royalty). In 1848 the crown and the *ali‘i* (royalty) received their land titles. Large parcels at Waiehu, including Ahikuli, Waiehu, and Waiehu 2 were awarded to William C. Lunalilo, the future king. While the entire *ahupua‘a* of Waihe‘e was awarded to Victoria Kamāmalu, the sister of Alexander Liholiho (King Kamehameha IV) and Lot Kamehameha (King Kamehameha V).

In 1850, most of the chiefs ceded a third of their lands to the Government in order to obtain an allodia title for the remainder and thus greatly increasing the Government land base (Alexander 1890:114). The designation of lands to be set aside as Government lands paved the way for land sales to foreigners; in 1850, through the Alien Land Ownership Act, the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995:41-51).

Kuleana awards for individual parcels within the *ahupua‘a* were subsequently granted with the passing of the Kuleana Act of 1850. These awards were presented to tenants who were Native Hawaiians, naturalized foreigners, non-Hawaiians born in the islands, or long-term resident foreigners who could prove occupancy on the parcels before 1845. Approximately 84 Land Commision Awards (LCAs) were awarded of the 116 claims in the Waiehu Ahupua‘a. LCAs were granted by ministers representing the Kingdom of Hawaii Department of the Interior. Testimony to establish title to real property was recorded by both Native Register, in which claimants would provide traditional proof of ownership, and Foreign Register, where boundary survey evidence would support traditional claims.

In general, Waiehu Ahupua‘a is notable for having many LCAs in the valley (Figure 10). Overall, the traditional cultivation of taro by directing stream water through a fretwork of stone terraces, or *lo‘i*, was the primary land use listed in LCAs in Waiehu Valley, and a very large number of *lo’i* in many of the claims appears commonplace. Other structures or infrastructure supporting both *lo‘i* and *kula* (dryland) agriculture such as paths, roads, house lots, garden plots, and river segments were all listed as ancillary to the original claims made on behalf of taro cultivation.

Māhele records associated with LCAs in Waiehu indicate that the vicinity west of the project area is likely within a portion of the extensive system of *lo‘i* that formerly characterized Wailuku and Waihe‘e valleys (Waihona ‘Aina 2000). Numerous *lo‘i* are documented in these claims, which were undoubtedly irrigated by Waiehu Stream and its tributaries in that area (Table 1). According to the land use claims, house lots also were common on these parcels, and some lands were *kula* (pasture). The project area is located within *apana* 20 and/or 21 of LCA 8559B*M granted to William C. Lunalilo (Figure 11). The LCA document does not specify definitive boundaries or land use for these *apana,* which together comprise approximately 2000 acres in Waiehu.

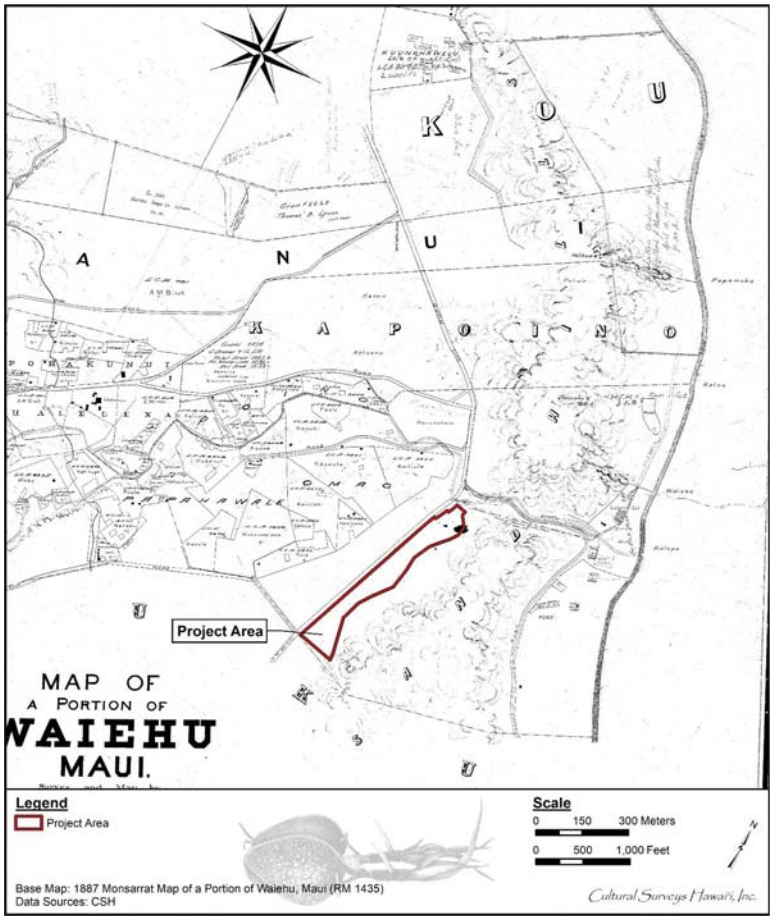

Figure 10. Portion of the Monsarrat (1887) Map of a Portion of Waiehu showing numerous LCAs west of the project area, many of which with houses (black quadrilaterals)

Table 1. LCAs within the current project area (in **bold**) and vicinity

LCA Number	Claimant	Acreage	Land Use
3275U	Kaiolani	7.53 acres	*Kalo* (taro), *kula* (pasture), three *lo‘i*, and a house
3327:1	Naialaolao	2.36 acres	20 *lo‘i* and a house lot
3432:1	Kula	3.53 acres	*Kalo*, *kula* and a house
3437	Kaliuula	6.7 acres	21 *lo‘i* and a *kula*
3441:1	Kapoula	8.96 acres	As many as 42 *lo‘i*, possible *kula*, and a house lot
3444	Kalopa, wahine	1.40 acres	28 *lo‘i*
8559B*M:20&21	**Lunalilo, William C.**	**Approximately 2,000**	**Not specified**

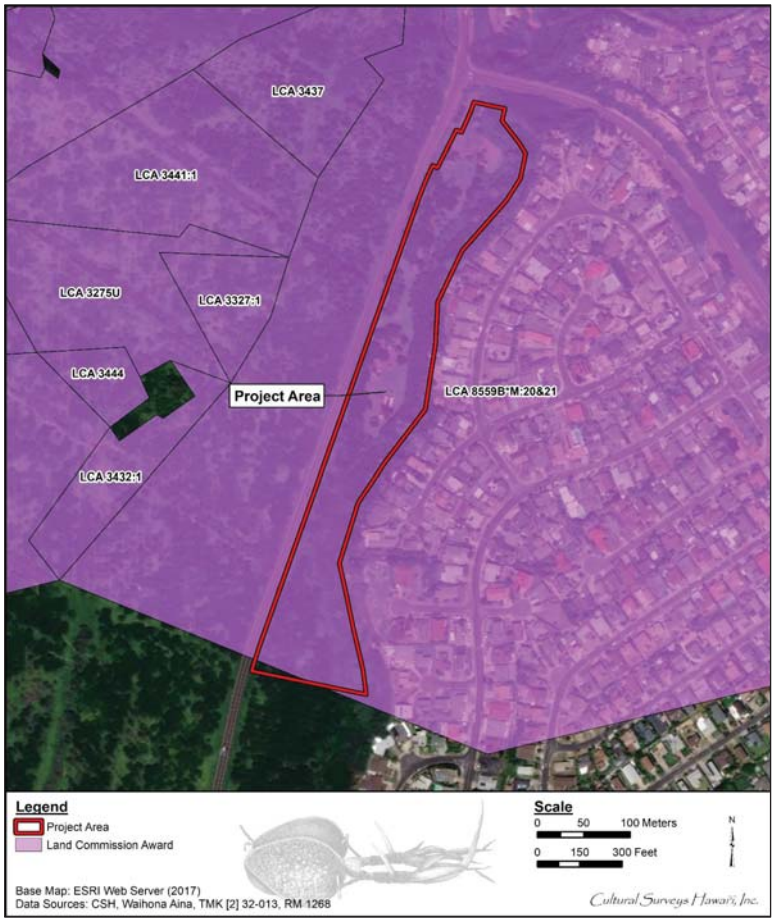

Figure 11. Esri (2017) aerial image showing the project area and LCAs within the project area and vicinity

2.1.5 Mid- to Late 1800s

With the introduction of Western enterprise to Wailuku District, and aided by the Māhele of 1848, the landscape and traditional economy of the area changed dramatically. Traditional cultivation of taro in the stream valleys of Nā Wai ‘Ehā ultimately gave way to planting of sugarcane on Wailuku Sugar Company lands that expanded along the alluvial stream deltas formed by Waihe‘e, Waiehu, Wailuku, and Waikapū Streams (Kelly et al. 1978).

The operation of a small-scale sugar mill at Waiehu is first reported by George Wilfong in 1849 (Wadsworth 1936). He describes the factory as consisting of a set of wooden rollers, “Perhaps 18 inches in diameter and two feet long, mounted vertically and driven usually by animal power, and a series of three open try pots bought from visiting whalers. Presumably, the cane was fed by hand, the juice being simply concentrated by successive boiling in the open kettles.” While Wilfong makes no mention of the processes leading to crystallization and sugar recovery, he does stress the profits resulting from the sale of the thick syrup to whalers.

By 1857, many of the small-scale sugar mills on Maui, earlier accounted for by Wilfong, had been consolidated into three small plantations (Gilmore 1936). Wailuku Sugar Company was first organized in 1862 by James Robinson, Thomas Cummins, and J. Fuller. That same year, Thomas H. Hobron purchased land in the Waihe‘e Valley for the cultivation of sugar cane. “Christopher Lewis became the first owner of the Waihee Plantation, and L.L. Tolbert was its first manager” (Kelly and Hee 1978:12). A sugar mill in Waihe‘e was constructed in 1863, and the first production figures for the crop of 1865 (Figure 12) were promising to the industry: 757 tons of sugar and 45,000 gallons of molasses. An article published in the 3 December 1883 issue of The Honolulu Advertiser commenting on the sugar cane fields and their bright prospects mentions the opening of Waihe‘e Mill:

> The cane is green, fresh and growing vigorously. To look over the thousands [of] acres of flowering cane ripe for the mill is a beautiful sight. The Wailuku mill after a temporary suspension, is grinding and turning out a fine quality of sugar from cane which gives a highly satisfactory yield. The Waikapu Mill is also in full blast, and I understand the Waihee will commence to-day. The planters of Maui should be in high spirits. The prospect never looked brighter. [The Honolulu Advertiser 1883:2]

Waihe‘e Mill was the largest of the three mills operating in Central Maui (HC&S Breeze 1958b). The mill manager was Samuel T. Alexander, and the mill’s head foreman was Henry Perrine Baldwin, both of whom would resign in the late 1860s to establish a sugar enterprise in Sunnyside, Maui (lower Makawao) that would later grow to the giant Hawaiian Commercial & Sugar Company (Dorrance 2000). Remnants of Waihe‘e Mill were still standing in 1958 (Figure 13).

1865. 1865.
Sugar and Molasses
—FROM THE—
WAIHEE PLANTATION.
CROP NOW COMING IN AND FOR SALE
in quantities to suit purchasers by
482-3m ALDRICH, WALKER & CO.

Figure 12. Advertisement for Sugar and Molasses from Waihee Plantation in 1865 (The Pacific Commercial Advertiser 1865)

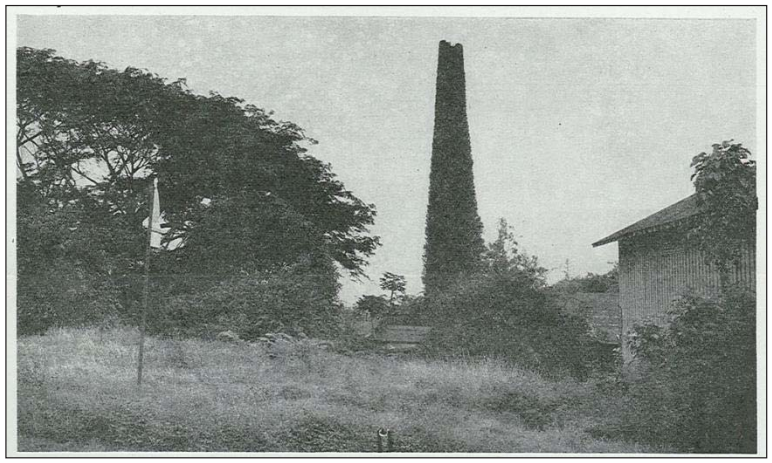

Figure 13. Smokestack and other remnants of Waihe‘e Mill in 1958 (HC&S Breeze 1958a)

The lack of housing structures depicted within the project area on a 1887 map suggests that the project area may have been under commercial sugarcane cultivation as early as the mid to late 1800s (see Figure 10). By 1925, many of the LCAs in the vicinity had been acquired by C. Brewer & Company and Wailuku Sugar Company (Figure 14). Though not clearly indicated, the project area was likely also a part of these commercial sugarcane lands at this time.

In 1879, Claus Spreckels was flush with success from building the Haiku (Spreckels) Ditch linking East Maui water sources at Honomanū with his sugar fields in the central isthmus. By 1882, he had capitalized on that success to engineer the Waihe‘e (Spreckels) Ditch in West Maui, an endeavor that was not without complications:

> Rapid [p]rogress is being made with the Spreckels Waihee ditch, a large dam is being constructed high up in the Waihee gulch. Tunnelling through the sand hills was not a success, the men had finally to cut down through from the top of the hills until they got the level, then put in the pipes covered by an arched roof. The Spreckels mills now appear to be too far away from the cane, and the probabilities are that two more mills and works will be put up immediately, back of Kahului, distant about one and half miles. [The Honolulu Advertiser 1882:2]

Engineers working for the wealthy entrepreneur tunneled into geologic strata forming the walls of Waihe‘e Stream. The 15-mile-long ditch started at the 435 foot elevation of the Waihe‘e Stream, and carried 60 million gallons of water per 24-hour day (mgd) to the Wai‘ale Reservoir at the 214 foot elevation. In 1882, millions of gallons of water were released for Waikapū sugar fields (Adler and Spreckels 1966). Spreckels became the first to irrigate his fields by water from both the East and West Maui mountains (Wilcox 1996).

A newspaper article published in 1883 mentions “rumors of a big water suit ahead, of the people Kuleana holders of Waiehu against Sir Claus Spreckels” (The Honolulu Advertiser 1883:2). Wailuku Sugar Company took over Waihe‘e Plantation in 1895, at which time, Waihe‘e (Spreckels) Ditch became a source of conflict and legal action. Wailuku Sugar Company maintained that the takeover ended Spreckels’ rights to water from Waihe‘e Ditch. The legality of the arrangement became moot when Spreckels’ interest in the Hawaiian Commercial & Sugar Company (HC&S) was sold to the partnership of Henry P. Baldwin and Samuel T. Alexander in 1898 (Dean 1950).

2.1.6 1900s

The Russo-Japanese War of 1904-1905 indirectly affected residents of Waiehu as indicated by the following excerpt from an article published in The Honolulu Advertiser on 11 April 1904:

> Believing that there will be a great increase in the price of rice, many of the taro-planters of Wailuku, Waiehu, and Waihee as soon as their present crop of taro is harvested will plant their patches with rice instead of continuing the cultivation of the old staple. Some of them have done so already…. Of late the market price of taro on Maui has been a moderate one owing to the production of fine and abundant taro. Apropos of the war the Japanese of this island are sending away monthly large sums of money to aid their native country in its struggle…. In spite of the war, there is no difficulty in obtaining laborers on the different sugar estates. [The Honolulu Advertiser 1904:3]

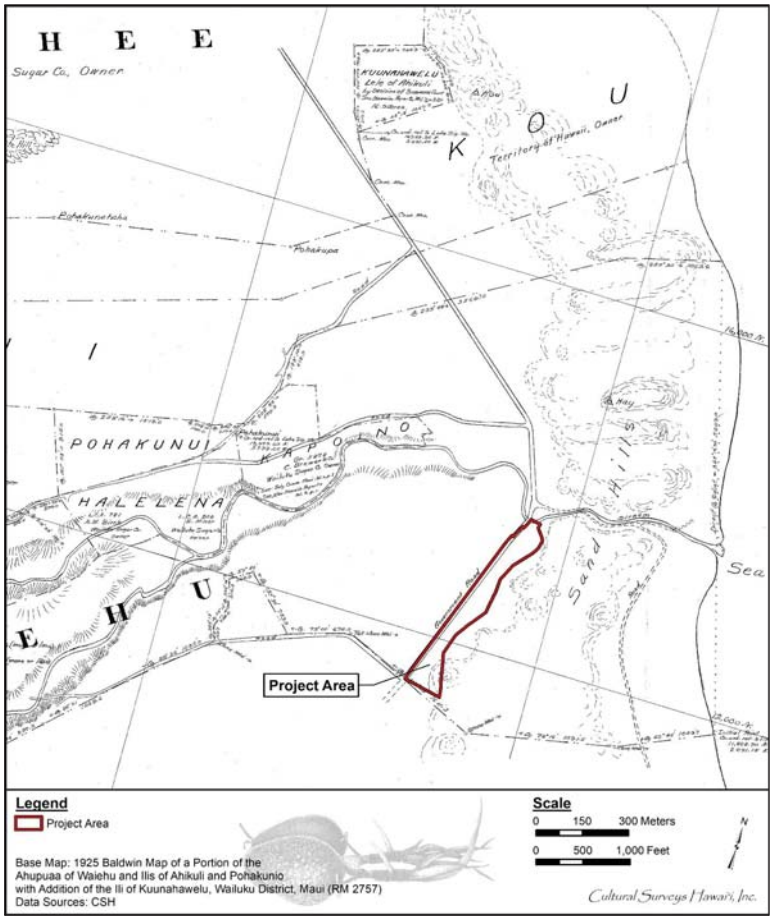

Figure 14. Portion of a Baldwin (1925) map of a portion of Waiehu Ahupua‘a and Ili showing that many of the former LCAs in Waiehu had been acquired by sugar companies; the project area was likely also included as sugarcane lands during this time

Legal groundwork for a new Waihe‘e Ditch began in 1904, which resulted in an interim exchange lease agreement. The terms stipulated that HC&S relinquish 9,693 acres of land in Waikapū, Mā‘alaea, and Wailuku to the Wailuku Sugar Company, and that HC&S receive all of the water from the South Waiehu Ditch (Wilcox 1996).

By 1905, the stage was set for a novel cooperative venture in water development between the Wailuku Sugar Company and the Hawaiian Commercial & Sugar Company. The interests of these two companies in the Upper (“New”) Waihe‘e Ditch, completed in 1907, were seven-twelfths for the Wailuku Sugar Company, and five-twelfths for the HC&S Company. The construction project was largely undertaken by Japanese laborers. The original construction involved more than 10 miles of ditch, 22 tunnels, diversion dams, flumes, and a three-foot-diameter steel siphon crossingthe entire width of ‘Īao Valley. The cooperative agreement granted the use of day water to Wailuku Sugar Company, while night water went to the HC&S Company. As for the original Spreckels Ditch (SIHP # 50-50-07-1508), the 60 mgd yield was split 50/50 between the two plantations (Wadsworth 1936). The Upper Waihe‘e Ditch tapped the Waihe‘e Stream at the 650 foot elevation just below the Aliele Falls. The longest tunnel was especially challenging, as much of it went through hard, fine-grain basalt. Even using compressed air and percussion drills, the tunnel took eighteen months to cut. The yield of Upper Waihe‘e Ditch was 50 mgd (Wilcox 1996).

The Territorial Government of Hawaii promoted the conservation of water as a vital natural resource of the territory and approved special taxes to be levied beginning in 1909. The U.S. Geological Survey published its first investigation of stream flow measurements in 1913, following the “Gaging of streams and the determination of the water supply of the Territory of Hawaii” beginning in 1910 (Larrison 1915). Figures given for the Waiehu Stream are separated as recordings given for the South Waiehu Stream and the North Waiehu Stream. The discharge at these measuring stations was large, and measurements were recorded in “acre-feet”. An “acre-foot” is equivalent to 43,560 cubic feet. The monthly discharge for each intake of the Waiehu Stream for the month of April 1913 follow: 666 acre-feet for South Waiehu Stream (about 300 feet above South Waiehu ditch intake) and 322 acre-feet for North Waiehu Stream (50 feet above uppermost diversion) (Larrison 1915).

By 1913, Wailuku Sugar Company was irrigated entirely from mountain sources. In addition to the two major ditches described previously, ditches from two smaller streams diverted water from Waikapū Stream, two on the Waiehu Stream, and five from the Wailuku Stream in ‘Īao Valley. These nine ditches have been either consolidated or abandoned over the years and are now maintained by Wailuku Agribusiness (Wilcox 1996). Modifications in 1935 diverted the full capacity of Waihe‘e, Manaole, and Huluhulupueo streams through intake grates into the Waihe‘e Ditch. The Aliele Falls intake was abandoned for a new one slightly downstream (Wilcox 1996).

As new ditches were constructed crossing the windward coast of West Maui, the lands of Waiehu were subjected to sugar cultivation by the Wailuku and Waihe‘e plantations. In response to the growing field systems and need for labor housing, two new plantation camps were built at the confluence of the North and South Waiehu Streams. They were named Mango Tree Camp and Waiehu Camp. These camps are depicted on 1933 and 1942 USGS maps (Figure 15 and Figure 16). These maps also document a portion of the plantation railroad that once extended through the project area, but is no longer present.

Figure 15. Portion of a 1933 USGS topographic map showing Waiehu Camp and Mango Tree Camp west and southwest of the current project area, respectively, and a railroad transecting the project area longitudinally (U.S. Geological Survey 1933)

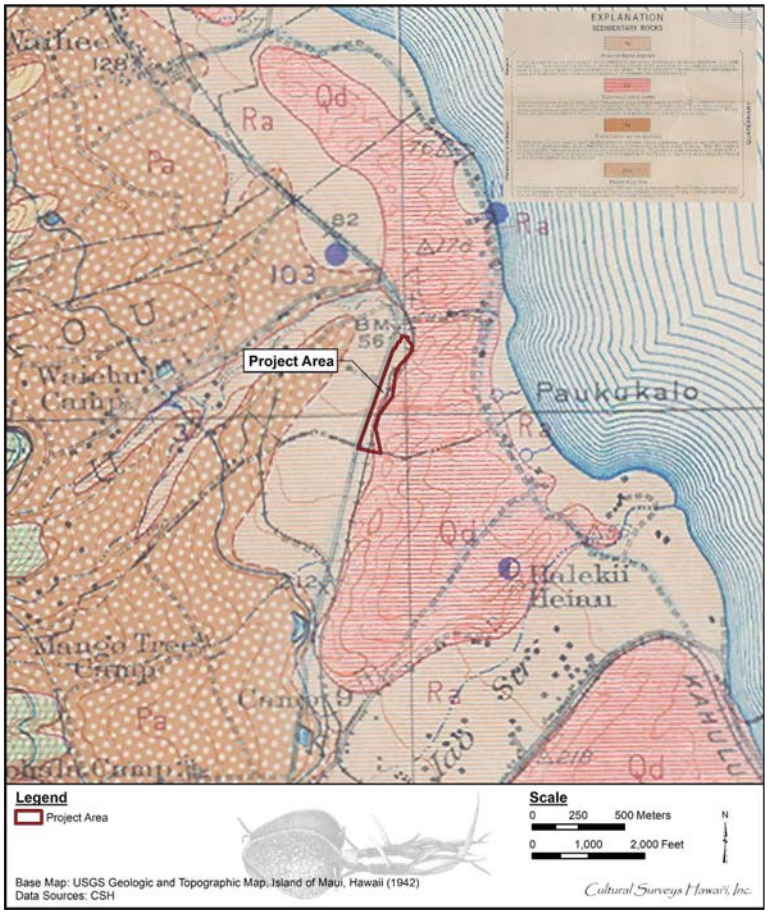

Figure 16. Portion of a 1942 USGS geologic and topographic map showing Waiehu Camp and Mango Tree Camp west and southwest of the current project area, respectively, and a railroad transecting the project area longitudinally (U.S. Geological Survey 1942)

All field labor for the Wailuku Plantation was housed in 11 villages at different field points. A 1955 USGS map shows Waiehu Village labeled west of the project area and Puuohala Village to the south (Figure 17). The Waihe‘e Dairy provided milk to the plantation workers at cost, from their herd of purebred Holstein and Gurnsey dairy cattle. The plantation also grew taro, which was made into *poi* at the dairy, where 15 tons annually were available for sale to the workers, also at cost (Gilmore 1936).

Following the growth of the populated areas surrounding the Waihe‘e, Waiehu, Wailuku, and Waikapū plantations, the combined lands required dedicated sources of drinking water and *kuleana* water. The County of Maui cooperated in water development tunnels in the Waikapū and Wailuku valleys. The Kama Ditch intake below the ‘Īao-Waikapū Ditch intake, in Wailuku Stream, served mostly *kuleana* lands (Wilcox 1996). The continued growth of Waihe‘e, Waiehu, Wailuku and Waikapū was directly related to the transportation services provided by the Wailuku and Kahului Railroad (Fredericksen and Fredericksen 2002).

From 1906 to 1947, Wailuku Agribusiness Company had a railroad system for transporting cut cane to the mill; a portion of the tracks extended between Kahekili Highway and sand dunes (Kennedy 1989). Historic maps show this railroad transecting the project area in 1933 (see Figure 15) and 1942 (see Figure 16), but it had been removed by 1955 (see Figure 17).

By the early 1940s, the main town of Wailuku was transformed from a large plantation village to an important seat of County government. With the onset of World War II, the rapid construction of military defensive structures demanded the immediate use of plantation heavy equipment and operators. Plantation employees from Wailuku and Kahului were pressed into emergency service following the Japanese attack on Pearl Harbor, until military construction personnel were able to take over. By 1942, the U.S. Navy had formed Construction Battalions for building the essential infrastructure required during wartime on Maui. Over the next three years, plantation labor had resumed its prewar agricultural work, and made new plans for expansion in the postwar years (Woodbury 1946).

Along with the change in the agricultural economy came a change in the density and makeup of the population as immigrant labor was hired by the plantation to work the growing sugar cane fields. Handy and others (1991:497) note that the upper section of the modern city of Wailuku is largely built on pre-Contact terrace sites, and by 1934, had been adapted to market gardening by Japanese and Portuguese gardeners. Adaptation of *lo‘i* and *kula* fields to market gardening likely occurred in the other three valleys of Nā Wai ‘Ehā as well.

Handy and Handy (1972:496-497) note the following about Waiehu

> The cane fields now extend throughout this region, continuously from Waihe‘e on the lower slopes; but above Waiehu and Puakala from the upper roads following the irrigation ditches well toward the upper limits of the cane, a few old plantations still persisted in 1933. Some were used for raising wet taro, some for truck gardening. However, except for these few patches the old terraces of the upper slopes are entirely ploughed under. [Handy and Handy1972: 496-497]

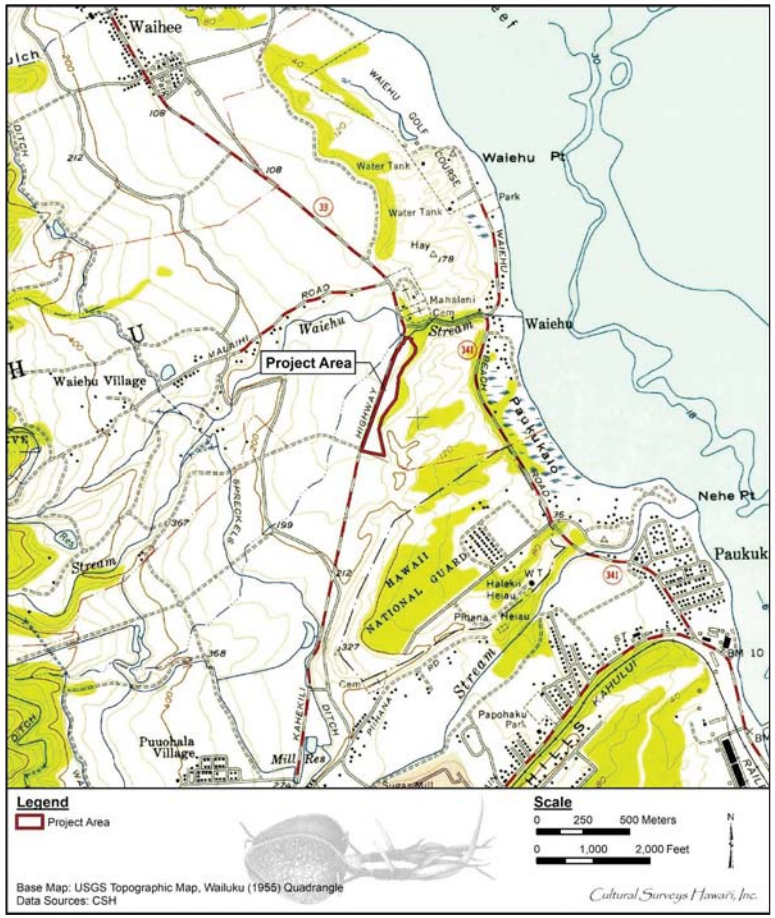

Figure 17. Portion of a 1955 USGS topographic map showing the current project area without a railroad transecting it; Waiehu Village and Puuohala Village are west and southwest of the project area, respectively, and Spreckels Ditch flows west, northwest, and south of the project area (U.S. Geological Survey 1955)

Postwar Maui saw the wholesale development of Kahului as a master-planned community providing fee-simple ownership of single-family homes. The majority of the homes located between Baldwin High School and Pu‘unene Avenue were purchased by plantation employees. This trend continued throughout the 1950s, with plantation camp populations falling in the outlying communities, including Waihe‘e and Waiehu, and rising in the central townsites of Kahului’s new “Dream City” (Dean 1950).

The period of the Vietnam Conflict brought continued changes to the Waihe‘e area. With the prosecution of hostilities in Southeast Asia, O‘ahu military bases were operating at maximum capacity. A Rest & Recreation center was built in an abandoned school cafeteria in Waiehu by the “Camp Maui Detachment of the Marine Corps League.” The center opened in 1967 for use by the U.S. Marine Corps and was staffed by local Mauians (Kester 1967).

2.1.7 Contemporary Land Use

2.1.7.1 Agriculture

Much of the land around and within the current project area was planted in commercial sugarcane until at least the late 1970s (Figure 18 through Figure 20). In March 1979, C. Brewer announced its plans to phase in macadamia nut crops in the Waihee-Waiehu area over a five-year period (Tanji 1979a). Nearly 2,000 acres would be planted with macadamia nut trees, starting with an initial 484 acres in 1979. This plan included the current project area, which is seen in 1988 as at least partially planted with macadamia trees (Figure 21). Full production was expected within seven to 10 years with a projected output of 7,000 pounds of macadamia nuts per acre, to be marketed under Brewer’s Mauna Loa label. Wailuku Sugar Company, a subsidiary of C. Brewer, would retain 3,100 acres in sugarcane. However, by 1988, after 125 years of sugar operations and varied attempts at diversified agriculture, Wailuku Sugar Company mill closed.

Macadamia nuts were commercially farmed at the current project area until at least the end of the twentieth century. In a 1999 news article, the high costs of macadamia nut farming on Maui were recognized (The Honolulu Advertiser 1999). Not only were actual yields less than projected, but nuts had to be shipped to O‘ahu for processing, and significant amounts of nuts ruined during shipping. Macadamia nut orchard lands in Waiehu, including the current project area, were up for sale in the first decade of the twenty-first century. Patches of macadamia nut trees are still grow within portions of the project area today.

The beginning of what resembles a small-scale agricultural operation, which included access roads and an above ground water tank/ reservoir, is visible within the project area on a Google Earth image from 2010 (Figure 22). This endeavor expanded by 2013 with additional land clearing, more access roads, agricultural plots, and paved areas, and structures, most notably within the northern and central portions of the project area (Figure 23). By 2016, the operation appears to have ceased with some of the previously cleared and paved areas covered with natural vegetation (Figure 24). The present-day landscape is similar to that seen in 2016 and 2018 (see Figure 3).

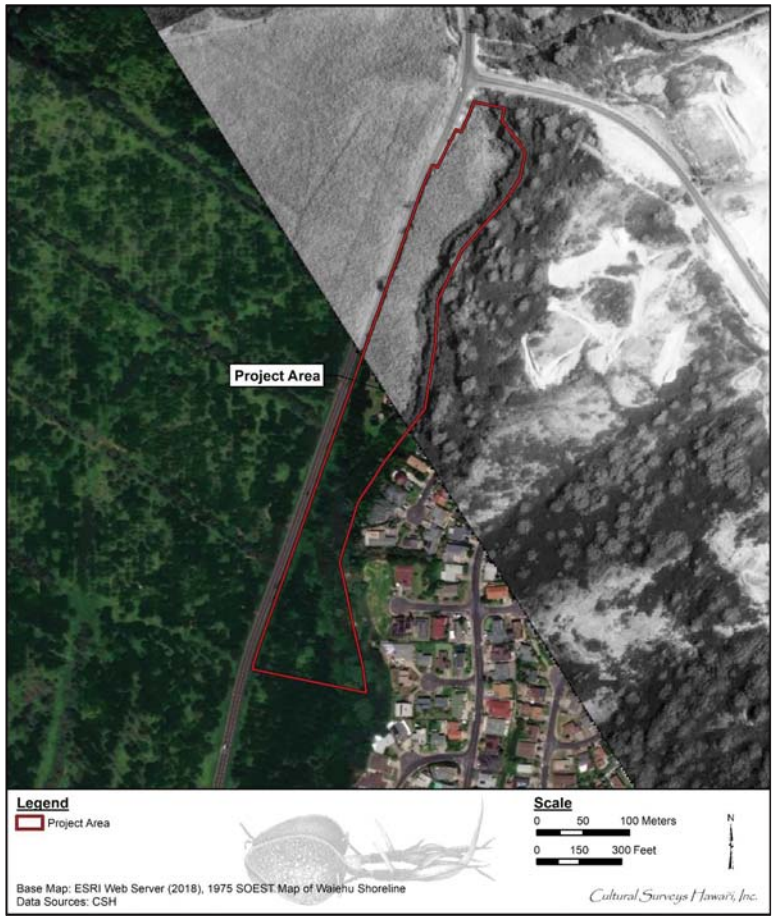

Figure 18. Esri (2018) aerial image of the project area with a partial overlay of a 1975 aerial photo (School of Ocean and Earth Science Technology [SOEST] 1975) showing the northern portion of the project area with sugarcane

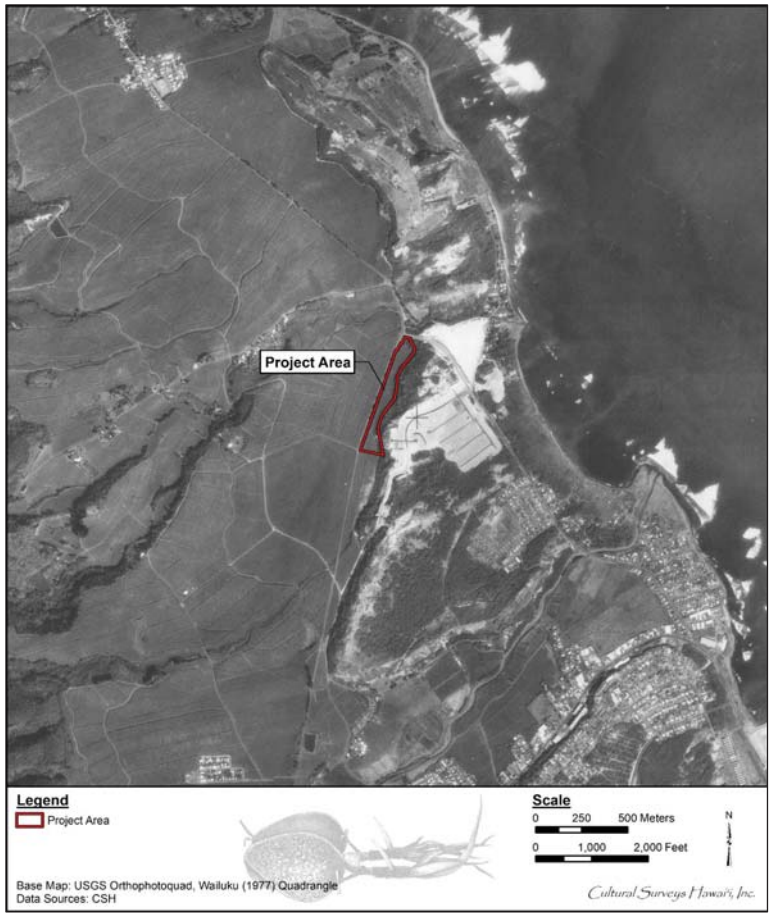

Figure 19. Aerial image showing the cane fields and development around the project area in 1977, which is mostly covered in sugarcane (U.S. Geological Survey 1977)

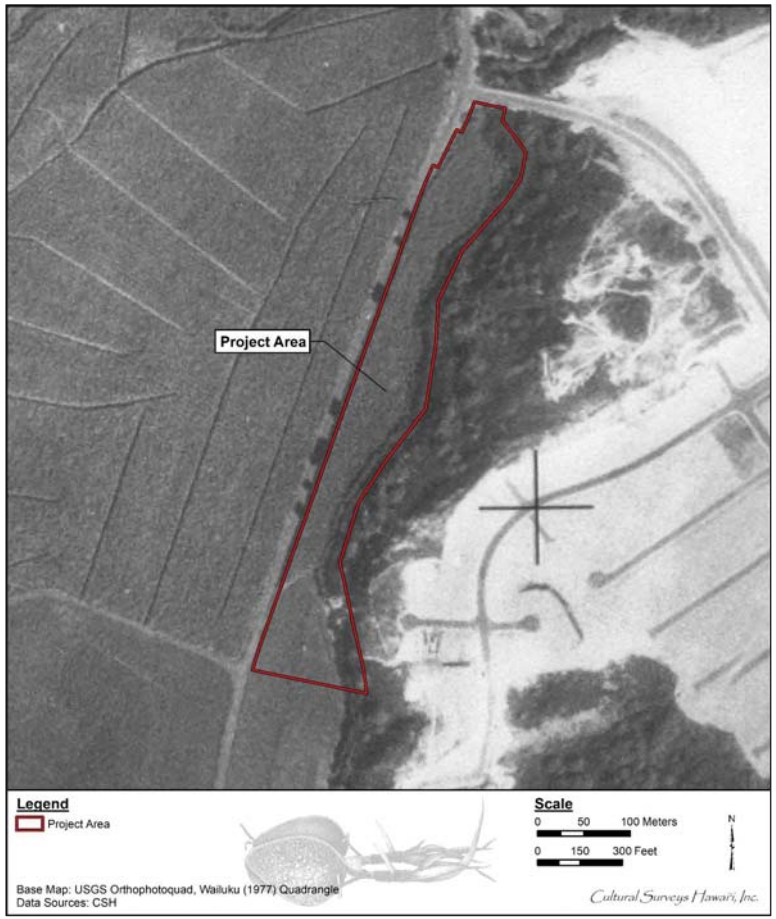

Figure 20. Zoomed in 1977 aerial image showing the project area mostly covered in sugarcane and with trees growing along the eastern boundary (U.S. Geological Survey 1977)

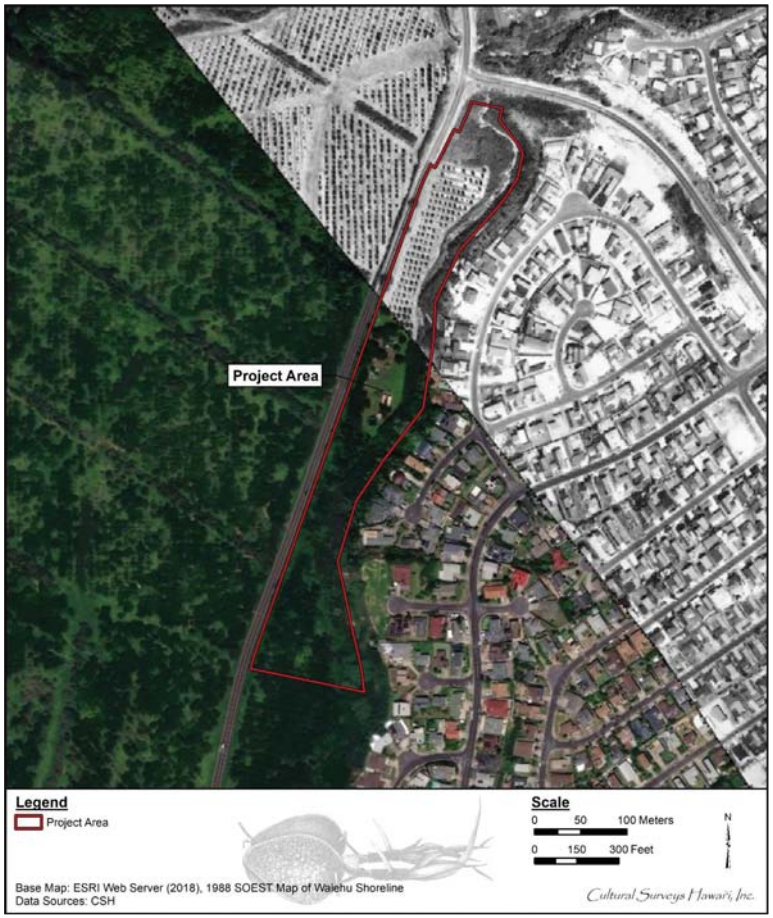

Figure 21. Esri (2018) aerial image of the project area with a partial overlay of a 1988 aerial photo (SOEST 1988) showing the northern portion of the project area with sugarcane

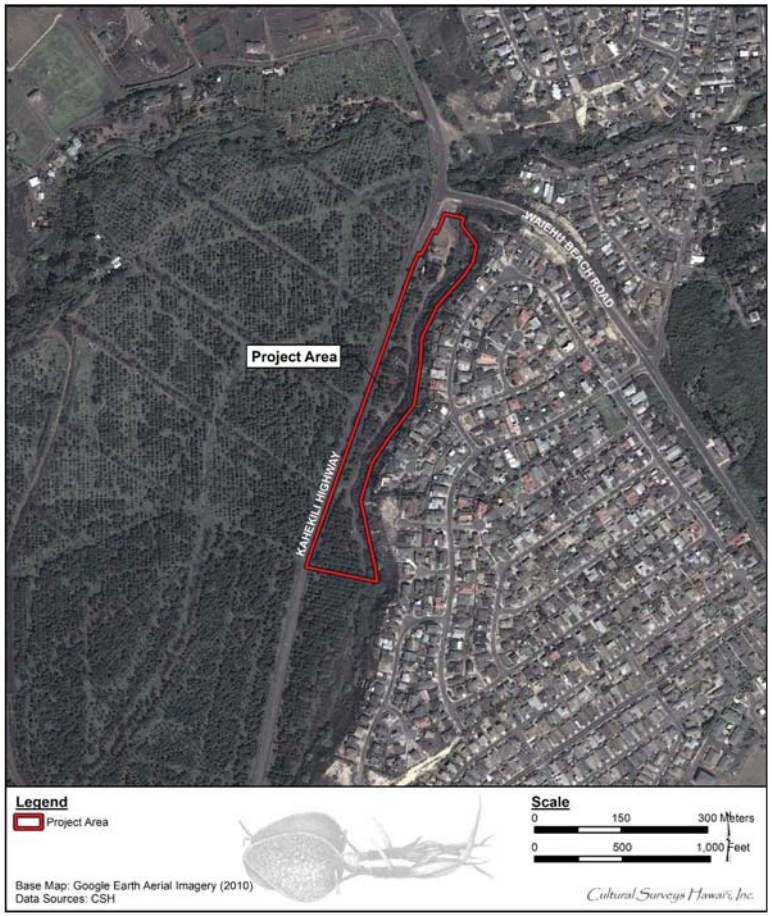

Figure 22. Aerial photo showing the project area in 2010 with groves of macadamia nut trees, and what appears to be the beginning of an agricultural endeavor with some clearing across the project area, an access road, and an above ground water tank/reservoir (Google Earth 2010)

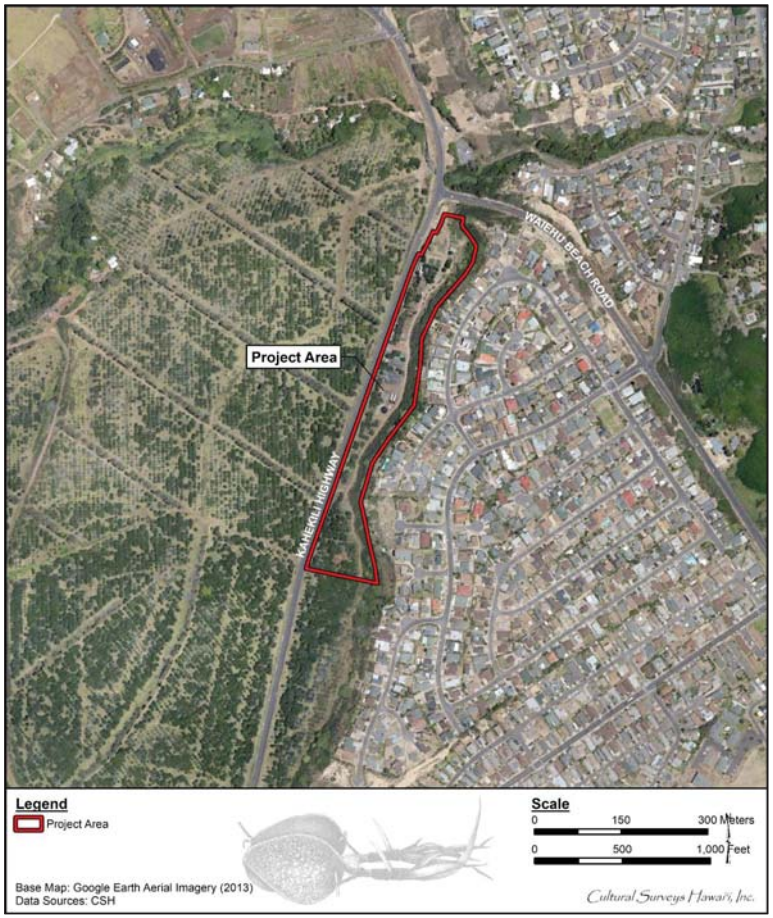

Figure 23. Aerial photo of showing the project area in 2013 with access roads, paved areas, structures, and agricultural plots (Google Earth 2013)

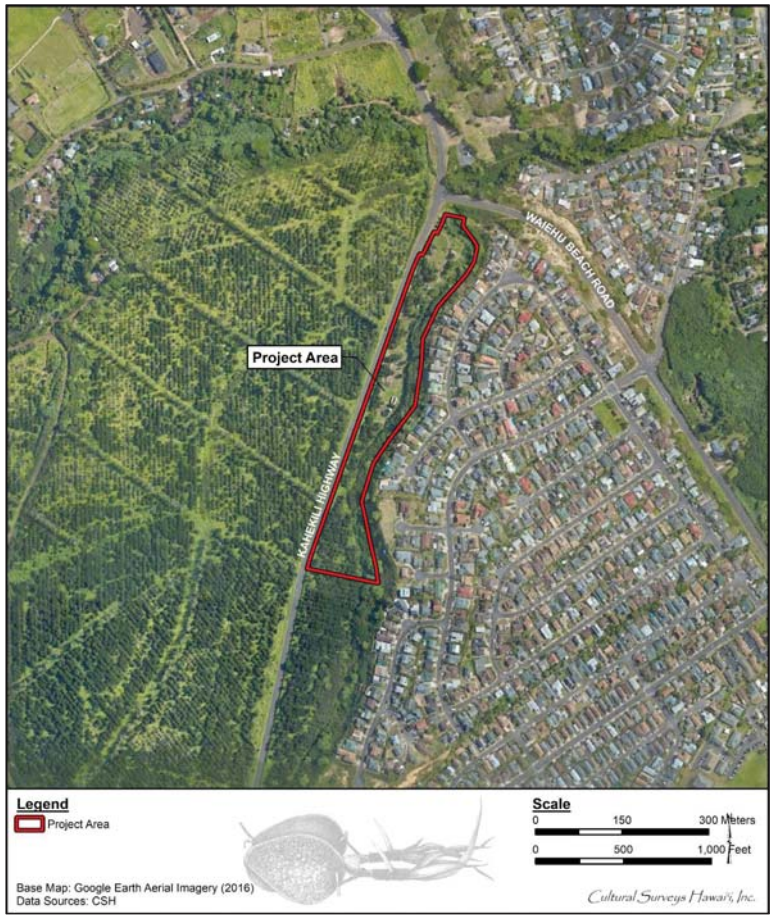

Figure 24. Aerial photo showing the project area in 2016 containing remnants of a previous agricultural operation: some areas remained cleared but with new overgrowth and a few structures and water tank/ reservoir are still on the property (Google Earth 2016)

2.1.7.2 Residential Development

While the current project area and much of the lands to its west remained under agricultural production, the resident population of the Waiehu area, especially *makai* from the current project area continued to grow. In September 1975, ground-breaking commenced for the Waiehu Heights Subdivision (Figure 25), a 720-unit residential development project on 144 acres purchased by Waiehu Heights Associates from Wailuku Sugar Company (The Honolulu Advertiser 1975). This subdivision borders the current project area to the east and is located on top of the lithified sand dune.

In May 1978, two coffin burials were revealed during grading for the development of Waiehu Heights (Tanji 1979b). Grading was halted for over two months while archaeologists from Bernice Pauahi Bishop Museum were consulted and conducted a survey of the area. No additional burials were identified, so grading proceeded. In 1979, after bulldozers cut deeper into the sand dunes, an additional 77 coffin burials were exposed. The presence of coffins indicates the burials occurred post-1778; however, “according to reports, the burials also were done ‘Hawaiian style,’ meaning that to prevent desecration, the graves were not marked. The coffins were placed in caves and the openings hidden under the sand” (Tanji 1979b:1).

All the burials were disinterred, and an announcement was made in an attempt to locate family members to identify the buried individuals before the remains were reinterred. The reinterment location is unknown by CSH. Neither CSH nor the SHPD have been able to locate original archaeological reports concerning these burials or surveys conducted at the Waiehu Heights Subdivision project area. A complaint was filed against the developer and contractor by resident, Charles K. Maxwell of Pukalani, who had warned the developer “that they would be building over an old burial ground” (Tanji 1979b:1; 1979c). Mr. Maxwell expressed hopes that remains would be relocated near their original burial location in Waiehu Heights (Tanji 1979c). Additional human burials have been previously identified during development of the Oceanview Estates subdivision on dune sand northeast of the current project area (Han 1982).

The current affordable housing project proposes additional residential development on the flat, former agricultural land that is located along Kahekili Highway. No ground disturbance is planned for the sand dune slope that defines the eastern boundary of the project area.

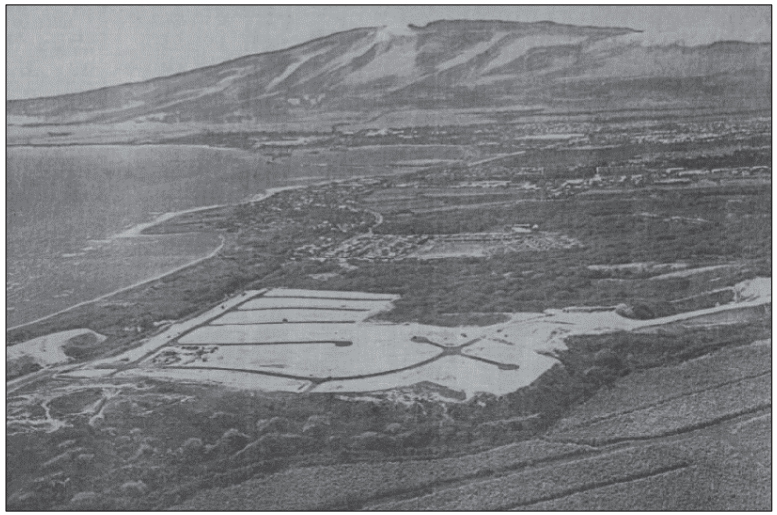

Figure 25. Progress of Waiehu Heights Subdivision development in August 1976; trees along the edge of the cleared sandy area separate the subdivision area from the current project area, which is seen in the foreground covered in sugarcane (Honolulu Star-Bulletin 1975:H-8)

2.2 Previous Archaeological Research

Winslow M. Walker Walker (1931) conducted the earliest systematic archaeological study of the area, expanding upon earlier work for the Bernice Pauahi Bishop Museum by John F.G. Stokes (1916) and Thomas G. Thrum (1908, 1916, 1917, 1918) that focused on generating descriptive lists of traditional Hawaiian ceremonial structures (i.e., *heiau and ko‘a*). These early studies documented burials on the long sandy ridge near the shore northeast of Waihe‘e Village, an adze grinding stone at Wawaekanaka, eight *heiau* at Waihe‘e, and a former fishpond at Kapoho, northeast of Waihe‘e Village. Walker (1931:71) also observed active taro fields and terraces in Waihe‘e.

In Waiehu, Walker (1931) identified five *heiau*: Halelau (Site 37), Kamakoa (Site 38), Malumaluakua (Site 39), Kukuikomo (Site 40), and Puukoa (Site 41). Sites 37 and 41 were both reported as destroyed. Site 38 was identified “in a grove of eucalyptus at about 600 ft. elevation” as “a group of curiously eroded stones which may have had sacred significance, but no trace of walls” was observed; this site was “[s]aid to be place of King Kamakokole where drums were heard on night of Kane” (Walker 1931:141). Walker (1931:142) describes Site 39 as “a level spot without evidences of walls or platforms” surrounded by a “grove of kukui trees” with a “large rock in the center [that] may have served for sacrificial purposes.” Site 40 was identified as “[a]nother heiau without walls or platforms” located “on a ridge between North and South Waiehu Gulches” (Walker 1931:143). Kawailana, an 88-years-old native informant, related to Walker (1931:142) that “the heiaus near Waiehu were all built by Kahekili to Kane, and men and pigs were laid on the lele. In this region a heiau seems to mean merely a sacred spot not marked necessarily by either walls or platforms of stone.” All *heiau* recorded by Walker (1931) in Waiehu were identified west and beyond the immediate vicinity of the current project area (see Figure 5).

Between 1931 and 1976, only sporadic archaeological studies were undertaken in the Waiehu area. The National Historic Preservation Act in 1966 and HRS Chapter 6E, which established the Historic Preservation Program in 1976, mandated the historic preservation review of potential effects of proposed state projects (HRS 6E-8) and any project involving a permit, license, certificate, land use change, subdivision, or other entitlement for use, which may affect historic property (HRS 6E-42). Following the passage of the Act, archaeological studies occurred as a condition of development on a more frequent basis. However, only a few studies have been conducted within the project area vicinity (Table 2 and Figure 26). No historic properties have been previously identified within the current project area. Historic properties documented in the vicinity include confirmed and potential human burials, traditional and historic agricultural, and habitation features (Figure 27).

2.2.1 Han (1982)

From 4 through 12 June 1981, Bernice Pauahi (B.P.) Bishop Museum conducted archaeological salvage excavations and mapped six sites in a portion of the Waiehu dune area (Han 1982), now known as Oceanview Estates Subdivision, which is northeast of the current project area This study was a follow-up to a previous B.P. Bishop Museum archaeological reconnaissance conducted in 1978 to test traditional claims that the area contained ancient burials and a limestone quarry. Historic properties identified during both studies were initially designated Bishop Museum site numbers and were later designated SIHP #s. During the 1978 study, a human burial and a walled

Table 2. Previous archaeological studies within the project area (in **bold**) and vicinity

Reference	Type of Study	Location	Results (SIHP # 50-50-04-####)
Han (1982)	Archaeological salvage excavations	Oceanview Estates Subdivision	Identified four Bishop Museum sites: Ma-C10-17, limestone quarry, Ma-C10-18 and -19, human remains, and Ma-C10-20, scattered shell midden/ possible materials work area; further investigated previously identified Bishop Museum Site Ma-C10-15, human burial, and Ma-C10-16, terraced wall/historic habitation area
Kennedy (1989)	**Archaeological walk-through reconnaissance survey**	Wailuku Project District #3 and Piihana Project District #2 lands, which **included the southern portion of the current project area**	**Identified SIHP # -2985, rock mound/ possible burial, just outside southeast corner of current project area (on top of the dune)**; also identified SIHP # -2986, likely Chinese grave with marker, SIHP # -2987, a small agricultural terrace complex, and Mahalani Cemetery (no SIHP #) further south (not seen on Figure 27)
Estioko-Griffin (1990)	Field Inspection	Waiehu Development Increment C	Examined SIHP # -2986 (likely grave marker) previously identified by Kennedy (1989) and inspected a burial exposed near a sand pit and other reported burials (all south of current project area vicinity/not depicted on Figure 27)
Folk and Hammatt (1992)	Archaeological survey and subsurface testing	Waiehu Beach Lots	Identified SIHP # -3115, two buried charcoal lenses radiocarbon dated from the 14th to 17th century
Fredericksen and Fredericksen (1999)	AIS	Waiehu Kou 2 Residential Development	Identified SIHP # -4731, a pre-Contact habitation area with two associated human burials (north of current project area vicinity/not depicted on Figure 27)
Donham (2003)	Archaeological inspection/ assessment	1376 Kakae Place, Oceanview Estates	No historic properties identified
Dega (2003)	Archaeological monitoring	921 Kualoa Place	No historic properties identified

Reference	Type of Study	Location	Results (SIHP # 50-50-04-####)
Wilson and Dega (2004)	AIS	Approximately 240 acres across Kahekili Highway from the current project area	Identified six historic properties, SIHP # -5522 -5527, and further documented previously identified SIHP # -1508, Spreckels Ditch; four were of these SIHPs were identified in the current project area vicinity: SIHP # -5522, sugarcane agriculture modifications, SIHP # -5523, basalt debitage; SIHP # -5524, isolated *Conus sp*. shell, and SIHP # -5525, clearing terrace and mound
Madeus and Fredericksen (2005)	AIS	2-acre parcel on Malaihi Road	Identified SIHP # -5739, a pre- and post-Contact agricultural and habitation complex; mentions SIHP # -4759, a habitation area remnant with three possible burials, which was identified by Xamanek Researches in a separate AIS conducted north of the project area (see Figure 27)
Dega (2006)	Archaeological monitoring	955 Puuloa Street	No historic properties identified
Lee-Greig et al. (2006)			Identified SIHP # -6081, historic era agricultural/habitation complex; SIHP # -6082, traditional/ historic cultural material scatter; and SIHP # -6083 is an abandoned *auwai;* further documented four features of SIHP # -5739 previously identified by Madeus and Fredericksen (2005)
Shefcheck and Dega (2008)	**AIS**	**Current project area**	**No historic properties identified.**

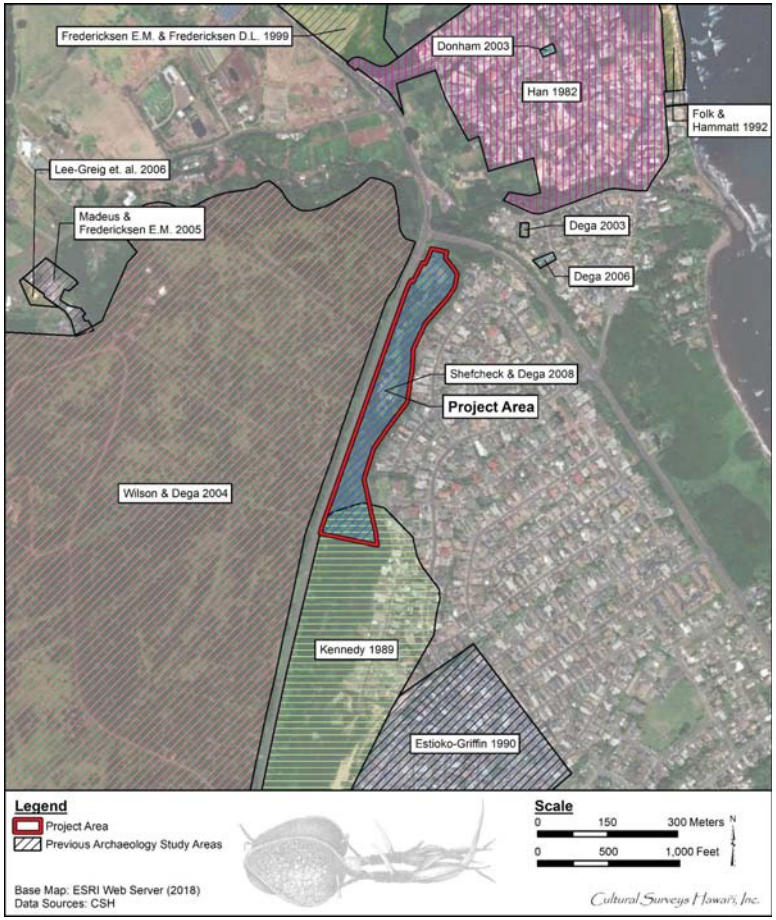

Figure 26. Esri (2018) aerial image showing previous archaeological studies conducted within the project area and vicinity

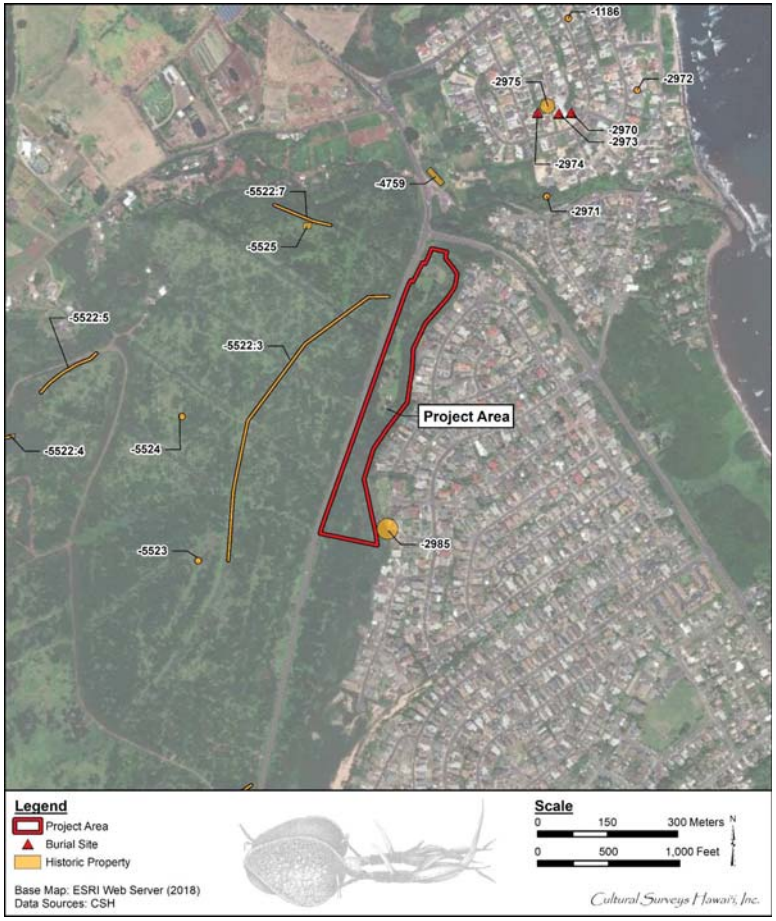

Figure 27. Esri (2018) aerial image showing the project area and locations of previously identified historic properties in the vicinity

terrace were identified and designated as Bishop Museum Sites 50-Ma-C10-15 (SIHP # 50-50-04-2970) and 50-Ma-C10-16 (SIHP # -2971), respectively; a limestone quarry was not identified with any certainty at that time. During the excavations conducted in 1981, four additional sites were identified: 50-Ma-C10-17 through -20/ SIHP #s -2972 -2975. Site 50-Ma-C10-17 (SIHP # -2972) is the locus of the reputed limestone quarry, Sites 50-Ma-C10-18 and -19 (SIHP #s -2973 and -2974) are both scatters of fragmented human remains, and Site 50-Ma-C10-20 (SIHP # -2975) is a scattered shell midden and possible materials work area. At Site 50-Ma-C10-15 (SIHP # -2970), a human burial in a flexed position was disinterred during the 1981 study. Further investigation at Site 50-Ma-C10-16 (SIHP # -2971), walled terrace, determined the site to be an early to mid-1900s historic habitation area. In addition, an approximately 11.5-acre possible ancient fishpond (SIHP # -2976) was documented at the northeast corner of the subdivision (not depicted on Figure 27).

2.2.2 Kennedy (1989)

Between 1 and 7 January 1983, Archaeological Consultants of Hawaii, Inc. (ACH) conducted an archaeological walk-through reconnaissance survey (Kennedy 1989), which included the southern portion of the current project area. No historic properties were identified within the current project area; however, SIHP # -50-50-04-2985, a small rock mound interpreted as a potential burial site, was documented near the southeast corner of the project area on top of the adjacent lithified dune (see Figure 27). In addition, ACH identified SIHP # -2986, a likely Chinese grave with a 'typically Chinese' marker (Kennedy 1989:5), SIHP # -2987, a small agricultural terrace complex, and Mahalani Cemetery (no SIHP #) further south and away from the immediate vicinity of the current project area (i.e., not depicted on Figure 27).

2.2.3 Estioko-Griffin (1990)

On 14 December 1990, the SHPD conducted a field inspection at Waiehu Development Increment C, a Housing Finance and Development Corporation (HFDC) construction site in Paukukalo (Estioko-Griffin 1990). The inspection included an examination of burials exposed at a sand mining pit and another area in which bone fragments were exposed during grubbing. In addition, a reported 'Japanese' grave previously identified by Kennedy (1989) as a likely Chinese grave (SIHP # -2986) was inspected. At least one individual within a burial pit was exposed "along the steep face of the sand mining pit" (Estioko-Griffin 1990:1). Due to safety concerns, mechanical excavation was recommended. An analysis of previously exposed fragments identified both animal and isolated human skeletal elements in an area also containing recent refuse. Subsurface testing was not recommended by the SHPD in this area, since it was slated to be filled with 20 to 30 ft of sand. Archaeological monitoring of grubbing with "small equipment" and "slow and controlled" grading was recommended for the area near where the burials were exposed (Estioko-Griffin 1990:2). The SHPD recommended that the marked Japanese or Chinese burial be relocated. No SIHP #s were identified in the immediate vicinity of the current project area (i.e., not depicted on Figure 27).

2.2.4 Folk and Hammatt (1992)

CSH conducted an archaeological survey and subsurface testing of Waiehu beach lots along the coast northeast of the current project area (Folk and Hammatt 1992). The study included a pedestrian survey and subsurface testing of nine trenches excavated by backhoe. No cultural remains were identified during the surface survey. Two buried charcoal lenses were encountered

during subsurface testing and designated SIHP # 50-50-04-3115. Radiocarbon analysis dated the lenses from the 14th to the 17th century. No cultural materials were observed in association with SIHP # -3115 or elsewhere during the study. No further archaeological work was recommended.

2.2.5 Fredericksen and Fredericksen (1999)

Between March and May 1999, Xamanak Researches conducted an archaeological inventory survey (AIS) of an approximately 1,110-m long by 18-m wide drainage and diversion easement corridor for the Waiehu Kou 2 Residential Development Project (Fredericksen and Fredericksen 1999). The AIS included a 100 percent pedestrian survey of the corridor and subsurface testing within the corridor and portions of two adjacent proposed retention basins. Seventy mechanically-excavated trenches and 18 manually-excavated units were tested. One historic property was identified during the study: SIHP # 50-50-04-4731.

SIHP # -4731 is interpreted as an extensive, pre-Contact habitation area, which is located along the *mauka* side of a large, coastal sand dune north of the current project area. During the AIS, two human burials, one child and one adult, were identified as associated with SIHP # -4731. A dog burial was also encountered within a test unit. Artifacts recovered during the study include lithics (flakes, cores, adze fragments, etc.), worked bone pieces and tools associated with fishhook manufacturing, shells and a drilled pig's tooth for adornment, over 300 pieces of volcanic glass, a fish bone awl and picks, and a "utilized shark tooth" (Fredericksen and Fredericksen 1999:53). Radiocarbon analyses of four charcoal samples indicate that SIHP # -4731 was inhabited from the 13th century through the 18th century. SIHP # -4731, deemed significant under Criteria A, D, and E, is located north, beyond the vicinity of the current project area (not depicted on Figure 27)

2.2.6 Donham (2003)

On 24 June 2003, Akahele Archaeology conducted an archaeological inspection for modification of a dwelling at 1376 Kakae Place in Oceanview Estates (Donham 2003). No historic properties were identified. Per consultation with the SHPD, the negative findings were published in an archaeological assessment report.

2.2.7 Dega (2003)

On 15 September 2003, Scientific Consultant Services, Inc. (SCS) conducted archaeological monitoring of residential construction on a parcel of private property 921 Kualoa Place (Dega 2003) within a neighborhood northeast of the present project area. SCS monitored the excavation of approximately 25 linear meters (80 linear ft) of trenches measuring approximately 60 cm (2 ft) wide with a maximum depth of 30 cmbs (approximately 12 in). No historic properties were encountered. Observed stratigraphy consisted of two stratigraphic layers: a silty clay fill overlying naturally deposited Jaucus sand. Full-time archaeological monitoring was recommended for any additional ground-disturbing projects within or near the parcel due to the known cultural sensitivity of the area, which includes nearby previously identified human burials.

2.2.8 Wilson and Dega (2004)

In 2004, SCS completed an archaeological inventory survey (AIS) of approximately 240 acres in Waiehu (Wilson and Dega 2004). This study area is located west of the current project area, on the opposite, *mauka* side of Kahekili Hwy. The AIS included a 100 percent pedestrian survey and subsurface testing of mechanically-excavated trenches and manually-excavated test units. Six

historic properties were newly identified: SIHP #s 50-50-07-5522 through -5527. In addition, one previously identified historic property, SIHP # -1508 (Spreckels Ditch), was also documented during the study.

SIHP # -5522 is described as sugarcane agricultural modifications. SCS identified seven cane field features comprising SIHP # -5522: 1) drainage ditch; 2) erosion control agricultural berms; 3) drainage ditch/ swale; 4) irrigation ditch with associated boulder mound; 5) motorized vehicle access dirt road; 6) piggery access dirt road; and 7) access graded dirt road. SIHP # -5523 represents an isolated lithics find of basalt debitage consisting of an interior flake, a polished flake, and a piece of volcanic glass. SIHP # -5524 marks the location of a worn, single, isolated *Conus sp.* shell interpreted as historic midden material; however, testing of the site was not conducted, and no other cultural materials were identified in association with the shell. SIHP # -5525 is a terrace and mound resulting from cane field clearing; SIHP # -5526 is the concrete and cinder block foundation remnants of a piggery; and SIHP # -5527 is a terrace complex consisting of five terraces likely associated with early historic agriculture.

No additional archaeological work was recommended for the historic properties identified during the study. SCS recommended archaeological monitoring for any land alterations occurring with 50 m (164 ft) of Kahekili Highway and noted a greater potential for encountering human burials within the northeastern portion of the study area, which is near cemeteries and sand dunes known to contain human burials.

2.2.9 Madeus and Fredericksen (2005)

In August 2005, Xamanek Researches, LLC conducted an AIS of approximately 2 acres fronting Malaihi Road and Waiehu Stream (Madeus and Fredericksen 2005). The study included a 100 percent pedestrian survey and the manual excavation of two 50 cm by 50 cm test units. One historic property was identified: SIHP # -50-50-04-5739, an agricultural and habitation complex consisting of 43 features. Thirty-five of these features are considered pre-Contact agricultural features used subsequently post-Contact, while the remaining eight features are interpreted as post-Contact features. Function determinations include 38 features used for agriculture and animal husbandry (35 agricultural terraces, one *auwai* (irrigation ditch), a concrete water trough, and a concrete animal pen or horse stable), four habitation features (historic house, two historic garages, and a sewer tank depression), and one feature of indeterminate function. The latter feature was a scatter of beach materials consisting of coral, cobbles, pebbles, and shell, which appeared to be imported during historic habitation, possibly for yard beautification purposes. No further archaeological work was recommended for the house, terraces, husbandry features, and scatter; the landowner agreed to preserve these features. Precautionary archaeological monitoring was recommended for ground disturbance associated with proposed construction on the parcel.

Within the previous archaeology discussion section of the AIS report, Madeus and Fredericksen (2005) discuss an AIS of the Waiehu Kou off-site sewer line previously conducted by Xamanek Researches in the year 2000. Neither CSH nor the SHPD has been able to locate the original report for this study. It is mentioned here since SIHP # -4759, "interpreted as a low-density habitation area remnant, which has at least 3 probable precontact burials associated with it," was identified approximately 150 m (492 ft) north of the current project area (Madeus and Fredericksen 2005:12). (see Figure 27).

2.2.10 Lee-Greig et al. (2006)

In 2006, CSH conducted an AIS of an approximately 0.50-acre private property on Malaihi Road (Lee-Greig et al. 2006) in a residential area west of the current project area. The study consisted of a surface survey and subsurface testing. Three historic properties were newly identified: SIHP #s -6081 through -6083. SIHP # -6081 is a historic era agricultural and habitation complex consisting of seven features, which include a lotus pond, a planting circle, habitation remnants represented by low terraces and a surface scatter of cultural materials, a water control feature, and a paved area of indeterminate function. SIHP # -6082 is a cultural material (traditional and historic) scatter of indeterminate function. SIHP # -6083 is an abandoned *auwai*. In addition to identifying the aforementioned historic properties, CSH further documented four features (three earthen terraces and one *auwai*) of SIHP # -5739 previously identified by Madeus and Fredericksen (2005). CSH determined that information available from the historic properties identified during the AIS were adequately recorded; as such, the project specific effect determination was “no historic properties affected,” and no additional archaeological work was recommended (Lee-Greig et al. 2006:62).

2.2.11 Dega (2006)

On 9 May 2006, SCS conducted archaeological monitoring for a private residential construction project on a parcel at 955 Puuloa Street (Dega 2006) located northeast of the current project area. Excavations for the project consisted of three manually-excavated foundation trenches. These approximately 30-cm (12-in) wide trenches were excavated to a maximum depth of 50 cmbs (approximately 20 in). Two trenches were approximately 10 m (33 ft) long, while the third trench measured approximately 8 m (26 ft) in length. No historic properties were identified. Two stratigraphic layers were observed: top soil fill overlying naturally deposited Pu‘uone sand. Due to the cultural sensitivity of the general area, including the nearby previous identification of human burials, SCS recommended full-time archaeological monitoring for any future ground-disturbing activities within or near the parcel.

2.2.12 Shefcheck and Dega (2008)

From 29 October through 2 November 2007, SCS conducted an AIS of the current 11.5-acre project area (Shefcheck and Dega 2008). The study included a pedestrian survey of the entire project area and representative subsurface testing of 17 mechanically-excavated trenches. At the time of the AIS, the parcel was vacant and scattered throughout with modern trash; the western portion of the project area contained “a grove of macadamia nut trees (*Macadamia integrifolia*)” within a “pre-existing macadamia nut orchard” (Shefcheck and Dega 2008:5). SCS noted that the area had previously been mined for sand by Hawaiian Cement and that the project area was used to stockpile materials during the construction of Waiehu Heights Subdivision. No historic properties were identified at or below the surface.

Two general patterns of stratigraphy were observed across the project area. Stratigraphy observed in the north portion of the project area consisted of a very dark grayish brown silt loam at 0 to 40 cmbs overlying a brown silt from 40 cmbs to base of excavation (BOE). Observed stratigraphy in the southern portion of the project area consisted of three strata: a very dark grayish brown silt loam at 0 to 10 cmbs atop a brown silt extending from 10 to 120 cmbs overlying pale brown silty sand, identified as an original deposit of pu‘uone sand, at 120 cmbs to BOE.

SCS recommended the following for the current project area:

> The presence of sandy matrix and the high number of burials and other culturally significant subsurface deposits in the surrounding area suggest the likelihood for the discovery of archaeological sites, such as burials and/or habitation sites, in the subsurface deposits of the project area. Thus, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities [Shefcheck and Dega 2008:18]

2.3 Background Summary and Predictive Model

Waiehu Ahupua‘a is notable for its extensive *lo‘i* agriculture, which appears to have been concentrated west of the project area but may have extended within the project area. Expansive and productive wetland taro cultivation within Waiehu provides evidence that a substantial population would have been established in the region during the pre-Contact period. The project area may have once included pre-Contact archaeological sites related to traditional agricultural use, water control, or habitation. Subsequent commercial sugarcane and macadamia nut farming likely impacted and destroyed pre-Contact surface structures or deposits that may have existed within the project area. An archaeological inventory survey of the parcel (Shefcheck and Dega 2008) found no evidence of pre-Contact agricultural land use or habitation. Nonetheless, there remains a potential for remnants of pre-Contact land use within the project area such as buried structural remnants or soil deposits.

The project area is located on the edge of, but outside of, a lithified dune system that extends throughout the isthmus of Maui. On-going traditional, historical, and archaeological research have documented knowledge and evidence of the use of the dune system for burial. Research and archaeological testing conducted for the current project area indicate that the project area is predominately located within alluvial sediment that has been deposited along the backside of the lithified dune. However, sandy soils were documented in the southern portion of the project area during the project’s AIS (Shefcheck and Dega 2008). No burials or cultural deposits were observed during archaeological testing within the project area. Furthermore, Shefcheck and Dega (2008) suggest that the project area had previously been mined for sand by Hawaiian Cement and that the project area was used to stockpile materials during the construction of Waiehu Heights Subdivision. Given the results of archaeological testing and a review of previous land use, the project area appears to be located near, but outside of the lithified dune and associated burial cluster. No project-related ground disturbance is planned for the sand dune slope that defines the eastern boundary of the project area. Nonetheless, there remains a potential for the identification of fragmentary human skeletal remains within the project area given the documentation of historic commercial agriculture and sand mining that could have displaced and scattered material from the adjacent dune.

As Wailuku District underwent a dramatic change from traditional agriculture to commercial sugarcane cultivation beginning in the mid-1800s, Waiehu Ahupua‘a not only experienced a shift in agriculture focus but a shift in settlement as well. Many LCAs along Waiehu Stream were acquired by commercial sugarcane companies. The lack of house lots depicted within the current project area on historic maps indicates that the project area has been uninhabited from at least as early as the late 1800s, during which sugarcane cultivation may have begun on the current project area lands. No historic properties related to commercial agriculture were identified during an AIS

of the project area (Shefcheck and Dega 2008), however there remains the potential to identify buried structural remnants or soils related to commercial agriculture during project-related ground disturbance.

From 1906 to 1947, Wailuku Agribusiness Company had a railroad system for transporting cut cane to the mill, with a portion of the tracks extending between Kahekili Highway and sand dunes in Waiehu (Kennedy 1989). Historic maps show that this railroad transected the project area in 1933 (see Figure 15) and 1942 (see Figure 16) and had been removed by 1955 (see Figure 17). No historic properties related to the railroad were identified during an AIS of the project area (Shefcheck and Dega 2008), however, there remains a potential to identify buried structural remnants, layers, or artifacts related to the railroad during project-related ground disturbance.

Sugarcane likely continued to grow at the current project area until at least 1979, prior to being converted into a portion of a commercial macadamia nut orchard. Macadamia nuts were farmed at the current project area until at least the end of the twentieth century. Small groves of macadamia nut trees still grow within portions of the project area today. The AIS of the project area (Shefcheck and Dega 2008) documented modern trash and evidence of macadamia nut farming within the project area. Trash deposits or remnants of late twentieth century agriculture have the potential to be older than 50 years (pre-1970 at the time of this AMP) and therefore considered to be historic properties. If trash deposits are identified during project-related ground disturbance, the age of these deposits will be analyzed and the deposits will be assessed as historic properties if determined to be more than 50 years old.

Section 3 Archaeological Monitoring Provisions

An AIS of the current project area, which included subsurface testing, was previously conducted by SCS in 2007 (Shefcheck and Dega 2008). No historic properties were identified. However, precautionary archaeological monitoring of all project-related ground disturbance was recommended for the project area due to the presence of sand deposits in the southern portion of the project area and the numerous burials and other significant subsurface cultural deposits previously identified in the vicinity.

Under Hawai‘i State historic preservation legislation, “Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities, which may adversely affect historic properties” (HAR §13-13-279-3). Hawai‘i State historic preservation legislation governing archaeological monitoring programs requires that each monitoring plan discuss eight specific items (HAR §13-13-279-4). The monitoring provisions below address these eight requirements in terms of archaeological monitoring for the excavations within the current project area.

1) Anticipated Historic Properties:

   Traditional and historic background research conducted for this AMP has identified the types of historic properties that could be present within the project area based on former land use. This research, as summarized in Section 2.3, indicates a potential for buried structural remnants or soil deposits related to pre-Contact agriculture, water control, or habitation, fragmentary skeletal remains that were displaced from commercial agricultural operations and sand mining operations in the project area, buried remnants related to the former railroad that extended through the project area, and trash deposits related to late-Twentieth Century macadamia nut farming within the project area.

   No historic properties have been previously identified within the project area. A 100 percent-coverage pedestrian inspection has confirmed that no historic properties are present on the surface of the project area (Shefcheck and Dega 2008). Representative subsurface test excavations found no evidence of buried historic properties or human burials within the project area (Shefcheck and Dega 2008). The sampling strategy completed for the project area suggests that the potential for identifying burial historic properties is low.

2) Locations of Historic Properties:

   No historic properties have been previously identified within the project area.

   SIHP # -2985, a possible human burial, was previously identified on top a sandy ridge (lithified dune) near the southeast corner of the current project area. The current project will not include project-related ground disturbance into the dune slope.

3) Fieldwork:

   The SHPD shall be notified prior to the start of ground disturbing work. On-site archaeological monitoring shall be conducted for all project-related ground disturbance occurring throughout the project area. One archaeological monitor will be assigned to each piece of ground-disturbing equipment in operation at all times and in all locations

throughout the project area. Any departure from this will occur only after consultation with and written concurrence from the SHPD.

The monitoring fieldwork will likely encompass the documentation of subsurface archaeological deposits (e.g., trash pits, structural remnants) and will employ current standard archaeological recording techniques. This will include drawing and recording the stratigraphy of excavation profiles where cultural features or artifacts are exposed as well as representative profiles. These exposures will be photographed, located on project area maps, and sampled. Photographs and representative profiles of excavations will be taken even if no historically significant sites are documented. As appropriate, sampling will include the collection of representative artifacts, bulk sediment samples, and/or the on-site screening of measured volumes of feature fill to determine feature contents.

Documentation in the field may also include plotting GPS points with a Trimble Geo XH mapping grade GPS unit with a TSCI Datalogger and real-time differential correction. This unit provides sub-meter horizontal accuracy in the field. GPS field data will be postprocessed, yielding horizontal accuracy between 0.5 and 0.3 m. Any plotted GPS points will be recorded in a table along with their location.

In the event of significant finds, the SHPD will be notified. If human remains are identified, construction activity in the vicinity will be stopped and no exploratory work of any kind will be conducted unless specifically requested by the SHPD. All human skeletal remains that are encountered during excavation will be handled in compliance with HAR §13-13-300 and HRS §6E-43.

4) Archaeologist’s Role:

The on-site archaeologist has the authority to stop work immediately in the area of any findings so that documentation can proceed, and appropriate treatment can be determined. In addition, the archaeologist has the authority to slow and/or suspend construction activities in order to ensure that the necessary archaeological sampling and recording can take place.

5) Coordination Meeting:

Before work commences on the project, the on-site archaeologist shall hold a coordination meeting to orient the construction crew to the requirements of the archaeological monitoring program. At this meeting, the monitor will emphasize his or her authority to temporarily halt construction and state that all finds (including objects such as bottles) are the property of the landowner and may not be removed from the construction site. At this time, it will be made clear that the archaeologist must be on site during all subsurface excavations.

6) Laboratory Work:

Laboratory work will be conducted in accordance with HAR §13-13-279-5(6). Laboratory analysis of non-burial related finds will be tabulated, and standard artifact and midden recording will be conducted as follows. Artifacts will be documented as to provenience, measurements, weight, type of material, and presumed function. Photographs of representative artifacts will be taken for inclusion in the archaeological monitoring report. Bone and shell midden materials will be sorted down to species, when possible, and then tabulated by provenience.

As appropriate, collected charcoal material obtained within intact cultural deposits will be analyzed for species identification. Charcoal samples ideal for dating analyses will be sent to Beta Analytic, Inc. for radiocarbon dating. If appropriate, artifacts may be sent to the University of Hawai‘i-Hilo Geoarchaeology Lab for Energy-Dispersive X-ray Fluorescence (EDXRF) analysis in order to identify and possibly geographically locate the source material. All analyzed samples, provenience information, and results will be presented in table form within the archaeological monitoring report.

7) Report Preparation:

The report will contain sections on monitoring methods, archaeological results, stratigraphy, and results of laboratory analyses, and it will present a synthesis of these results. The report will address the requirements of a monitoring report (pursuant to HAR §13-13-279-5). Photographs of excavations will be included in the monitoring report even if no historically significant sites are documented. Should burial treatment be completed as part of the monitoring effort, a summary of this treatment will be included in the monitoring report. Should burials and/or human remains be identified, CSH will provide all appropriate additional written documentation (e.g., letters, memos, reports) that may be requested by the SHPD.

8) Archiving Materials:

All burial materials will be addressed in accordance with SHPD directives. Materials not associated with burials will be temporarily stored at the CSH Wailuku office until an appropriate curation facility is selected, in consultation with the landowner and the SHPD. All data generated will be stored at CSH offices.

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Appendix A SHPD Correspondence

LINDA LINGLE
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FORESTRY AND WILDLIFE
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

June 13, 2008

Michael F. Dega, Ph.D.
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 975
Honolulu, Hawai'i 96813

LOG NO: 2008.2334
DOC NO: 0806PC23
Archaeology

Dear Dr. Dega:

SUBJECT: Chapter 6E-42 Historic Preservation Review of a Revised Archaeological Assessment for Approximately 11.75 Acres Located in Waiehu Waiehu Ahupua'a, Wailuku District, Island of Maui, Hawai'i TMK: (2) 3-3-001: por. 016

Thank you for the opportunity to review this revised report, which our staff received on June 12, 2008 (Shefcheck and Dega 2008): *An Archaeological Assessment of Approximately 11.75 Acres in Waiehu*…Scientific Consultant Services, Inc.

The report was first reviewed by SHPD staff on May 20 of 2008, resulting in two requested revisions (SHPD LOG NO: 2007.4178: DOC NO: 0805PC32). The most recent version of the report was reviewed in hardcopy format to confirm completion of previously requested revisions and suggestions.

The report now contains the required information as specified in HAR §13-276-5 regarding the contents of inventory survey level work conducted in general, and is acceptable.

Should you have any questions or comments regarding this review, please contact Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy McMahon, Archaeologist and Acting Archaeology Branch Chief
State Historic Preservation Division

c: Jeff Hunt, Director, Dept. of Planning, 250 S. High Street, Wailuku, Hawai'i 96793

STATE HISTORIC PRESERVATION DIVISION ACCEPTANCE LETTER OF ARCHAEOLOGICAL MONITORING PLAN

APPENDIX

G-1

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

November 10, 2021

IN REPLY REFER TO:
Project No.: 2020PR34681
Doc. No.: 2111AM04
Archaeology

Lori Tsuhako, Director
County of Maui
Department of Housing and Human Concerns (DHHC)
2200 Main Street, Suite 546
Wailuku, HI 96793
Email: director.hhc@mauicounty.gov

Dear Lori Tsuhako:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
County of Maui DHHC Request for Determination
Waiehu Affordable Housing Development Project
Archaeological Monitoring Plan
Wailuku Ahupuaʻa, Pūʻali Komohana District, Island of Maui
TMK: (2) 3-3-001:106

This letter provides the State Historic Preservation Division's (SHPD's) review of the draft archaeological monitoring plan (AMP) titled *Archaeological Monitoring Plan for the Affordable Housing Project in Waiehu, Waiehu Ahupuaʻa, Wailuku District, Maui Island, TMK: (2) 3-3-001:106* (Yates and Hammatt, October 2020) prepared in support of the County of Maui DHHC Waiehu Affordable Housing Development project. SHPD received the current submission via email on October 23, 2020 (Log No. 2020.02574). In addition to the draft AMP, the submission also included a SHPD HRS 6E Submittal Form, a TMK map, a conceptual plan, a copy of a SHPD-accepted archaeological inventory survey (Shefcheck and Dega 2008) conducted in 2007 by Scientific Consultant Services, Inc. (SCS) for a 11.75-acre project area [TMK: (2) 3-3-001:016 por.] a copy of SHPD's acceptance letter (June 13, 2008; Log No. 2008.2334, Doc. No. 0806PC23), and a letter submitted by the County of Maui Department of Housing & Human Concerns (DHHC) dated October 15, 2020 initiating HRS 6E review of the proposed affordable housing project.

The County of Maui DHHC, in cooperation with Maui Economic Opportunity, Inc. (MECO) and Hale Mahaolu, proposes the subject affordable housing project within a 11.48-acre project area on the subject property. The project will involve the construction of 120 residential units as well as a 6,262-sq.-ft. a 3,600-sq.-ft. community center, 240 parking stalls, and 12 additional stalls for the community center. Aerial photographs show the property is a former agricultural field.

The Shefcheck and Dega (2008) archaeological inventory survey included the current project area and involved a 100% coverage pedestrian survey and excavation of 17 trenches. No historic properties were identified. However, a Puuone sand deposit was identified within the southern portion of the project area and a Chinese grave (SIHP # 50-50-04-02986) has been previously identified outside of the southeast boundary of the project area. Additionally, SHPD records show SIHP # 50-50-04-02977 (Historic Burials) was identified during Phase II development of the neighboring subdivision. The negative findings were presented in an archaeological assessment (AA) report (Shefcheck and Dega 2008) which included a recommendation that archaeological monitoring be conducted during project-related ground disturbing activities due to nearby of significant historic properties and the potential for buried cultural deposits and/or burials to be encountered. SHPD accepted the Shefcheck and Dega (2008) AA report in a letter dated June 13, 2008 (Log No. 20082334, Doc. No. 0806PC23).

Based on the recommendation of archaeological monitoring made by Shefcheck and Dega (2008), the DHHC stipulated that archaeological monitoring would be conducted for mitigation purposes and submitted a draft AMP (Yates and Hammatt, October 2020) for SHPD review and acceptance.

SHPD concurs with archaeological monitoring for identification purposes, not as a mitigation measure. No significant historic properties have been identified within the project area. Archaeological monitoring will be conducted in order to adequately identify if any historic properties are present and, if so, to determine potential impacts to them and, if necessary, to ensure that appropriate mitigation is implemented.

Cultural Surveys Hawai‘i, Inc. (CSH) produced the subject AMP (Yates and Hammatt, October 2020) in support of the current project. The plan includes summaries of historic land use and previous archaeological investigations in the area, and stipulates the following:

- A coordination meeting will be conducted between the construction team and monitoring archaeologist prior to construction activities so the construction team is aware of the archaeological monitoring requirements and the archaeological monitoring provisions detailed in the plan;
- On-site monitoring will be conducted for all ground disturbing activities. One monitor is required for each piece of ground altering machinery during this project;
- The archaeological monitor has the authority to temporarily halt all activity in the area in the event of a potential historic property being identified, or to record archaeological information for cultural deposits or features;
- If non-burial historic properties are identified, documentation shall include, as appropriate, recording stratigraphy using USDA soil descriptions, GPS point collection with a receiver capable of sub- meter accuracy, recordation of feature contents through excavation or sampling of features, screening of features, representative scaled profile drawings, photo documentation using a scale and north arrow, and appropriate laboratory analysis of collected samples and artifacts. Additionally, photographs and profiles of excavations will be collected from across the project area even if no significant historic properties are encountered. Representative soil profile shall be at lease 2-meter sections and their locations shall be recorded on a USGS topographic map;
- If human remains are identified, work will cease in the vicinity and the find shall be secured, and provisions outlined within the Hawaii Revised Statutes (HRS) §6E-43 and HAR §13-300-40, and any SHPD directives, shall be followed;
- Collected materials not associated with burials will be temporarily stored at the archaeological firm’s office/laboratory until an appropriate curation facility is selected, in consultation with the landowner and the SHPD; and
- Any changes in these provisions shall occur only with written approval from the SHPD.

Based on the information provided, SHPD has insufficient information for determining the potential for the project to adversely impact archaeological historic properties. SHPD agrees with archaeological monitoring conducted for identification purposes

The plan meets the minimum requirements of HAR §13-279-4. **It is accepted.** Please send two hard copies of the document, clearly marked FINAL, along a copy of this letter and a text-searchable PDF version of the Final AMP to the Kapolei SHPD office, attention SHPD Library. Additionally, submit a text-searchable PDF copy of the Final AMP and a copy of this letter to SHPD HICRIS Project No. 2020PR34681 using the Project Supplement option, and a PDF copy of the Final AMP to lehua.k.soares@hawaii.gov.

SHPD hereby notifies the County that the AMP (Yates and Hammatt, October 2020) is accepted, and the project initiation process may proceed.

SHPD requests written notification via email and HICRIS at the start of archaeological monitoring for the proposed project. Within 30 days of completion of archaeological monitoring fieldwork, SHPD looks forward to receiving for review and acceptance a brief archaeological monitoring letter report of findings as specified in HAR §13-282-3(f)(1). Subsequently, SHPD looks forward to receipt of an archaeological monitoring report (AMR) meeting the requirements of HAR §13-279-5 for review and acceptance. Please submit the AMR and submittal review fee, and

all other project documents and correspondence to HICRIS Project No. 2020PR34681 using the Project Supplement option.

Please contact Andrew McCallister, Maui Archaeologist IV, at andrew.mccallister@hawaii.gov for matters regarding archaeological resources in this letter.

Aloha,
Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Trevor Yucha, CSH, tyucha@culturalsurveys.com

CULTURAL IMPACT ASSESSMENT REPORT

APPENDIX

H

FINAL
Cultural Impact Assessment for the Hale Mahaolu Ke Kahua Housing Community, Waiehu Ahupuaʻa, Wailuku District, Maui Island, TMK: [2] 3-3-001:106

Prepared for
Waiehu Housing, LP

Prepared by
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Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.
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(Job Code: WAIEHU 4)

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Management Summary

Reference	Cultural Impact Assessment for the Hale Mahaolu Ke Kahua Housing Community, Waiehu Ahupuaʻa, Wailuku District, Maui. TMK: [2] 3-3-001:106 (Kaapana and Hammatt 2020)
Date	April 2021
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: WAIEHU 4
Agencies	SHPD; County of Maui Department of Housing and Human Concerns (DHHC)
Land Jurisdiction	Maui Economic Opportunity, Inc. (MEO)
Project Location	The project area comprises TMK: [2] 3-3-001:106 in Waiehu Ahupuaʻa. It is bounded west by Kahekili Highway, north by Waiehu Beach Road, and east by the Waiehu Heights Subdivision. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	The 100% affordable housing project will involve the construction of 120 residential units, including 28 1-bedroom units, 60 2-bedroom units, and 32 3-bedroom units as well as a 3,477 ft² non-profit building, a 3,231 ft² community center, and 264 total parking stalls. The project will focus on providing housing for Maui residents earning 60% or less of the area median income.
Project Acreage	The project area is 11.476 acres (4.64 hectares).
Document Purpose	This cultural impact assessment (CIA) was prepared to comply with the State of Hawaiʻi's environmental review process under Hawaiʻi 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 Hawaiʻi significance Criterion e, pursuant to Hawaiʻi 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.

Results of Background Research	Background for this project yielded the following results presented in approximately chronological order: 1. Waiehu Ahupua‘a was once an independent land district and did not reside in any other *moku*. Along with Waihe‘e Ahupua‘a, the *moku* was referred to as Nā Poko (Sterling 1998:91). 2. Waiehu Ahupua‘a is a part of what is more commonly known as Nā Wai ‘Ehā (The Four Waters) which consists of Waikapū, Wailuku, Waiehu, and Waihe‘e. These areas were made famous for their freshwater streams. 3. Niukūkahi and ‘A‘awa were famous surfing spots in Waiehu Ahupua‘a that we frequently visited by many Maui *ali‘i*. Other famous surfing spots include Kehu and Ka‘ākau of Wailuku and Pala‘ie and Kahahawai of Waihe‘e. 4. Traditional history describes Waiehu as a place of abundance; from the mountain to the sea. Residents of Waiehu had bountiful access to freshwater to help feed their *lo‘i kalo* and their *kula*. The waters of Waiehu provided opportunity for various fishing practices and ocean recreational activity. 5. Waiehu is known to have many Land Claim Awards referencing many *‘ili ‘āina*, *lo‘i kalo*, and *kula*. The project area resides within LCA 8559B*M which was granted to William C. Lunalilo. This LCA document includes approximately 2,000 acres of land in Waiehu, however ,it does not specify definitive boundaries or land use for this *‘āpana*. 6. In the mid-1800s, Waiehu was known to have a small-scale sugar mill. In Waihe‘e, there was the Waihe‘e Sugar Company. These two sugar plantations once produced sugar on their own until eventually being absorbed under the Wailuku Sugar Company. 7. Since the start of the sugar plantation, water diversion has been an issue amongst the residents of Maui, including Waiehu and the other ahupua‘a of Nā Wai ‘Ehā. Water was being diverted from the streams of Nā Wai ‘Ehā in order to irrigate the sugar fields, leaving many Native Hawaiian and other residents with little to no access of water. The diversion of water affected many Native Hawaiians and other residents’ ability to farm *kalo* and other produce.

Results of Community Consultation	CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants in order to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Community outreach letters were sent to 73 individuals or groups; five responded, two provided written testimony, and two of these *kama‘āina* (native-born) and/or *kūpuna* (elder/of the grandparent’s generation) met with CSH for more in-depth interview. Consultation was received from community members as follows: 1. Kumu Hōkūlani Holt-Padilla, *kama‘āina* of Waiehu, Kumu Hula of Pā‘ū o Hi‘iaka, and Director of Ka Hikina O Ka Lā 2. Kaniloa Kamaunu, *kama‘āina* of Waiehu 3. Confidential Informant 4. Daniel Ornellas, *kama‘āina* of Waiehu, representing Kwong Fook Tong Chinese Cemetery.
Identification of Cultural Practices	Community consultation conducted as part of this CIA has identified the following cultural, historical, and natural resources where cultural practices (including traditional and customary native Hawaiian rights) are being exercised in Waiehu Ahupua‘a: 1. All interviewees shared various cultural practices that are still practiced both *mauka* and *makai*. There are many *kama‘āina* who continue to farm *kalo* as well as *kama‘āina* who still fish. 2. A confidential informant shared about gathering *limu* along the edges of Waihe‘e as there were a vast variety of *limu* that grew within the area. 3. All participants mentioned the sand dunes that are both *makai* and *mauka* of the project area. The sand dunes were vast and were predominantly recognized as a place where *kūpuna* would bury those who have passed. Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following cultural practices within Waiehu Ahupua‘a: 1. *Kalo* farming 2. Fishing 3. *Limu* gathering 4. Burial practices No on-going cultural practices were identified within the project area during community consultation for this CIA. However, the project area is located adjacent to an inland sand dune complex where numerous human burials have been documented. The project area is also located in the general vicinity of on-going subsistence-based *kalo* farms.

Identification of Impacts to Cultural Practices	No impacts to on-going cultural practices were identified within the project area during community consultation for this CIA. Consultation has identified a number of concerns related to the environment and the broader community: 1. Kumu Hōkūlani Holt-Padilla suggested that the project developers should be cognizant of the weather patterns that occur throughout the area, such as wind, rain, and sun. The wind Ho‘ēha ‘ili refers to the wind blowing up the sand around and if you should walk by, your skin would be hurt by the sand being blown in the wind. She shared that this wind blows typically blows from makai to *mauka*. 2. Kumu Hōkūlani Holt-Padilla also shared about past weather conditions that have devasted the area. Tidal waved has hit Waiehu on several occasions. To her recollection, the last one being in 1959 or 1960. Even though there have been no recent tidal waves, the possibility and awareness should be taken into consideration. 3. Mr. Kamaunu shared that an increase of development and population has the potential to increase noise and traffic pollution which will affect air quality, community living, and lifestyle. 4. All interviewees shared their thoughts, memories, and opinions about the water diversion issue that has been going on for over a century. Many of them shared that this issue has left many Native Hawaiian families with limited access to water which presented a very difficult challenge in sustaining their *lo‘i kalo* and other agricultural practices. 5. Mr. Kamaunu as well as the other interviewees shared that the water that is being diverted is used to sustain other areas of Maui. It is important to note that water, as Mr. Kamaunu shared, is a limited source. With an increase in population and housing in Waiehu, water usage will increase and the source of water will be stretched thin. 6. Mr. Kamaunu mentioned that an increase of concrete and asphalt affects the water cycle and the healthiness of the water. By an increase of concrete and asphalt (such as the parking lot of the project) has the potential of generating more run-off and debris which will flow into the stream and ocean. 7. Mr. Kamaunu also expressed concern on the “who” this affordable housing is for as well as how is “affordable housing” defined. Mr. Kamaunu shared that the community is made up of multiple generations of local residents. Many of these *kama‘āina* are living in multigenerational homes due to the high cost of living. Will these “affordable housings” go to local residents or are for outsiders to come in?

Mitigation Recommendations	Based on the results of community consultation and CSH’s expertise in conducting cultural impact assessments, the following actions are recommended to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups: 1. A number of concerns expressed by the community during consultation do not relate specifically to on-going cultural practices within the project area, but nonetheless should be considered during project planning and development. These concerns include: a. Awareness of weather patterns b. Awareness of potential for impacts from tidal events c. Community impacts from an increase in noise and traffic d. Community impacts from an increase in water usage e. Community impacts from runoff as a result of an increase in asphalt/concrete surfaces f. Understanding the need for truly affordable housing for local Maui residents 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* (ancestral 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 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.

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Section 1 Introduction

1.1 Project Background

At the request of Waiehu Housing, LP, Cultural Surveys Hawai‘i, Inc. (CSH) conducted a cultural impact assessment (CIA) for the Hale Mahaolu Ke Kahua Housing Community, Waiehu Ahupua‘a, Wailuku Moku, Maui, TMK: [2[3-3-001:106. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2017 aerial photograph (Figure 3). The project is bounded west by Kahekili Highway, north by Waiehu Beach Road, and east by Waiehu Heights Subdivision.

The 100% affordable housing project will involve the construction of 120 residential units, including 28 1-bedroom units, 60 2-bedroom units, and 32 3-bedroom units as well as a 3,477 ft² non-profit building, a 3,231 ft² community center, and 264 total parking stalls (Figure 4).

1.2 Document Purpose

The purpose of this CIA is 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, 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 also support the project’s historic preservation review.

1.3 Scope of Work

The scope of work for this cultural component includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with 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 at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.

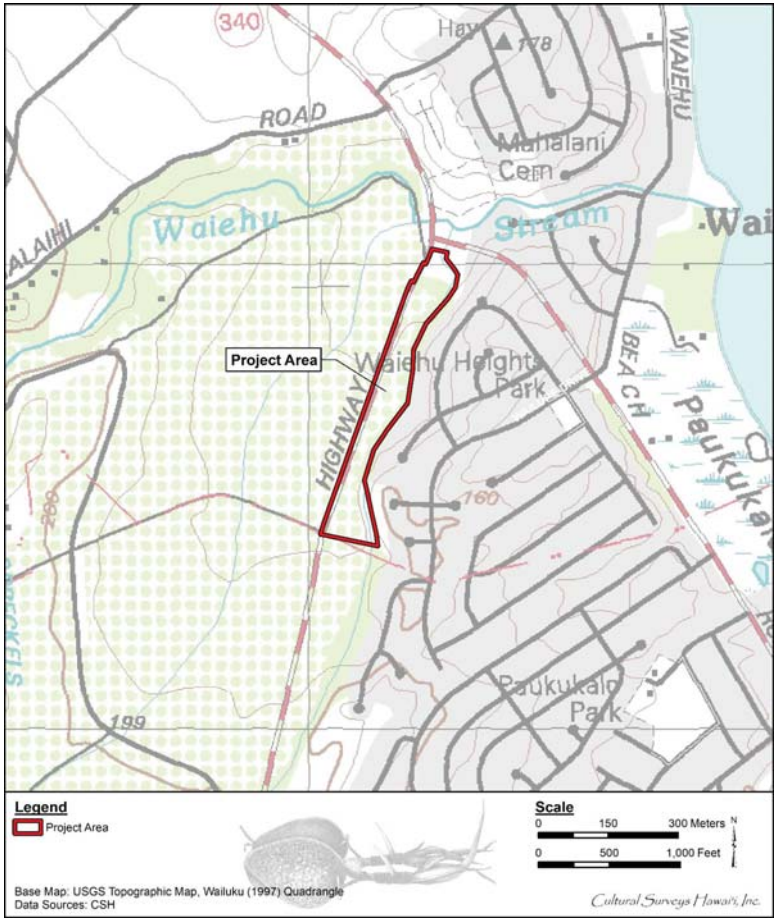

Figure 1. Portion of the 1997 Wailuku USGS 7.5-minute topographic quadrangle showing the location of the project area (U.S. Geological Survey 1997)

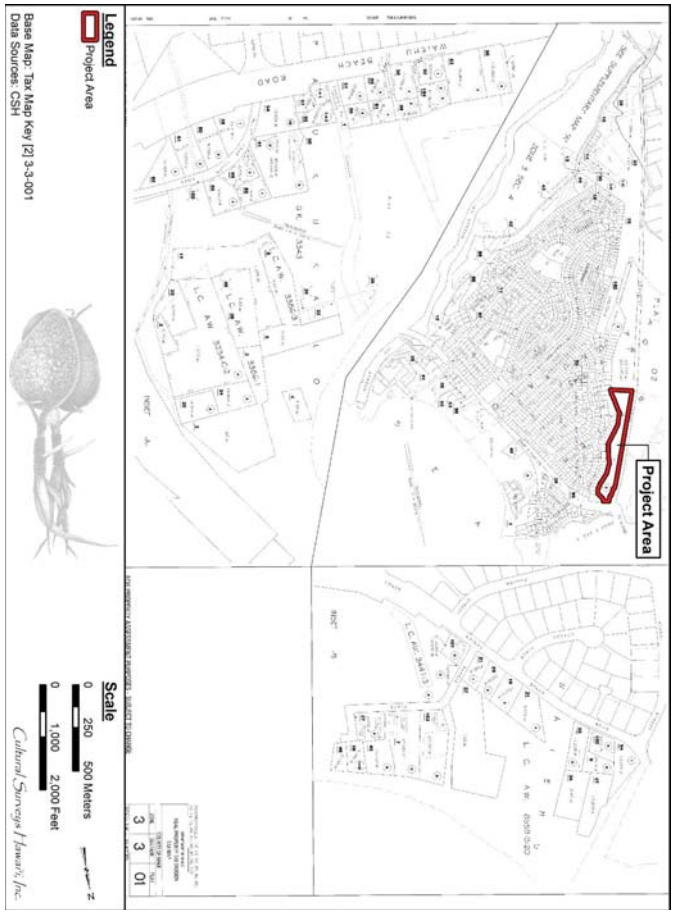

Figure 2. Tax Map Key (TMK) [2] 3-3-001 showing the project area (Hawaii TMK Service 2014)

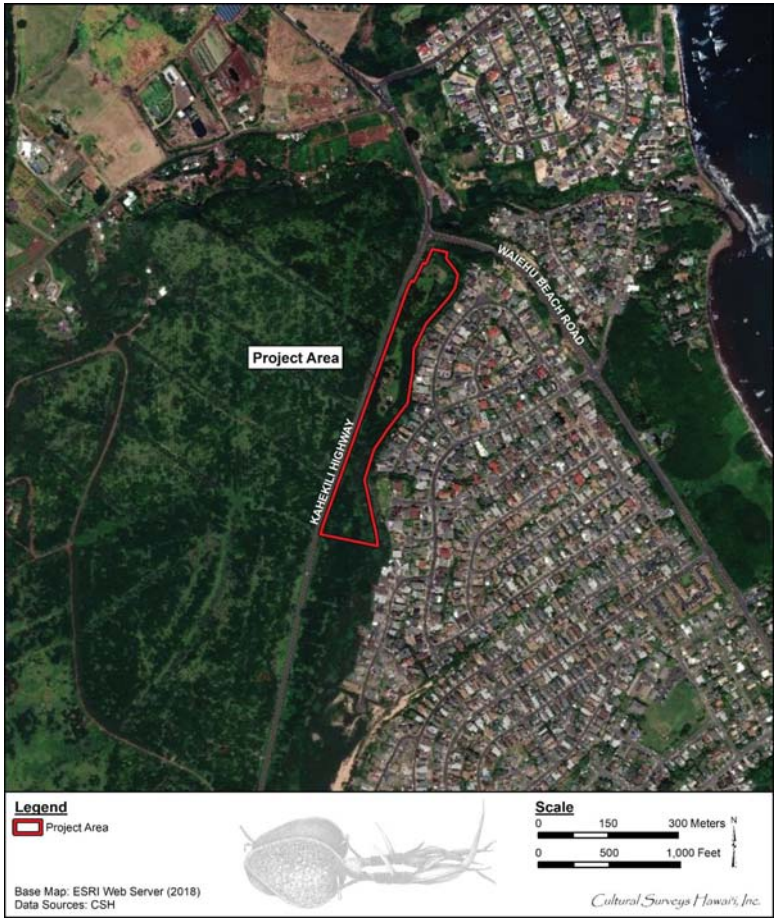

Figure 3. Aerial photograph of the project area (ESRI 2018)

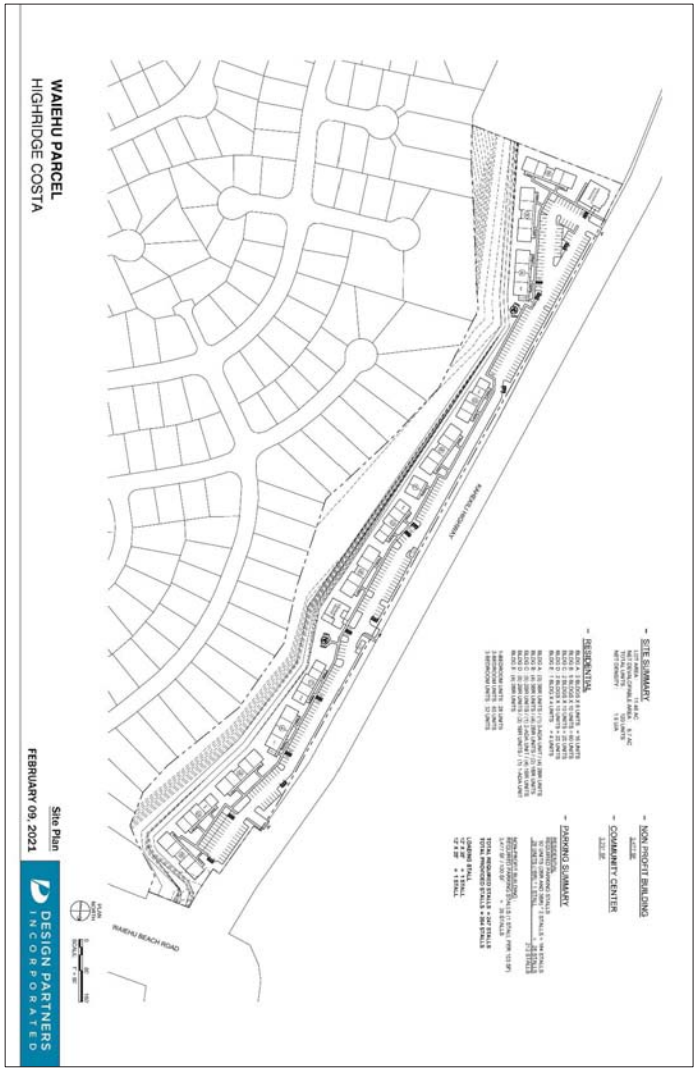

Figure 4. Concept site plan for proposed project (Design Partners Incorporated 2021)

3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at 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 Natural Environment

The *ahupua‘a* of Waiehu (as well as Waihe‘e) was once independent land areas that did not reside within any *moku* (Sterling 1998:91) and was therefore referred to as *Nā Poko* (Shefcheck and Dega 2008:6).

The current project area is situated approximately 0.6 kilometer (km) to 0.8 km (approximately 0.4 mile to 0.5 mile) west of the nearest coastline at about 20 meters (m) to 38 m (approximately 65 feet [ft] to 125 ft) above mean sea level (AMSL). The terrain of the project area gently slopes upward from north to south. Waiehu Stream flows eastward/ *makai* (seaward) approximately 60 m (197 ft) north of the project area, while a tributary across Kahekili Highway runs roughly parallel to the project area’s western border before merging with Waiehu Stream northwest of the project area (Figure 5).

The project area is located adjacent to a lithified dune system, historically known as the Sand Hills (*Pu‘u one*). Traditional, historical, and archaeological research contain documented knowledge of evidence of the use of sand dunes for burial practices.

1.4.1 *Ka Lepo* (Soil)

The majority of the project area overlies alluvium. Most alluvial deposits in Waiehu derive from igneous rocks of the Wailuku Volcanic Series, the oldest exposed lavas of West Maui Mountain. The Wailuku Volcanic Series consists primarily of thin *pāhoehoe* (unbroken type) and *‘a‘ā* (stony, rough type) basaltic lavas that are considered to be of late Pliocene to early Pleistocene age, approximately 1.3 million years old. The Wailuku Volcanic Series was followed by the Honolua Volcanic Series during the Pleistocene epoch with little apparent break in time. A considerable number of vents along the north and northeast rift zones of West Maui produced lava flows during this latter series of volcanic activity, covering the older Wailuku Series lavas on the northeast flank just north and south of Waiehu Valley (Macdonald et al. 1983). The end of the Honolua Volcanic Series on West Maui was followed by a long period of erosion, during which the deep valleys formed and most of the older alluvium and colluvium that chokes the heads of these valleys was deposited.

The northeastern boundary of the project area extends along the edge of a lithified sand dune. The lithified calcareous sand dune that borders the project area is part of an inland dune system that extends across the Maui isthmus (Figure 6), with some dunes reaching up to 60 meters in height (Macdonald 1983:388). These dunes were formed by windblown sand from large beaches exposed during a stand of the sea likely 12 m lower than the present sea level on the northern coast of Maui (Macdonald et al. 1983:388).

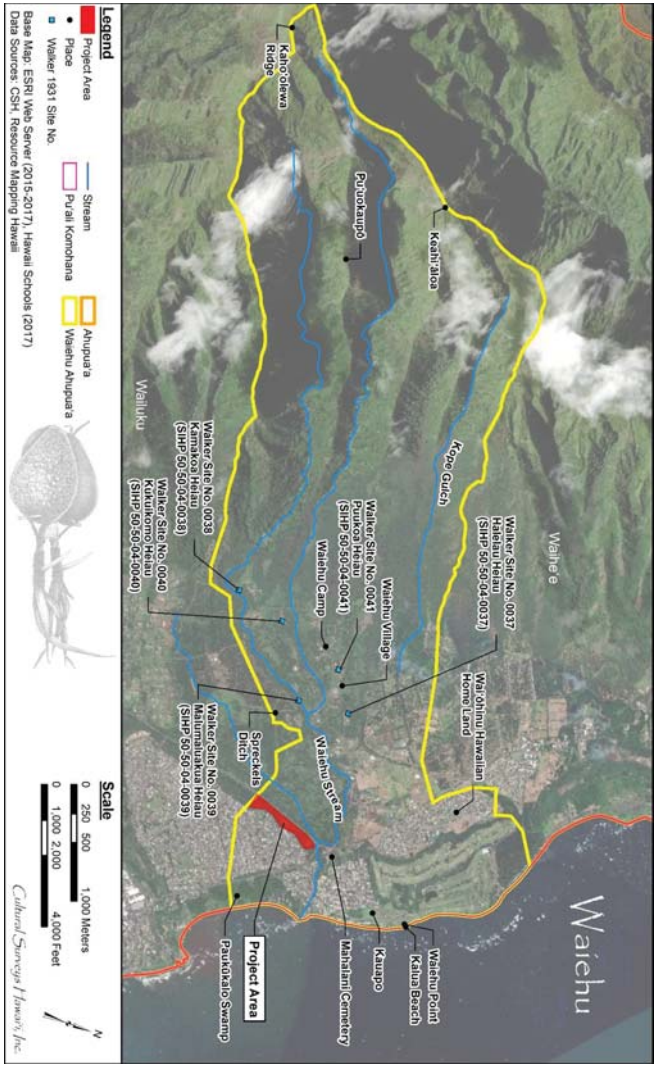

Figure 5. Aerial imagery showing the project area within Waiehu Ahupua‘a, locations of streams, place names, and *heiau* that were previously identified by Walker (1931)

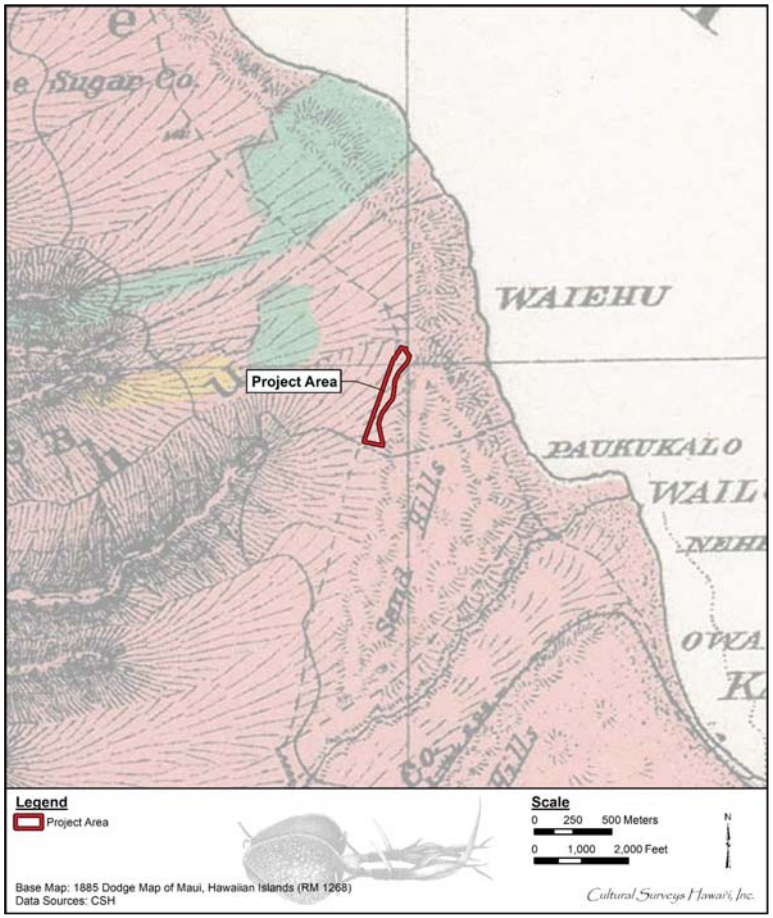

Figure 6. Portion of a Dodge (1885) map of Maui showing the project area extending along the edge of a portion of the northeastern extent of Sand Hills.

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), the project area's soils consist of Iao silty clay, 0 to 3 percent slopes (IaA), Iao cobbly silty clay, 3 to 7 percent slopes (IbB), and Puuone sand, 7 to 30 percent slopes (PZUE) (Figure 7). Most soils across the project area are composed of Iao silty clay, 0 to 3 percent slopes, while some of the southern portion of the project area contains Iao Cobbly silty clay, 3 to 7 percent slopes. Puuone sand, 7 to 30 percent slopes comprises soils within a southern portion of the project area as well as soils extending along and *makai* from the project area's eastern boundary.

In general, the Iao Series is described as follows:

> This series consists of well-drained soils on valley fill and alluvial fans. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from 100 to 500 feet. The annual rainfall amounts to 25 to 40 inches. The mean annual soil temperature is. 74° F. Iao soils are geographically associated with Paia, Pulehu, and Wailuku soils.
>
> These soils are used for sugarcane. Small acreages are used for pasture and homesites. The natural vegetation consists of bermudagrass, feather fingergrass, koa haole, lantana, and Natal redtop. [Foote et al. 1972:46]

In addition, Iao silty clay, 0 to 3 percent slopes is described as soil on which "runoff is slow and the erosion hazard is no more than slight" (Foote et al. 1972:46-47). "[E]xcept for the texture of the surface layer and the content of cobblestones," Iao Cobbly silty clay, 3 to 7 percent slopes is described as having "a profile like that of Iao clay, 3 to 7 percent slopes" (i.e., dark-brown approximately 15-in thick surface layer; approximately 45-in thick very dark brown, dark-brown, and very dark grayish-brown subsoil; moderately slow permeability; medium runoff; and slight to moderate erosion hazard [Foot et al. 1972:46]).

The Puuone Series is generally described as follows:

> This series consists or somewhat excessively drained soils on low uplands on the island of Maul. These soils developed in material derived from coral and seashells. They are moderately sloping to moderately steep. Elevations range from 50 to 350 feet. The annual rainfall amounts to 20 to 30 inches, most of which occurs in winter. The mean annual soil temperature is 75° F. Puuone soils are geographically associated with lao and Jaucas soils.
>
> These soils are used for pasture and homesites. The natural vegetation consists or bermudagrass, kiawe, and lantana. [Foote et al. 1972:117]

Puuone sand, 7 to 30 percent slopes is more specifically described by the following:

> This soil is on sandhills near the ocean. Included in mapping were small areas or lao and Jaucas soils. Also included were small areas where the cemented layer is less than 20 inches below the surface.
>
> In a representative profile the surface layer is grayish-brown, calcareous sand about 20 inches thick. This is underlain by grayish-brown, cemented sand. The soil is moderately alkaline in the surface layer.

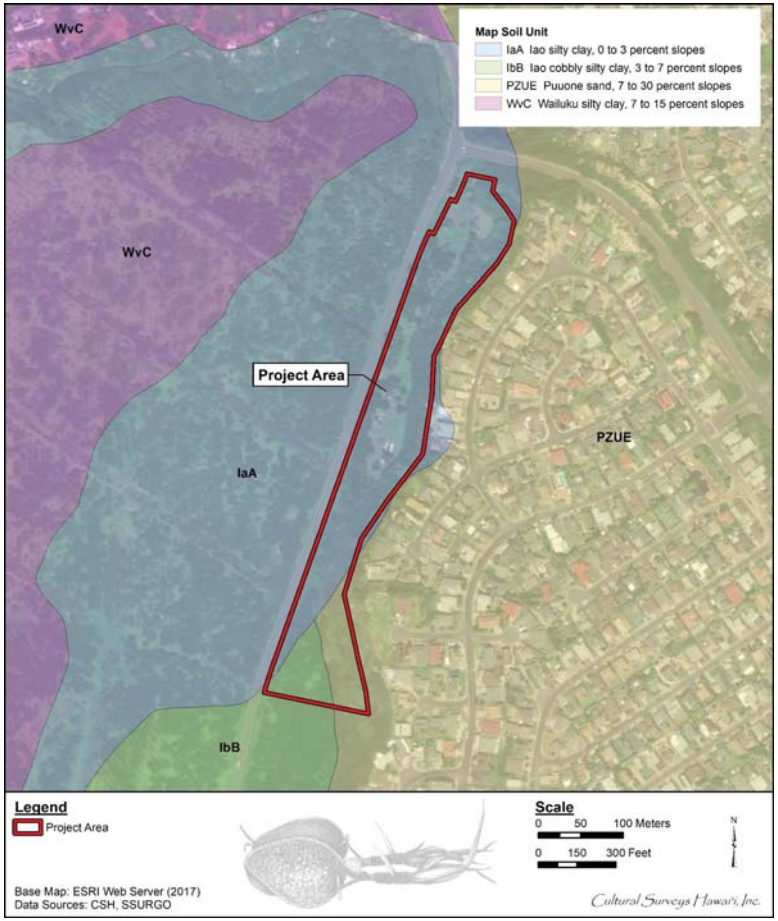

Figure 7. Overlay of Soil Survey of the State of Hawaii (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database 2001)

> Permeability is rapid above the cemented layer. Runoff is slow, and the hazard or wind erosion is moderate to severe. The available water capacity is about 0.7 inches per root in the surface layer and subsoil. In places roots penetrate to the cemented layer. [Foote et al. 1972:117]

In 2014, the average annual air temperature for the project area was between 21.36°C (70.45°F) in February and 25.39°C (77.70°F) in August with an average annual air temperature of 23.41°C (74.14°F) (Giambelluca et al. 2014). The vicinity of the project area received a mean annual rainfall of 617.1 mm (24.30 inches) between 1978 and 2007, according to the University of Hawai‘i 2011 *Rainfall Atlas of Hawaii* (Giambelluca et al. 2013). The mean monthly rainfall varied between 9.4 mm (0.37 in) in June to 112.8 mm (4.44 in) in January.

The project area was once part of a larger macadamia nut farm. During the AIS conducted in 2007, vegetation at the project area included “a grove of macadamia nut trees (*Macadamia integrifolia*), dense cane grass, and sparse *koa haole* (*Leucaena leucocephala*)” (Shefcheck and Dega 2008:5): The current vegetation is likely similar to that noted in 2007. The southern end and eastern edge of the parcel appear the most densely vegetated.

1.4.2 *Ka Makani* (Winds)

For Native Hawaiians, *makani* (wind) were named for various reasons such as describing the intensity or direction of the wind, relating the wind to a story, or even relating the wind to the landscape. David Malo, a Native Hawaiian historian, explains some general terms related to wind:

> […] There was the *kona*, a wind from the south, of great violence and of wide extent. It affected all sides of an island, east, west, north, and south, and continued for many days […]The *kona* wind often brings rain, though sometimes it is rainless […] The *hoolua*, a wind that blows from the north, sometimes brings rain and sometimes is rainless […] The *hau* is a wind from the mountains, and they are thought to be the cause of it, because this wind invariably blows from the mountains outwards towards the circumference of the island. [Malo 1951:14]

1.4.2.1 *Nā Makani o Nā Wai ‘Ehā* (The Winds of Nā Wai ‘Ehā)

The Wind Gourd of La‘amaomao tells the story of Pāka‘a and his son Kuapāka‘a who are descendants of the wind goddess La‘amaomao. With their possession of her special wind gourd, they could control and call forth the winds of Hawai‘i. Pāka‘a’s chant traces the winds of and surrounding Maui Island. Pāka‘a’s chant is listed below and recounts the various winds associated with Nā Wai ‘Ehā:

[…]	[…]
Kololio mai o Waikapu,	Kololio is of Waikapū,
Ka Iaiki ko Wailuku,	I‘aiki is of Wailuku
Ka Oopu ko Waihee,	O‘opu is of Waihe‘e
[…]	[…]
[Ke Au Okoa 1867]	[Nakuina 2005:55]

The chant called by Pāka‘a reference three winds of Nā Wai ‘Ehā, of Waikapū, Wailuku, and Waihe‘e. Within this particular chant, the wind of Waiehu is not called upon or mentioned. In *Sites of Maui* (Sterling, 1998) however, there is mention of all four winds of Nā Wai ‘Ehā. These winds are referenced below:

> Wailuku’s wind is the Makani-lawe-maile, the wind that takes it easy.
>
> Waiehu’s wind is the Makani-hoo‘eha-ili, the wind that hurts the skin.
>
> Waikapu’s wind is the Makani-ko-koloio, the gusty wind,
>
> Waihee’s wind is the Makani-kili-‘oopu, the
>
> [Sterling 1998:62]

There are a few differences in Sterling’s compilation compared to the ones mentioned in the newspaper Ke Au Okoa (1867) and Nakuina’s *The Wind Gourd of La‘amaomao* (2005).

Makani-hoo‘eha-ili, the wind of Waiehu, is described as a wind “that hurts the skin” (Sterling 1998:62). Sterling mentions that Mary Kawena Pukui, defined the term “hoo‘eha-ili’ to figuratively represent a love disturbance (Sterling 1998:52).

The wind name for Wailuku is different than the one mentioned in both Ke Au Okoa (1867) and Nakuina’s work (2005). Sterling (1998) gives the meaning, “the winds that takes it easy” for “Makani-lawe-maile”. However, Ke Au Okoa (1867) and Nakuina (2005) record the wind as I‘aiki or, loosely translated, small fish. It is not uncommon for places to have more than one wind and wind name.

A *mele* (song) entitled “I Waikapū Ke Aloha” (see Section 3.4.2) also references Nā Wai ‘Ehā by these four wind names mentioned by Sterling.

1.4.2.2 Ka Makani Maahaaha

In the *ka‘ao* (folktale) of Konole and His Wife (see Section 3.1.1.2), the Maahaaha (*Ma‘aha‘aha*) wind, said to be of Waiehu, is also mentioned:

> […] is a wind that distorts the features of the land’s growing things when looking at it, thus giving a strange appearance to the things God created. [Sterling 1998:71-72]

1.4.2.3 Ka Makani Līlīlehua

Pukui and Elbert (1986) referenced the wind name Līlīlehua as the “name of wind and rain , famous at Pālolo, O‘ahu, and Wai-ehu, Maui” (Pukui and Elbert 1986:206) defining the wind name to mean a “*lehua* chill.”

1.4.3 *Ka Ua* (Rains)

Precipitation is a major component of the water cycle and is responsible for depositing *wai* (fresh water) on local flora. Pre-Contact *kānaka* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer), lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *ho‘oilo* (winter, rainy season) continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17).

Each small geographic area on Maui had a Hawaiian name for its own rain. According to Akana and Gonzalez:

> Rain names are a precious legacy from our kūpuna who were keen observers of the world around them and who had a nuanced understanding of the forces of nature. They knew that one place could have several types of rain, each distinct from the other. They knew when a particular rain would fall, its color, its duration, its intensity, its path, its sound, its scent, and its effect on the land and their lives […] Rain names are a treasure of cultural, historical, and environmental information. [Akana and Gonzalez 2015:xx]

It was a customary and necessary tradition to grant a name for each type of rain. Rains were named to show their action toward plants or the supposed effects on people or their possessions (Pukui and Elbert 1986:361). Many rains are identified in the broader region of Waiehu which will include Waihe‘e, Waikapū, and Wailuku. The following section presents various literary work that mention these rains.

1.4.3.1 Ka Ua Hō‘eha‘ili

This rain is associated with Waiehu, Maui and Akana and Gonzalez (2015) define its name to mean “to hurt the skin” (Akana and Gonzalez 2015:36). Below is a reference to this rain that was found in a message about the passing of Joseph Nāwahīokalani‘ōpu‘u:

He aloha, he lihaliha, he kūmākena	Loving, heartsick, grief-stricken
He ‘ū iā ‘oe	Mourning for you
E Hon. Iosepa Kaho‘oluhi Nāwahiokalani‘ōpu‘u	O Hon. Joseph Kaho‘oluhi Nāwahiokalani‘ōpu‘u
A ha‘o ē!	We shall truly miss you!
I uē ‘ia mai nei ‘oe e Nā Wai ‘Ehā	You have been mourned by the lands of the four waters
E ka makani Kili‘o‘opu o Waihe‘e	By the Kili‘o‘opu wind of Waihe‘e
Ka ua Hō‘eha‘ili o Waiehu	And the Hō‘eha‘ili rain of Waiehu
[Akana and Gonzalez 2015: 36-37]	

1.4.3.2 Ka Ua Kili‘o‘opu

Ka Ua Kili‘o‘opu is a rain associated with Wailuku, however, through various *kanikau* (lamentation) and *mele*, this rain has been associated with other parts of Nā Wai ‘Ehā. According to Akana and Gonzalez (2015), Ka Ua Kili‘o‘opu was listed as a rain for Waikapū as well as Wailuku (Akana and Gonzalez 2015:83-84).

This rain appears in a *kanikau* for Kamakaokalani, who is said to be from Waihe‘e by referring to the name of the rain, Ka Ua Kili‘o‘opu.

Ku‘u kāne mai ka ua Kili‘o‘opu o Waihe‘e	My dear husband from the Kili‘o‘opu rain of Waihe‘e
‘Au‘au ka ‘uhane I ka wai o Nī‘aukawa	The spirit bathes in the water of Nī‘aukawa
[Akana and Gonzalez 2015:83]	

Akana and Gonzalez (2015) also referenced a mele in which the lyrics mention “ka ua Kili‘o‘opu o Waihe‘e” (Akana and Gonzalez 2015:83). However, the authors noted that in their research of this *mele*, it has been known that the sources of this *mele* “place the Kili‘o‘opu at Waiehu not a Waihe‘e”.

He loa Pu‘ukoa‘e	Expansive is Pu‘ukoa‘e
He pāpā‘ōlelo na ka makan	A conversation held by the wind
Makani lū ‘inoi nā lehua o Kaukini	Wind that violently scatters the lehua blossoms of Kaukini
Polipoli Pūlehu i ka ua Kili‘o‘opu o Waihe‘e	Pūlehu is polished by the Kili‘o‘opu rain
Me ka ua nā māmala ‘ino a ka wai	With the rain come hard strokes of the water
[Akana and Gonzalez 2015:83]	

1.4.3.3 Ka Ua Līlīlehua

Ka Ua Līlīlehua is a rain that is found throughout various areas of Maui, including Waiehu. It is described to a gentle mist that resembled “tiny drops on the lehua blossom” (Akana and Gonzalez 2015:155). In a *mele inoa* (name chant) for Princess Ka‘iulani, Prince Leleiōhoku composed this *mele* and referenced the rain and Waiehu as such.

E aloha a‘e ana ho‘i	Greetings to
I ka ua Līlīlehua	The Līlīlehua rain
I ka lawe mālie i ka pili	Softly moving in
Ko‘iawe i ka wai o Waiehu	Lightly showering the waters of Waiehu
[Akana and Gonzalez 2015:157-158]	

1.4.4 *Nā Kahawai* (Streams)

As previously mentioned, Waiehu is part of a greater land division named Nā Wai ‘Ehā or The Four Waters; valleys that were rich in land with taro and the streams would spread fanwise towards the sea (Handy and Handy 1972:272).

Nā Wai ‘Ehā are:

> […] four great valleys which cut far back into the slopes of West Maui and drain the eastward watershed of Pu‘u Kukui and the ridges radiating northeastward, eastward, and southeastward. [Handy and Handy 1972:496]

Waiehu Stream and neighboring Waihe‘e stream both “open toward the ocean and their streams empty into it” (Handy and Handy 1972:496).

> Waiehu is the second valley of the famous Na Wai Eha of western Maui, and it is waters by twin streams […] [Handy and Handy 1972:496]

1.4.5 *Ka Lihikai a me Ka Moana* (Seashore, Ocean)

Traditionally, the seashore and ocean areas were vitally important for resource extraction in the early days of settlement, and fishermen along the coast maintained a respected status within traditional Hawaiian society. Kanahele (1995:17) asserts that “early Hawaiians regarded fishing as the oldest, and hence the most prestigious of professions.”

The shoreline, beaches, and to the deep oceans of Waiehu were a popular spot for all, from the *ali‘i* (chiefs) to the *maka‘āinana* (commoners). Places, like Kehu or Nuikuikahi, were once known to be favorite spots for *ali‘i* to surf (Sterling 1998.72). Other fishing activities and practices such as raising fish in a *loko i‘a* (fishpond), shoreline to deep ocean fishing, and *limu* (seaweed) gathering were also practiced in Waiehu.

1.4.6 Built Environment

The current project area consists of mostly undeveloped lands stretching along a portion of the eastern side of Kahekili Highway. The project area appears to contain some remnant structures and ground modifications from a former small-scale agricultural operation. The northern portion of the project area is bounded by Waiehu Beach Road. Waiehu Heights Subdivision, consisting of over 200 housing structures and associated infrastructure (e.g., asphalt paved roads, sidewalks, and various utility features), borders the eastern boundary of the project area. Additional residential lots and subdivisions are developed in Waiehu within the vicinity of the project area, mostly concentrated *makai* of Kahekili Highway. Directly across Kahekili Highway, west of the project area, is a large expanse of land planted in macadamia nut trees.

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 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 2020), 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

We begin our consultation efforts with utilizing our previous contact list to facilitate the interview process. We then review an in-house database of *kūpuna*, *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. We also contact 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* (insight) and *mana‘o* (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 *kūkākūkā* [consultation, discussion] in participant’s choice of place 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, interviews are recorded and transcribed later.

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 interviewee’s 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) providing missing details for *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*, 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.

In order to ensure the safety of participants and comply with State and County COVID-19 mandates, no in-person interviews were conducted as part of this CIA. While it is always a preference to meet with participants in person, CSH cultural researchers were able to effectively communicate with participants via telephone, email, and video conference call interviews.

2.2.3 Interview Completion

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask to make any necessary edits. Once the interviewee has made those edits, we incorporate 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 transcription, interview summary, and any photos that were taken during the interview. We also include a thank you card and honoraria. This is for the interviewee’s records.

It is important to CSH cultural researchers to 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,” 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 informants if we have lost our *kūpuna*. CSH makes it a point to reach out to the *‘ohana* of our fallen *kūpuna* and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

Section 3 Traditional Accounts

3.1 *Nā Ka‘ao a me Nā Mo‘olelo*

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, storytelling is better heard rather than read for much becomes lost in the transfer from the spoken to the written word and *ka‘ao* are often full of *kaona* or double meanings.

Ka‘ao are defined by Pukui and Elbert as a “legend, tale […], romance, [and/or], fiction” (Pukui and Elbert 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” (Pukui and Elbert 1986:254). The *mo‘olelo* are generally traditional stories about the gods, historic figures or stories that cover historic events and locate the events with known places. *Mo‘olelo* are often intimately connected to a tangible place or space.

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. However, it is also necessary to note there are exceptions, and not all *ka‘ao* discuss gods of an ancient past. *Mo‘olelo* on the other hand, reference a host of characters from *ali‘i*, to *akua* and *kupua* (supernatural beings), to finally *maka‘āinana*, 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* 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.

3.1.1 *Nā Ka‘ao*

3.1.1.1 Ka Mo‘olelo O Hi‘iakaikapoliopele

Ka Mo‘olelo o Hi‘iakaikapoliopele is an epic tale that follows Hi‘iaka as she travels from her home on Hawai‘i island to Kaua‘i to fetch Lohi‘au for her sister, the goddess Pele.

In this section of the story, Hi‘iaka, Lohi‘au and Wahine‘ōma‘o, arrive on Maui, they learned that the ruler of Maui, ‘Olepau, was having a house-warming feast. As they approached this feast, Hi‘iaka began to alter her appearance from a beautiful woman to an “old hag” (Ho‘oulumāhiehie 2006b:296). With her appearance changed, Hi‘iaka offered her chant to ‘Olepau. He soon recognized that the person who was chanting was indeed Hi‘iaka. However, ‘Olepau’s wives, Waihīnalo and Kawelokaiehuehu were not convinced that the old woman was Hi‘iaka, saying to ‘Olepau:

> *Kā! ‘O Hi‘iakaikapoliopele kā auane‘i kēlā wahi wahine a pupuka a ‘ino nui wale e kū maila. ‘A‘ole kēlā ‘o Hi‘iakaikapoliopele. He wahine u‘i maopopo ‘o Hi‘iaka, akā, ‘o kēlā ‘ino e kū maila lā, he wahi kū‘ou‘ou maka ma‘i kēlā, a he ‘ino ha‘alele loa nō ho‘i.* [Hooulumāhiehie 2006a:319]
>
> Hah! As though that ugly, horrible woman standing there could be Hi‘iakaikapoliopele. That is not Hi‘iakaikapoliopele. Hi‘iaka is a renowned beauty but that nasty thing standing there is a sickly wretch, and loathsome as well. [Hooulumāhiehie 2006b:297]

Hi‘iaka knew that these two women would not allow her and her companions into the feast. By luck, Hi‘iaka’s sister, Kapokūlani, also arrived to the feast. Unfortunately, Kapokūlani could not allow her sister and her companions into the feast as it was not her place, however, this gave the courage for Hi‘iaka to chant again, asking permission to enter.

After several attempts, Kawelokaiehuehu and Waihīnalo continued to refuse Hi‘iaka’s request. To this, Kapokūlani pleaded with the wives to let the old woman in, not revealing the true identity of her sister. After much dialogue and mistreatment of her sister, Kapokūlani, Hi‘iaka sought vengeance on the wives for their callousness towards Kapokūlani and herself. Hi‘iaka began to chant a prayer that brought sickness and death to ‘Olepau for the carelessness of his wives. When the wives heard this chant, they began to counter the chant with a prayer of life. As the battle of chants between Hi‘iaka and the wives continued, it was clear the wives were no match for Hi‘iaka and soon, ‘Olepau was dead.

Upon his death, his wives sent messengers, Kaiehu and Paukūkalo, to fetch the younger brothers of ‘Olepau and to spread the word of his death. However, on their return, Waihīnalo and Kawelokaiehuehu learned that the rulers of Moloka‘i and Lāna‘i, the younger brothers, are also dead. The wives send Kaiehu and Paukūkalo on another errand; to fetch Kauakahimaikūlani, ‘Olepau’s most powerful priest who can bring ‘Olepau back to life.

As Kaiehu and Paukūkalo make their way to the priest, they capture a pig to present to the priest as an offering to the *akua*. Hi‘iaka and her companions continued on their journey when they were stopped by the sound of a pig squealing. Hi‘iaka noticed the two messengers and understood their intentions of offering the pig to the *akua* to restore ‘Olepau back to life. Hi‘iaka then chanted:

E Kaiehu e!	O Kaiehu
E Paukūkalo e!	O Paukūkalo
He ala pi‘i na ka ma‘i kāne	It is an uphill climb brought on by the male ailment
Hala iho nō ka ma‘i wahine	The female ailment is now done

Akua lamalama kai o Niua lā	The sea of Niua is radiant as a deity
Mai Waihe‘e nō a Kapulehu	From Waihe‘e to Kapulehu
[Hooulumahiehie 2006a:337]	[Hooulumahiehie 2006b:313]

After Hi‘iaka finished chanting, a tornado-like storm gathered and blew past Kaiehu and Paukūkalo, blasting dirt into their eyes. Paukūkalo’s eyes became swollen like *kukui* (candlenut, *Aleurites moluccana*) nuts while Kaiehu became red like an *‘āweoweo* (*Priacanthus*) fish (Ho‘oulumāhiehie 2006b:313). As the two approached the priest, Kauakahimaikūlani, he questioned their arrival and the offering of the pig. Kaiehu and Paukūkalo explained to the priest of the death of ‘Olepau and their wishes to bring him back to life. Kauakahimaikūlani, sadden by the news, revealed that ‘Olepau’s death is final and he cannot be restored. The messengers plead with the priest until he finally agrees to help. The priest, however, noticed the eyes of Kaiehu and Paukūkalo and inquired. Kaiehu, not wanting to share about the storm, said they were both born that way, however, Kauakahimaikūlani saw through the lies and said,

> *I ‘ula nā maka o ‘olua i ka leo o ka honua. No laila, ‘alua auane‘i ‘āina o Maui nei e kapa ‘ia ana ma kēia mau inoa, ‘o Kalepolepo i pula ai na māka o ‘olua, a ‘o Honua‘ula ho‘i kahi i ‘ula ai nā ōnohi maka o ‘olua.*
>
> *Ua loa‘a ‘olua i ke ehu lepo wāwae o ke akua, ‘o ia ‘o Hi‘iakaikapoliopele. No laila, no ko ‘olua hō‘ike ‘ole mai ia‘u i ka mea ‘oia‘i‘o, e ho‘i ‘oe, e Kaiehu, a Waiehu, noho mālie, a ‘o ‘oe, e Paukūkalo, e ho‘i ‘oe a Wailuku, i ka ‘āina i kapa ‘ia ‘o Hala‘ula. E ho‘i ‘olua a ha‘i aku i nā ali‘i wahine a ‘Olepau, a me nā ali‘i me nā maka‘āinana, na‘u nō au e hele aku.* [Ho‘oulumāhiehie 2006a:339]
>
> Your eyes are red from the dirt of the earth. So two lands here on Maui will come to be called these names, Kalepolepo, “The dirt,” where your faces were filled with dust, and Honua‘ula, “Red earth,” where your eyes became red.
>
> You two were caught in the dust from the feet of the goddess, Hi‘iakaikapoliopele. Now, because you have not told me the truth, you, Kaiehu, return to Waiehu, where you are to stay, and you, Paukūkalo, return to Wailuku, to the land of Hala‘ula. Now go back and report to the royal wives of ‘Olepau, the chiefs, and the people; I shall go on my own. [Ho‘oulumāhiehie 2006b:315]

3.1.1.2 Konole and His Wife

The story below is of Konole who, by account of the ancients (Sterling 1988:71), are considered the gods of the torch fishermen.

> On the nights suitable for torch fishing, this man went fishing and this is what happened. On returning with the fish he would finish with the offering of fish to the god Pehu. His wife was angered and mistreated the children. When the husband returned from his customary occupation, the children were dead and because of the god like nature, of this man, he turned them all into stones and they were all scattered hither and yon at Waiehu. The distance between the husband and wife was not far. Between the parents and the children the distance was a little greater.

> It is said, if these evil ideas had not grown in the woman they would all have remained together in one place.
>
> The place where the parents lay was not a good place. The place where the children lay was a place of good appearance. Therefore, from one of the names a wind was called the Maahaaha. This is a wind that distorts the features of the land’s growing things when looking at it, thus giving a strange appearance to the things God created.
>
> There are famous supernatural stones which remain at Waiehu, Island of Maui at this time and the writer has seen these stones.
>
> It is told in the story of these wonderous persons that they had human bodies originally. [Sterling 1998:71-72]

3.1.1.3 The Story of Kū-ho‘one‘e-nu‘u

While Haumea was traveling in Kahikikū and Kahikimoe, she came across the daughter of ‘Olopana, who was the ruler; her name being Mulei‘ula. Mulei‘ula was having difficulty giving birth and those around her lamented. It was evident that either Mulei‘ula survives or the baby survives; not both. ‘Olopana being desperate to save both his daughter and grandchild begged Haumea to help his daughter deliver the baby, in return, he will give Haumea anything she desires. Haumea agreed to help and in return requested the tree called Kalauokekāhuli as well as the flowers, Kanikawī and Kanikawā. Mulei‘ula and ‘Olopana agreed to this request and Haumea began to assist.

Not long before Haumea started to help with the birth, the child began to emerge. As Mulei‘ula could feel that both her and the baby will live, she withdrew her agreement to give Haumea the tree and flowers. Upon hearing Mulei‘ula’s denial of the tree and flowers, “Haumaea clasped her [Mulei‘ula] thighs together, holding the shoulder of the child; it stuck and did not come out” (Kamakau 1991:7). Once again, Mulei‘ula agreed to giving the tree and flowers to Haumea. However, once she felt her and her baby will be okay and the baby was almost delivered, she once again rescinded her agreement to give the tree and flowers to Haumea. And again, Haumea stopped helping Mulei‘ula. This happened several more times until ‘Olopana screamed at his daughter “Why do you withhold your tree? Give it up! Choose between death and the tree!” (Kamakau 1991:7). Eventually, Mulei‘ula gave in. Her and her baby survived; Haumea received her tree and flowers.

Haumea left Kahiki and traveled to Hawai‘i in search of a place to plant this tree. She circled Hawai‘i and could not find a suitable place and left for Maui.

> *A luna keia o Maui, kaapuni ia Maui; a hiki i Waihee, ku keia ilalo: O Puukuma ka inoa o kahi i ku ai. Haalele keia i ka laau, hele keia e inu wai a Kane. Hoi mai keia, hapai i ka laau; ua kolo ke aa o ka laau ilalo, ua paa loa.*
>
> *E pa ae ana keia i ka pa no ka laau e ulu ai, mai Pihana a ka lae o Kahoomano. “Paa i ka pa a hiki i keia manawa,” hookaawale keia i ka makaki mawaho; o Kekilioopu ka makani maloko. Kii keia i na pua ako, a lawe keia i na pua, ia Kanikawi, ia Kanikawa. Hoi o Haumea i Nuumehalani.* [Ka Nupepa Kuokoa 1865]

She jumped over to Maui and circled it until she came to Waihe‘e where she set the tree down. Pu‘ukuma is the spot where she set it down. She left the tree and went for a drink of water – the water of Kāne. When she returned, she went to left the tree and found that its roots had crept below and that it was held fast. Haumea erected a wall around the growing tree, a wall that reached from Pihana to Kaho‘omano Point. Secure with the wall until this time (*Pa‘a i ka pā a hiki i keia manawa),* it was kept from the winds without; the Kili‘o‘opu was the wind within. Haumea took the two blossoms Kanikawī and Kanikawā and returned to Nu‘umehalani. [Kamakau 1991:7]

One day, a man named ‘A‘a‘alā‘au of Nakolo was traveling through the mountain side to chop some wood. While traversing, he came across the tree nearby. ‘A‘a‘alā‘au chopped the tree down and then returned home, unbeknownst to him, that the tree he chopped down was Kalauokekāhuli, the one that Haumea brought to Maui from Kahiki. Later that evening, a storm began and lasted for “twenty nights and twenty days” (Kamakau 1991:7).

Ia po no, hoomaka iho ana ka ua nui loa, he iwakalua po, he iwakalua ao ka ua ana; o na wahi kahawai ole, lilo i kahawai, o ka pa o ua laau nei, mokumoku i ka wai, a lilo i mau puu, a i mau kahawai.

O ua laau nei, lilo i ka wai, a hele i ka moana. Eono malama pae i Niukukahi, […] [Ka Nupepa Kuokoa 1865]

There were rushing streams where no streams had before. The wall surrounding the tree was broken up; parts of it washed up into mounds and parts of it washed into the streams. The tree itself was washed away, out into the ocean. After six months it washed ashore at Niukūkahi in Waiehu, Maui. [Kamakau 1991:7]

Kamakau (1991) continues this story by sharing where different branches of the tree went to and what they were eventually used for. For the purpose of this *mo‘olelo*, we follow the trunk of the tree to Kailua, O‘ahu where it has landed. “The trunk of the tree was used as a dung heap and as a place for throwing wastes. This was Kū-ho‘one‘e-nu‘u” (Kamakau 1991:8)

O Wailaahia ke kane, o Halelau ka wahine, he mau mea Akua ole. Hele mai ua Akua nei i ka po ma ka moeuhane, e kii aku i Akua no laua, e kolu po ekolu ao ka hoolale ana e kii aku e kalai I Akua no laua.

I kea o ana o ka hoolale ekolu, hoomakaukau iho la o Wailaahia i na mea i kauohaia. He puaa, he niu, he ia ula, he aahu, he kohekohe. Hele aku la ua kanaka nei, hahau iho la, a noa ae la, lawe ia’ku la iuka o Polipoli I Napoko, aia ma Waiehu.

Ua kukulu o Wailaahia I ka Waihau a kapu iho la, a noa ae la […] [Ka Nupepa Kuokoa 1865]

Wai-la‘ahia the husband and Halaelau the wife were people without gods. The god Kū-ho‘one‘e-nu‘u came at night in a dream to have them go and get it [the tree trunk] for a god for themselves. For three nights and three days they were urged to go and carve a god [from the tree] for themselves. On the third day of urging, Wai-la‘ahia prepared the things that had been ordered – a pig, coconuts, red fish, garments, and *kohekohe* grass.

Then he went and laid down his offering and freed the *kapu*. Then he took the tree trunk inland to Polipoli iat Nāpoko there in Waiehu. Wai-la‘ahia erected a *waihau* [a heiau for Kū-ho‘one‘e-nu‘u], dedicated it, and freed it. [Kamakau 1991:8]

3.1.2 *Nā Mo‘olelo*

3.1.2.1 The Battle of Kalae‘ili‘ili

Kahekili was the reigning chief of Maui around the year 1765. Kahahana was a soldier guard who lived in Ka‘apoko, Waihe‘e. One day, the chiefs distributed *i‘a* (fish) to the people and left out Kahahana and his wife. This led to a quarrel amongst Kahahana and the chiefs.

‘O ke kumu o ke kaua kūloko, ‘o kekahi pū‘ali koa, ‘o Kahanana ka inoa. No ka ‘ao‘ao o Ke‘eaumoku mā ia koa, ‘o kona wahi ‘āina ‘o Ka‘apoko, he wahi ‘ili ‘āina i loko o ke ahupua‘a ‘o Waihe‘e.

Ua hele mau kēia kanaka i ka mahi ‘ai, a i ke ahiahi ho‘i i ka hale, ua pūlehu kahi wahine i ka lū‘au, ua hā‘awi nā ali‘i I ka i‘a i nā kānaka pau, a koe lāua nei me kāna wahine. [Kamakau 1996:19]

The quarrel arose through a certain soldier of the guard named Ka-hahana [Kahanana] who belonged to Ke‘e-au-moku and lived at Ka‘apoko within the district of Waihe‘e. This man went every day to his plantation an when he returned at night his wife cooked the taro tops. The chiefs distributed fish to the people and left out this man and his wife. [Kamakakau 1992:83]

This action made Kahahana furious as all the chiefs and their wives would enjoy fish, meat, and *poi* (made from cooked taro corm, or rarely breadfruit, pounded and thinned with water), while he and his wife received nothing. Kahahana wanted revenge and killed several men, starting a war between warriors and chiefs of Kahekili with the warriors and chiefs of Ke‘eaumoku.

No laila, ‘a‘ahu ihola ‘o Kahanana i ka ‘ahu‘ula, ‘o ka mahiole i ke po‘o. ‘O ka hele nō ia a Niukūkahi, a make ke kanaka, a hopu hou ‘o Kahanana, ‘alua kanaka I makai ā Kahanana. ‘O ka ho‘omaka nō ia o ke kaua, ‘o ke kaua nō ia o nā ‘ao‘ao ‘elua a pō ka lā. I ka lua o ka lā kaua, ua ho‘ouka aku, ua ho‘ouka mai ke kaua me ka make o nā ‘ao‘ao ‘elua. ‘O Kalaw-‘ili‘ili ka inoa o kēia kaua […] [Kamakau 1996:19]

Then he put on his feather cloak and helmet and went to Niukukahi and slew a man, and he seized and slew two others. Thus the battle began and lasted all that day and the next with lost on both sides, neither side havinf the advantage. Ka-lae-‘ili‘ili was the name of this battle. [Kamakakau 1992:83]

3.2 *Nā Wahi Pana* (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 Kailua tangibly link the *kama‘āina* of Kailua 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* 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* (waterway or ditch), 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).

3.2.1 *Nā Inoa ‘Āina a me Nā Wahi Pana* (Place Names and Storied Places)

An analysis of place name meanings for the region surrounding the project area may yield some insight into the patterns of life in that area. Features of this area include *heiau*, *‘ili* (land section, subdivision), streams, surf, *palena* (boundaries), and *pu‘u* (hills). Literal translations of several of the place names for land areas and divisions near the project area are listed below. Unless otherwise noted, the translations are taken from Pukui et al. (1974).

Table 1. *Nā Inoa ‘Āina a me Nā Wahi Pana o Waiehu*

Name	Translation
‘A‘awa	Lit. “wrasse fish”; an ancient surfing area near Waiehu, West Maui.
Ahikuli (*ahupua‘a*)	
Alakaha (*‘ili ‘āina*)	Found in LCA 2468 to Keau, approximately .25 acre.
Alapaka (*‘ili ‘āina*)	Lit. “alpaca” or “alabaster” (Pukui and Elbert 1986:19) Found in LCA 3275 to Kaia; approximately 1 acre.
Halawa [Hālawa] (*‘ili ‘āina*)	Lit. “curve” (Pukui and Elbert 1986:52,122) Found in LCA 3219 to Apapau and LCA 3275-F to Kane.

Name	Translation
Halelau (*‘ili ‘āina; heiau*)	Lit. “House thatched with leaves rather than pili grass” (Pukui and Elbert 1986:53); Found in LCA 3213 to Ehu, LCA 499 to Auwae, LCA 3273 to Waiwaiole, LCA 3447 to Kaili, and LCA 5945 to Kepaa Heiau located mauka to the Waiehu Camp in the cane fields. Obliterated by a modern cemetery (Walker 1931)
Halelena (*‘ili kū* or *‘ili kūpono* – a nearly independent ‘ili land division within an ahupua‘a, paying tribute to the ruling chief and not the chief of the ahupua‘a)	Lit. yellow house.; Retained by Lunalilo but surrendered in commutation. Found in LCA 3274 to Wanaoa, LCA 204 to Edwin Miner, LCA 781 to Alx M. Birch, LCA 3275-M to Wahinekahiki, LCA 3440 to Kaiakahi, and LCA 5454 to Pauanihi
Hananui (*‘ili ‘āina*)	Lit. “big bay”; Found in LCA 781 to Alex M. Birch
Hanohano (*‘ili ‘āina*)	Lit. “majestic”; Found in LCA 2554 to Wawae, and LCA 3275 -W to Kaaea (Hanohanoiki)
Holoikauai (*‘ili ‘āina*)	Lit. “sail to Kaua‘i”; Found in LCA 2426 to Kaiwi, and LCA 2447 to Ka‘awa
Honohono (*‘ili ‘āina*)	Lit. “honohono kukui or basket grass; wandering Jew or dayflower, a creeping weed; rare native mint; an orchid; variation of hohono – bad smelling; a child game”; Found in LCA 1806 to Makalawelawe, and LCA 3459 to Keawe.
Ka‘akukui (*‘ili ‘āina*)	Lit. “rolling candlenut”; From LCA 3528 to Naoopu
Kaalaino (*‘ili ‘āina*)	Found in LCA 4149 to Kapohuli, LCA 3275-C to Mokupanei, LCA 3275-Y to Kaneiki, and LCA 3443 to Kamai
Kahakapiele (*‘ili ‘āina*)	Found in LCA 3219 to Apapau
Kahimana (*‘ili ‘āina*)	Found in LCA 5454 to Pauanihi
Kailiili (*‘ili ‘āina*)	Lit. “the pebble”; Found in LCA 1806 to Makalawelawe
Kalahape (*‘ili ‘āina*)	Found in LCA 3275-H to Pulehupo and LCA 3275-R to Kamaka
Kaluaolena (*‘ili ‘āina*)	Lit. “the ōlena pit”.; Found in LCA 3439 to Kamahaaloa, LCA 2475 to Kahalehuki, and LCA 3275-P to Waiwaiole
Kamakoa (*heiau*)	Located at head of Waiehu Road; grove of eucalyptus. (Walker 1931:141)

Name	Translation
Kaohe (*‘ili ‘āina*)	Lit. “the bamboo or several other plants”; LCA 2461 to Kanehailua, LCA 2474 to Kuhi, LCA 3456 to Keliinui, and LCA 5622 to Kaneiakala
Kaohia (*‘ili ‘āina*)	Lit. “the ‘ōhi‘a [*metrosideros polymorpha*] tree”; Found in LCA 4149 to Kapohuli
Kapaka (*‘ili ‘āina*)	Lit. “the raindrop”; Found in LCA 3275-E to Kaleo
Kapalaoa (*‘ili ‘āina*)	Lit. “the whale or the whale tooth”; Found in LCA 3435 to Keaohula, LCA 3429 to Kaupe, LCA 3431 to Kalamaia, LCA 3438 to Kumahana, LCA 3547 to Kamaka, and 5495 to Kepaa. In the ahupua‘a of Polipoli.
Kapoino (*ahupua‘a*)	Lit. “the misfortune, disaster, calamity, etc.”; Kapoino a me na Poko o Waiehu were retained by Lunalilo at the Māhele but surrendered in lieu of commutation. Found in LCA 3437 to Kailiula. Poino found in LCA 2419 to Kamahiai, LCA 3373 to Pu, LCA 3396 to Pilipowahine & Lani, LCA 3434 to Kaapowale, LCA 3443 to Kamai, and LCA 3446 to Kaahu.
Kapuoho (*‘ili ‘āina*)	Lit. “startled; to cry out in alarm” (Pukui and Elber 1986:356)
Kauhiloa (*‘ili ‘āina*)	Lit. “the long yam”. Found in LCA 3450 to Kapulu,
Kaulu/Kaula (*‘ili ‘āina*)	Lit. “the breadfruit”. Found in LCA 3275-L to Kamanele and LCA 3275-D to Kaholomoana
Kauwila (*‘ili ‘āina*)	Li.t “the uila tree” Found in LA 2466 to Kahula, LCA 2474 to Kuhi, LCA 2482 to Kane, LCA 3275-S to Kawahaale, LCA 3439 to Kamahaloa, and LCA 3460:2 to Kaia
Kehoni	point
Keokanui (*‘ili kūpono*)	Retained by Liholiho
Kiha (*‘ili ‘āina*)	Found in LCA 3379 to Puna
Kipapa (*‘ili ‘āina*)	Lit. “place prone, pavement”; found in LCA 8814 to Kamai and LCA 3377 to Puulau
Kope (*kahawai*)	Lit. “to rake”;
Kou (*‘ili kūpono*)	Retained by Liholiho
Kuhimana (*‘ili ‘āina*)	Found in LCA 2433 to Kahikapa and LCA 6935 to A. Moku
Kukuialaimaka (*‘ili ‘āina*)	Found in LCA 3436 to Kaphi and LCA 3374to Paele.
Kukuikomo (*heiau*)	Located near the ridge between North and South Waiehu Gulches; heiau with no platforms
Kukuiokomo (*‘ili ‘āina*)	Located in Ahikuli, found in LCA 3439 to Kamahaloa

Name	Translation
Kumukahi (*‘ili ‘āina*)	Lit. “first beginning”; Found in LCA 3451 to Kapahi and LCA 11222 to Kapahu
Kumuwiliwili (*‘ili ‘āina*)	Lit. “wiliwili [Erythrina sandwicensis] tree”; found in LCA 3275-E to Kaleo, LCA 2489 to Kuheleaukea, and LCA 2526 to Makanui
Kuunahawelu (*‘ili ‘āina*)	Found in LCA 3275-G and 8819 to Kamai, LCA 3275-O to Kawao, and LCA 9974 to Lupe. Also written as Kunuhawelu
Lualailua (*‘ili ‘āina*)	Lit. “twofold tranquility”; found in LCA 3275-E to Kaleo, LCA 2489 :4 to Kuheleaukea, LCA 2625 to Pa, and LCA 3459:3 to Keawe.
Mahalani (*pā ‘ilina*)	Lit. “heavenly rest”, cemetery
Malama	Ridge
Malumaluakua (*heiau*)	Located at Head of South Waiehu Gulch; groove of kukui trees surrounding a level spot with evidence of walls or platforms. A large rock in the center possibly for sacrificial purposes. (Walter 1931:142)
Mookahi (*‘ili ‘āina*)	Found in LCA 3448 to Kaalapali
Napoko (*poko*)	“the shorts, small lands; sometimes the personal lands of a chief”;
Niukahi (*nalu*)	Lit. “coconut standing alone”; an ancient surfing area.
Nukukahi (*heiau*)	“of this heiau nothing now remains but a heap of stones”
Ohia (*‘ili ‘āina*)	Lit. “‘ōhi‘a tree”; Found in LCA 3219 to Apapau, LCA 2461 to Kanehailua, LCA 2625 to Pa, and LCA 3275-V to Keaole
Ohiaiki (*‘ili ‘āina*)	Lit. “small ‘ōhi‘a”; found in LCA 4149 to Kapohuli, LCA 2613 to Pepeiao, LCA 3259 to Luaehu, LCA 3275-O to Kaowao, and LCA 3459 to Keawe
Ohianui (*‘ili ‘āina*)	Lit. “large ‘ōhi‘a”; found in LCA 3275 -E to Kaleo, LCA 2468 to Keau, LCA 3259 to Luaehu, LCA 3275-K to Mahi, LCA 3275-P to Waiwaiole, LCA 3459 to Keawe, LCA 3462 to Kalomi, and LCA 4049 to Kaniolo
Omao (*‘ili ‘āina*)	Lit. “green”; found in LCA 3275-C to Kaiolani, LCA 3327 to Naialaolao, LCA 3433 to Kula, LCA 3437 to Kailiula, LCA 3441 to Kapaula, LCA 3444 to Kalopa
Palaeale (*‘ili ‘āina*)	Lit. “bright, as the sun”; found in LCA 9974:2 to Lupe

Name	Translation
Panene (*‘ili ‘āina*)	Lit. “goose enclosure”; found in LCA 3275-E to Kaleo; LCA 2461:1 to Kanehailua, LCA 2625 to Pa, LCA 3275-F to Kane, LCA 3275-Y to Kaneiki; LCA 11259 to Keoole.
Papahawale (*‘ili ‘āina*)	Found in LCA 2447 to Kaawa; LCA 1806 to Makalawelawe, LCA 2572 to Naheana, 3275-T to Kahookano, 3275-X to Puula, LCA 3441 to Kapaula, LCA 3528 to Naoopu
Papalaloa (*‘ili ‘āina)*	Lit. “tall pāpala tree”; LCA 2466 to Kahula
Piilani (*‘ili ‘āina*)	A famous Maui chief; found in LCA 3237 to Kailiula
Pilipili (*‘ili ‘āina*)	Lit. “sticky, adnesive, tenacious; an herb [Drymaria cordata]; found in LCA 2572 to Naheana
Poaiwa (*‘ili ‘āina*)	Lit. “ninth-day”; found in LCA 2482 to Kane, LCA 2489 to Kuheleaukea, LCA 3275-R to Kamaka, LCA 3378 to Pepehi
Pohakulua (*‘ili ‘āina*)	Lit. “double stone”; found in LCA 5263 to Kualii
Pohakunui (*‘ili ‘āina*)	Lit. “large stone”; Retained by Lunalilo at the Māhele, LCA 8995-B, LCA 3428 to Kekai, LCA 2475 to Kahalehuki, LCA 3375 to Pohakupa, LCA 3433 to Kuaana, LCA 3458 to Kikaho, LCA 11256 to Lonoaea
Polipoli (*ahupua‘a, pu‘uhonua*)	Lit. “a soft porous stone used for polishing or for octopus lure sinkers”; Retained by Lunalilo at the Māhele, “Polipoli was Kūka‘ilimoku’s land made a pu‘uhonua land by Kamehameha I.
Poohuea (*‘ili ‘āina*)	Found in LCA 3528 to Naoopu, LCA 2475 to Kahalehuki, LCA 3525 to Hanae, LCA 3275-L to Kamanele, LCA 10631 to Pahanui.
Puu Kāne (*pu‘u*)	Lit. “Kāne’s Hill”
Puu o Kaupo (*pu‘u*)	Lit. “Kaupo Hill”
Puukoa (*heiau*)	Destroyed. Located near pond on ridge south of Waiehu Camp (Walker 1931:144)
Puuopalili (*pu‘u*)	Lit. “Palili’s hill”; found in LCA 3327 to Naialaolao, LCA 3432 to Kula
Ukihi (*‘ili ‘āina*)	Lit. “cold sores, name of a bird”; found in LCA 2487 to Kahue, LCA 3459 to Keawe, LCA 3275-E tp Kaleo
Waiale (*‘ili ‘āina*)	Lit. “rippling water”, found in LCA 3375 to Pohakupa
Waiehu (*ahupua‘a*)	Lit. “water spray”
Waiehu (*kahawai*)	Lit. “water spray”

Name	Translation
Wailaahia (*‘ili ‘āina*)	Lit. “consecrated water”; found in LCA 3258 to Laka

3.2.2 Surf at Waihe‘e and Waiehu

The surf on Maui were famous as these were the favorite spots for many *ali‘i* throughout the area. Kamakau (1992) writes:

> *‘O ka nalu o Kehu ame Ka‘ākau, ‘o ia kahi luana o nā ali‘i o Wailuku. ‘O ka nalu o Nuikūkahi me ‘A‘awa kahi kua kāhela o nā lai‘i o Waiehu me Nāpoko. ‘O Pala‘ie ame Kahāhāwai nā nalu luakaha o nā ali‘i o Waihe‘e*. [Kamakau 1996:18-19]

> The chiefs of Wailuku passed their time in the surf of Kehu and Ka‘akau, those of Waiehu and Napoko in the surfs of Niukukahi and ‘A‘awa, while those of Waihe‘e were accustomed to amuse themselves in the surfs of Pala‘ie and Kahahawai. [Kamakau 1992:83]

3.2.3 Ka Lae o Kehoni

During the reign of Kahekili as chief of Maui, he and has son would have wrestling matches at Ka Le o Kehoni. However, it is said that this place got its name as the birthplace of chiefess Namahana. According to Sterling (1992):

> At the point of Kehoni was a site for wrestling matches for Kahekili and his son. The name of the ridge above this place is Malama and the level land below is now the golf links …
>
> There was a large flat shiny rock there that people sought but could never find. Here the chiefess Namahana was born. And that is perhaps why the place was called Kehoni. [Sterling 1992:73]

3.3 *Nā ‘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 a proverb 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 Waiehu come from Mary Kawena Pukui’s *‘Ōlelo No‘eau* (Pukui 1983).

3.3.1 Ka ‘Ōlelo No‘eau #357

This *‘ōlelo no‘eau* is from a conversation with Kahekili, the ruler of Maui, and a messenger of Kamehameha I, who at that time, was in the process of conquering the Hawaiian islands.

> *E nānā mai a uhi kapa ‘ele‘ele ia Maui, a kau ka pua‘a i ka nuku, ki‘i mai i ka ‘āina a lawe aku.*
>
> Watch until the black tapa cloth covers Maui and the sacrificial hop is offered, then come and take the land.
>
> Said by Kahekili, the ruler of Maui, to a messenger sent by Kamehameha I with a question whether to have war or peace. Kahekili sent back this answer – “Wait until I am dead and all the rites performed, then invade and take the island of Maui.” [Pukui 1983:43]

3.3.2 Ka ‘Ōlelo No‘eau #1462

Referencing the ‘Aha‘aha wind of Niua, this *‘ōlelo no‘eau* showcases the transition from the Kili‘o‘opu wind to the ‘Aha‘aha breeze as it reaches Waiehu. This wind is also considered a good omen for fishermen.

> *Ka makani kā ‘Aha‘aha la‘i o Niua*
>
> The peaceful ‘Aha‘aha breeze of Niua that drives in the ‘aha‘aha fish.
>
> The ‘Aha‘aha breeze begins as the Kili‘o‘opu in Waihe‘e, Maui, before reaching Niua Point in Waiehu. It is a gentle breeze and the sea is calm when it blows. Fishermen launch their canoes and go forth to fish, for that is the time when the ‘aha‘aha fish arrive in schools. [Pukui 1983:158]

3.3.3 Ka ‘Ōlelo No‘eau #1465

An *‘ōlelo no‘eau* featuring the wind of Waikapū.

> *Ka makani kololio o Waikapū.*
>
> The swift, gusty wind of Waikapū.
>
> Waikapū is on Maui. [Pukui 1983:159]

3.3.4 Ka ‘Ōlelo No‘eau #1489

This *‘ōlelo no‘eau* describes the shape of Maui.

> *Ka moku puni kuapu‘u.*
>
> The hunchbacked island.
>
> Maui. Its shape on the map resembles the figure of a hunchbacked person. [Pukui 1983:161]

3.3.5 Ka ‘Ōlelo No‘eau #1763

As with some *‘ōlelo no‘eau*, the purpose is to sometimes describe a person’s action or lack thereof. This *‘ōlelo no‘eau* is an illustration of such and focuses on not only Maui, but includes Lāna‘i, Moloka‘i, and O‘ahu.

> *Ke ku no a Maui; ke ki‘ei no a Lāna‘i; ka moe no a Moloka‘i; ka noho no a O‘ahu.*
>
> Maui stands; Lāna‘i peers in; Moloka‘i sleeps; O‘ahu sits.
>
> Said of people who stand about, look on, go to sleep, and sit around, but who do not lend a hand with work. [Pukui 1983:189]

3.3.6 Ka ‘Ōlelo No‘eau #2143

This *‘ōlelo no‘eau* references one of the ruling chiefs of Maui, Kamalalawalu.

> *Maui a Kama.*
>
> Maui, island of Kama.
>
> Kamalalawalu was a ruling chief of Maui. [Pukui 1983:234]

3.3.7 Ka ‘Ōlelo No‘eau #2142

This *‘ōlelo no‘eau* is in reference to a song title with the same words.

> *Maui no ka‘oi.*
>
> Maui excels.
>
> From the song of this title by the Reverend Samuel Kapū. [Pukui 1983:234]

3.3.8 Ka ‘Ōlelo No‘eau #2145

Similar to ka *‘ōlelo no‘eau* #1763, this *‘ōlelo no‘eau* was created to illustrate a person’s intelligence or lack of through the perspective of an historic event.

> *Maui po‘ohakahaka.*
>
> Maui the empty headed.
>
> The people of Maui were said to lack intelligence. This saying originally referred to the empty skulls of defeated Maui warriors. [Pukui 1983:234]

3.3.9 Ka ‘Ōlelo No‘eau #2300

This *‘ōlelo no‘eau*, as mentioned earlier, references the four famous waters of Maui; Waihe‘e, Waiehu, Waikapū, and Wailuku.

Nā wai ‘ehā.

The four waters.

A poetic term for these places on Maui: Wailuku, Waiehu, Waihe‘e, Waikapū, ecah of which has a flowing water (wai). [Pukui 1983:251]

3.3.10 Ka ‘Ōlelo No‘eau #2904

This *‘ōlelo no‘eau* showcases the boundaries of Waiehu from one cliff to another.

Waiehu, mai ka pali o Kapulehua a ka pali o ‘A‘alaloa.

Waiehu, from the cliff of Kapulehua to the cliff of ‘A‘alaloa.

The boundaries of the district of Waiehu, Maui. [Pukui 1983:318]

3.3.11 Ka ‘Ōlelo No‘eau #2911

This *‘ōlelo no‘eau* showcases Waikapū with its wind, Kokololio.

Waikapū i ka makani kokololio.

Waikapū of the gusty wind.

Refers to Waikapū, Maui. [Pukui 1983:319]

3.3.12 Ka ‘Ōlelo No‘eau #2912

An *‘ōlelo no‘eau* for Wailuku, Maui.

Wailuku i ka malu he kuawa.

Wailuku in the shelter of the valleys.

Wailuku, Maui, reposes in the shelter of the clouds and the valley. [Pukui 1983:319]

3.4 *Nā Mele* (Songs)

The following section draws from the Hawaiian art of *mele*, poetic song intended to create two styles of meaning.

> Words and word combinations were studied to see whether they were auspicious or not. There were always two things to consider the literal meaning and the *kaona*, or ‘inner meaning.’ The inner meaning was sometimes so veiled that only the people to whom the chant belonged understood it, and sometimes so obvious that anyone who knew the figurative speech of old Hawai‘i could see it very plainly. There are but two meanings: the literal and the *kaona*, or inner meaning. The literal is like the body and the inner meaning is like the spirit of the poem.
>
> The Hawaiians were lovers of poetry and keen observers of nature. Every phase of nature was noted and expressions of this love and observation woven into poems of praise, of satire, of resentment, of love and of celebration for any occasion that might arise. The ancient poets carefully selected men worthy of carrying on their art. These young men were taught the old *meles* and the technique of fashioning new ones. [Pukui 1949:247]

There exists a number of *mele* that mention Waiehu as well as other areas within Nā Wai ‘Ehā. These particular *mele* may also be classified as *mele wahi pana* (songs for legendary or historic places). *Mele wahi pana* may or may not be accompanied by *hula* (dance) or *hula wahi pana* (dance for legendary or historic places). As the Hula Preservation Society notes,

> *Hula Wahi Pana* comprise a large class of dances that honor places of such emotional, spiritual, historical, or cultural significance that chants were composed for them. Only the composers of the chants could know the deepest meanings, as they would be reflections of their feelings and experiences […] Since the subjects of *Wahi Pana* compositions are extremely varied, their implementation through hula are as well. Coupled with the differences from one *hula* style and tradition to the next, *Hula Wahi Pana* can be exceptionally diverse. They can be done sitting or standing, with limited body movement or wide free movement; with or without the use of implements or instruments; with the dancers themselves chanting and/or playing an implement or being accompanied by the *ho‘opa‘a* [drummer and *hula* chanter (memorizer)]. Beyond the particular *hula* tradition, what ultimately determines the manner in which a *Hula Wahi Pana* is performed are the specific place involved, why it is significant, the story being shared about it, and its importance in the composer’s view. [Hula Preservation Society 2014]

3.4.1 Hanohano Waiehu

This *mele* was composed by David Alawa. Kawai Cockett (1998), a Hawaiian musician, states that:

> Waiehu (spraying mist) refers to the mist that forms around the upland waterfalls on windy days in this land north of ‘Iao valley on Maui. The song describes the physical and emotional weight, the “heavy baggage” (‘ukana lu‘ulu‘u) of love. The ua Hō‘eha ‘ili (rain that hurts the skin) is the name of the area’s rain drops born by the wind, that gently pinch you, causing a tingling sensation. Figuratively speaking, it could imply that one’s feelings have been hurt.

Hanohano Waiehu i ka uhiwai	Waiehu is magnificent in the heavy mist
Ha‘aheo i ka liko a‘o ka lehua	Proudly cherishing the lehua bud
‘O ka ne‘e a ka ua Hō‘eha‘ili	The slow creeping of the Hō‘eha ‘ili rain
Me he ala o ku‘u aloha kekahi	Is like my beloved in some ways
‘Akahi ho‘i au a ‘ike maka	For the first time I’ve experienced for myself
I ka ukana lu‘ulu‘u a ke aloha	The burdensome load of love
Ha‘ina ‘ia mai ana ka puana	The theme is told
Hanohano Waiehu i ka uhiwai	Waiehu is magnificent in the heavy mist

[Cockett 1998]

3.4.2 I Waikapū Ke Aloha/No Nā Wai ‘Ehā

The lyrics below appear under the names of two different mele, I Waikapū Ke Aloha as well as No Nā Wai ‘Ehā. Unfortunately, the composer for I Waikapū Ke Aloha is unknown. However, Scott Hai, who was from Ke‘anae but moved to Waihe‘e, is credited in composing No Nā Wai ‘Ehā. The *mele* focuses on the areas of Nā Wai ‘Ehā.

I Waikapū ke aloha	In Waikapū
Ka makani Kokololio	The gusty wind named Kokololio
Pili i ka poli nahenahe	Held in warm arms
He ‘inikiniki mālie	Gently pinching
I Wailuki [Wailuku] iho ‘oe	You were in Wailuku
I ka piko a‘o ‘Iao	To the summit of Iao
(*Ka makani lawe mālie*)	(Gentle wind)
Lihilihi o ka pua rose	Petals of the roses
He ‘inikiniki mālie	Gently pinching
I Wai‘ehu iho ‘oe	You were in Waiehu
Ka makani hō‘eha ‘ili	The wind that pierces the skin
Me ka ‘uhiwai a‘o uka	With the fog of the upland
Me ke a‘o ia uka	heavy fog
He ‘inikiniki mālie	Gently pinching
I Waihe‘e kāua	Both of us were in Waihe‘e
Ka makani Kili‘o‘opu	With the wind named Kili‘o‘opu
Me ka wai a‘o Eleile	With the water of Eleile
He ‘inikiniki mālie	Gently pinching
I Lahaina iho ‘oe	You were in Lahaina
Ka makani Kaua‘ula	With the Kaua‘ula wind
Me ka malu ‘ulu a‘o Lele	Amid the shelter of the breadfruit trees of Lele
He ‘inikiniki mālie	Gently pinching

Ha‘ina mai ka puana	Here ends my song
No nā wai ‘ehā	Of the four waters
E ho‘i nō e pili	Return, let us be together
He ‘inikiniki mālie	Gently pinching

[huapala.org]

3.4.3 Waikapū/‘Iniki Mālie

Similar to I Waikapū Ke Aloha and No Nā Wai ‘Ehā, Waikapū and ‘Iniki Mālie have the same lyrics but are printed in under two different song titles. Waikapū is credited to James Kahele. Unfortunately ‘Iniki Mālie did not list the composer (Elbert and Māhoe 1970:56).

Waikapō[ū] makani kokolo lio	Waikapū has a swift blowing wind
Makani houhou ‘ili	Wind that pierces the skin
‘Ini‘iniki mālie	Gently pinching it
Wailuku makani lawe mālie	Wailuku has a gently blowing wind
Makani houhou ‘ili	Wind that pierces the skin
‘Ini‘iniki mālie	Gently pinching it
Wai‘ehu makani ho‘eha ‘ili	Wai‘ehu has a wind that pricks the skin
Makani houhou ‘ili	Wind that pierces the skin
‘Ini‘iniki mālie	Gently pinching it
Waihe‘e makahi kili‘o‘opu	Waihe‘e has a cool wind
Makani houhou ‘ili	Wind that pierces the skin
‘Ini‘iniki mālie	Gently pinching it
Ha‘ina mai ana ka puana	This ends my song
Makani houhou ‘ili	Wind that pierces the skin
‘Ini‘iniki mālie	Gently pinching it

[huapala.org]

3.4.4 Nā Wai Kaulana

This *mele* was composed by Alice Namakelua to praise and honor “the four famous streams of West Maui” (huapala.org) as well as other areas within Maui. Places like Kepaniwai, ‘Iao, and

Haleakalā are distinguished *wahi pana* not only for their land formations, but for the *mo‘olelo* that accompany these areas.

‘Ike ana i ka nani o Maui	Seeing the beauty of Maui
I Kepaniwai o ‘Īao	Kepaniwai at ‘Īao
Ke kokolo a ka uwahi o Kula	The drifiting of the dust of Kula
Me he uhiwai ala no ka uka	Like fog, there in the uplands
Hui:	Chorus:
Ka‘apuni ‘oe a puni ‘o Maui	You travel around Maui
E ‘ike i nā wai ‘ehā	And see the four streams
O Waikapū, o Wailuku, o Waiehu	Waikapū, Wailuku, Waiehu
Kaulana nā wai ‘ehā	Famous are the four streams
He ‘īnikiniki mālie	Gently piercing is
O Waihe‘e i ka makani Kili‘o‘opu	Waihe‘e by the wind Kili‘o‘opu
O nā wai kaulana ‘ia a‘o ku‘u ‘āina	These are the famous streams of my land
O nā wai kaulana ‘ia a‘o ku‘u ‘āina	These are the famous streams of my land
I luna a‘o Haleakalā	Above Haleakalā
‘Ike ia e ka nani kamaha‘o	See the wondrous beauty
‘Alawai aku ‘oe i ka nani	If you glance over there, you will see
Ka nani o ke kukuna o ka lā	The beautiful rays of the sun
Eia iho hoi ia nani	Here is the beauty
O ka nani o ka pua li‘ulā	A mirage of flowers
He pua māka‘ika‘i mau ia	Stroll between the flowers
E ka nui ma ke lehulehu	Multitudes, growing in profusion
Kaulana nā pua like ‘ole	Flowers so famous, like no other
‘A‘ohe no a‘e like aku	Yes, none can compare to
Me ka nani o ka pua roselani	The beauty of the rose
O ka wehi a‘o ku‘u ‘āina	They adorn my land

[huapala.org]

3.4.5 Mauna Kahālāwai

The composer of this *mele* is unknown, however, the showcase of love for the island of Maui is seen throughout the *mele*. The ridges of Mauna Kahālāwai, also known as West Maui Mountains touched each of Nā Wai ‘Ehā. It is from these mountain ranges the waters flow to become Nā Wai ‘Ehā.

Hanohano i ka maka	Great wonders to the eyes
Ke ‘ike aku	To behold
Mauna Kahalawai o Maui	Mt. Kahalawai o Maui
E noho mai a i luna	It is there, up high
I luna ma na wahi ki‘eki‘e	Upon the highest point
I noho i lalo Kahakuloa	And there below is Kahakuloa
Waiehu, Paukukalo, ame Wailuku	Waiehu, Paukukalo, and Wailuku
Waikapū ‘a‘ole po‘ina Mā‘alaea	Waikapū, do not forget Mā‘alaea
Aloha i ka po‘e o ka ‘āina	Greetings and love to the people of the land
Aloha i ka po‘e o ka ‘āina	Greetings and love to the people of the land
Ha‘ina ‘ia mai ka puana	This is the end if my story
Mauna Kahalawai nou kēia mele	Mt. Kahalawai, this is your song
He inoa mai kahiko mai	A name from ancient times
Mauna Kahalawahi ‘o Maui	Mt. Kahalawai of Maui
Mauna Kahalawahi ‘o Maui	Mt. Kahalawai of Maui

[huapala.org]

Section 4 Historical Accounts

4.1 Pre-Contact to Early Post-Contact Period

Waiehu Ahupua‘a, along with the other *ahupua‘a* of Nā Wai ‘Ehā, were popular places for *ali‘i* to dwell. These lands were fertile and *wai* (water) was easily accessible and attainable. James (2001:56), shares

> […] Wailuku, Paukūkalo, and Waiehu were popular surfing spots amongst the chiefs of Maui, and from Waihe‘e to Wailuku lay the largest continuous area of wetland taro cultivation in the Islands. [James 2001:56]

Handy and Handy reiterate the prolific cultivation of *kalo* in Wailuku District saying that, “in ancient times [Wailuku District] was the largest continuous area of wet-taro cultivation in the islands” (Handy and Handy 1972:496). *Kalo* was perhaps the most distinguished plant within traditional Hawaiian horticulture and society. This is echoed in pre-Contact descriptions of agricultural cultivation in Wailuku which are dominated by passages illustrating the prominence of *kalo*. Handy and Handy describe the multifaceted role taro played in the pre-Contact era and its significance in the socio-cultural order:

> The function and nature of the taro plant, its cultivation and use, were responsible not only for its primal place in mythology but for the fact that the cult associated with it, namely that of the male god Kane (= Wakea) as first procreator, and of *Ka-wai-‘ola-a-Kane* or “The-life-giving-water-of Kane,” although less elaborated than that of the rain-father Lono, was more fundamental, not only in Hawaii but throughout Polynesia. It was, in fact, the basic cult of the primal procreator of nature and man, out of the union of Sky and Earth.
>
> Actually the course of fresh-water streams and ditches patterned the entire subsistence economy, and through this, the whole round and cycle of individual and social activity. The streams and ditches were the regulators, the law givers, in communal relationship; not directly, but because upon their water depended the taro, and upon the taro depended man.
>
> The requirements of labor, in connection with building and maintenance of dams, ditches, terraces, and embankments, and the planting, tending, and harvesting of the taro, determined the ordering of cooperative work and relationships between individuals and families within the community. This cooperation in turn was responsible for the obligations in the matter of work required of individuals and the right of individuals and families to a share in the products.
>
> Finally, taro in its habit of growth established a biological prototype of the form in which heredity and relationship were conceived. The taro growth supplied one of the terms in which the family system of the civilization was framed: *‘ohana*, meaning the dispersed biological family group as a whole. *‘Oha* means a shoot or sucker from the base of a plant, but essentially and primarily was applied to the buds from the corm of the taro that were broken off and replanted by the gardener. With the substantive suffix added, *‘oha-na* literally means “offshoots,” or “that which is composed of offshoots.”

> The family stock, then, budding and branching from parent stocks, was conceived of in terms of the habit of reproduction of the taro. [Handy and Handy 1972:76]

4.1.1 Kamehameha and Kahekili

After Kamehameha I conquered his island home of Hawai‘i, he was more than eager to gain control of the other islands, with Maui being his next target. Maui at that time was ruled by Kahekili, who also ruled Moloka‘i, O‘ahu, and Kaua‘i. In 1785 while Kahekili was living on O‘ahu, Kamehameha decided to make his attack on Maui, in Hāna. At first the attack seemed successful and appeared that Kamehameha’s army would be victorious, however, soon the battle changed and the warriors of Maui drew out Kamehameha’s army.

> When Kamehameha had conquered his own island, he was more than ever eager to gain control of the remainder of the group. But a great obstacle stood in his way in the person of Kahekili, Moi of Maui. By the time Kamehameha had become sole king of the island of Hawaii, Kahekili had succeeded in making himself overlord of Maui, Molokai, Oahu, and Kauai.
>
> Toward the end of 1785, Kamehameha sent an army under the command of his younger brighter to attempt the reconquest of Hana on Maui. This attempt met with some success at first but the invaders were later driven out. [Hoskins n.d:7]

In 1795, Kamehameha conquered Maui, Moloka‘i, and the rest of Kahekili’s domain (Hoskins n.d:7).

4.1.2 *Nā Pu‘uhonua a Ka‘ahumanu* (Ka‘ahumanu’s places of refuge)

In the adjacent *ahupua‘a* of Waihe‘e, there is land that is known to be a *pu‘uhonua* (a place of refuge) that belonged to Ka‘ahumanu. According to Kamakau (1992:313):

> Any condemned person could be saved if Ka-‘ahu-manu said the word. Her lands were also turned into places of refuge. Pu‘umau in Lahaina, Waipukua in Waihe‘e, Kalua‘aha in Molokai, and the rest, all became places where people could be saved from death. If a man killed another and he could escape from the friends of the man he had killed and run to the land set apart as a place of refuge, he would be saved from death. In the battle of Nu‘uanu between Kamehameha and Ka-lani-ku-pule many of the chiefs and chiefesses were taken prisoner—Ke-po‘o-loku, Kalola, Ihu-ka‘ika‘i, Ka-‘ele-o-Waipi‘o and their followers and many others—and they were told that through Ka-‘ahu-manu they might be saved, that any prisoner who appealed for life to Ka-‘ahu-manu was saved, hence many sought Ka-‘ahu-manu. The same was the case when Kamehameha made war in Hilo against Namakeha; many were saved through knowing this means of safety. [Kamakau 1992:313]

4.1.3 The Māhele (1848)

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—that introduced private property into Hawaiian society. In 1848, the Crown and the *ali‘i* received their land titles. *Kuleana* awards to commoners for individual parcels within the *ahupua‘a* were subsequently granted in 1850. The Crown Lands were considered the private lands of the monarch, and many lands were sold or mortgaged during the reigns of Kamehameha III and IV to settle debts to foreigners. To end this practice, the Crown Lands were made inalienable in 1865, and their dispensation was regulated by a Board of Commissioners of Crown Lands, which effectively put them under the administrative control of foreign-born residents (Kame‘eleihiwa 1992:310). Before the passage of the Act of 3 January 1865, which made Crown Lands inalienable, Kamehameha III and his successors did as they pleased with the Crown Lands, selling, leasing, and mortgaging them at will (Chinen 1958:27).

In 1850, the Privy Council passed resolutions that affirmed the rights of the commoners or native tenants. To apply for fee-simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and 14 February 1848. The Kuleana Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years, and knew that no one had challenged the claim. The land also had to be surveyed.

Not everyone who was eligible to apply for *kuleana* lands did so and, likewise, not all claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. Out of the potential 2,500,000 acres of Crown and Government Lands, less than 30,000 acres of land were awarded to the Native Hawaiian tenants (Chinen 1958:31).

In general, Waiehu Ahupua‘a is notable for having many Land Commission Awards (LCAs). Māhele records associated with the LCAs in Waiehu indicate that the vicinity west of the project area is likely a part of an extensive system of *lo‘i* that was formerly characterized the Wailuku and Waihe‘e valleys (Waihona ‘Aina 2000). A large portion of the LCAs located in Waiehu were primarily used for traditional cultivation of *kalo*. Other structures or infrastructure supporting both *lo‘i kalo* (taro patch) and *kula* (dryland) agriculture such as paths, roads, house lots, garden plots, were all listed as ancillary to the original claims made on half of taro cultivation (Figure 8).

The project area is located within *‘āpana* 20 and/or 21 of LCA 8559B*M, which was granted to William C. Lunalilo (Figure 9). The LCA document (LCA 8559B*M) comprises approximately 2,000 acres of land and does not specify definitive boundaries or specific land use for these *‘āpana*.

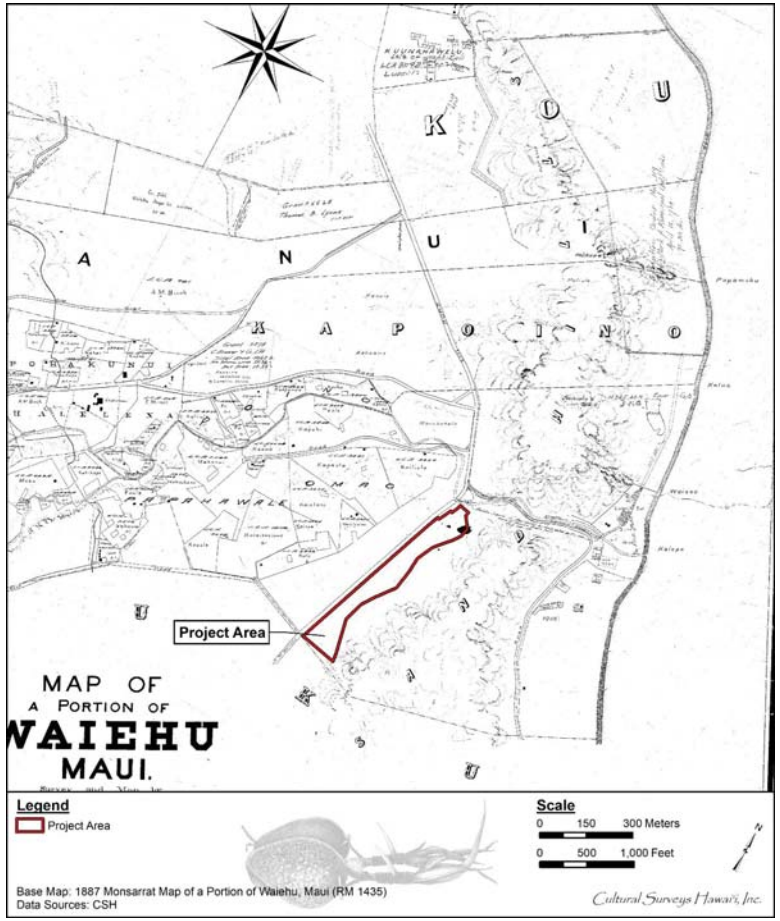

Figure 8. Portion of the Monsarrat (1887) Map of a Portion of Waiehu Maui showing numerous LCAs towards the *mauka* side and sand dunes towards the *makai* side of the project area

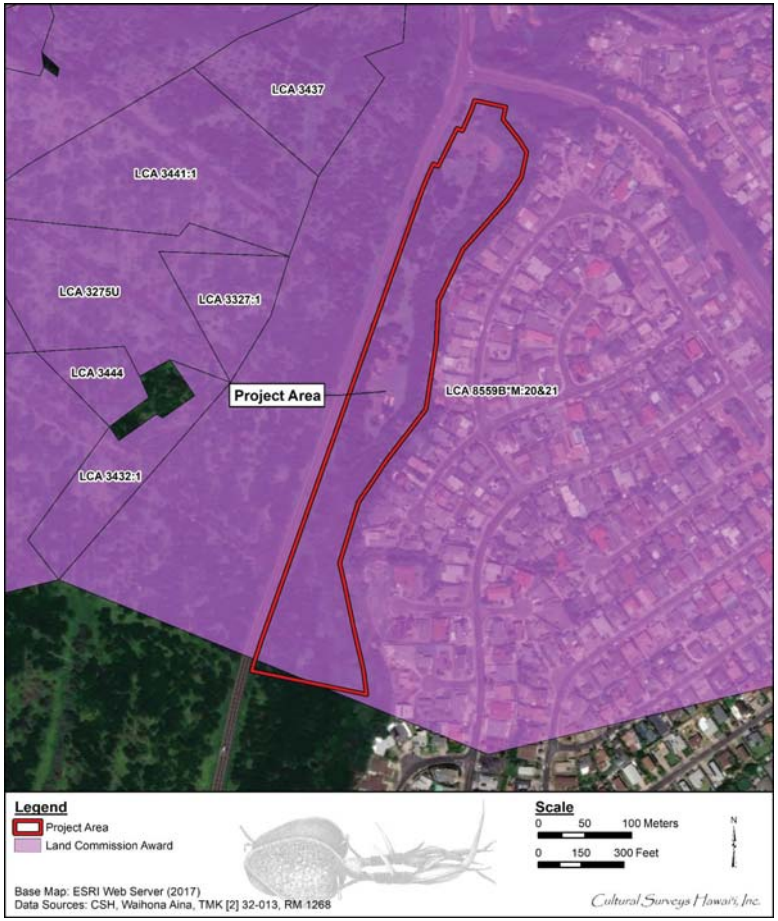

Figure 9. ESRI (2017) aerial image showing the project area and LCAs within the project area and surrounding vicinity

Table 2 indicates other LCAs within the surrounding vicinity of the project area and does not reflect all LCAs within Waiehu. As expected, many of these LCAs consist of *lo‘i kalo*, pastures, house lots, and place names associated with the ‘*āpana*.

4.2 Mid 1800s to 1900s

4.2.1 Sugar Plantation

Dorrance and Morgan (2000) wrote about the 165 years of sugar cane plantation in Hawai‘i. Dorrance and Morgan (200) shared that

> Early sugar makers found several varieties of wild cane: red, greenish-red, purple, green, yellow-striped, and variegated. The first Western cane farmers erected a mill amidst a large patch of cane, hired native workers, and harvested the surrounding field. The cane would be trimmed of leaves, hauled away by oxen and fed by hand into the wooden or stone grinders of an animal-powered mill. [Dorrance and Morgan 2000:4]

As the population of Native Hawaiians began to decline, the Kingdom of Hawai‘i and sugar cane plantation owners began contracting workers from other countries. Prior to the overthrow of the Hawaiian Kingdom in 1893, “the Chinese, Portuguese and northern Europeans, the Japanese […]” were among the firsts to be brought over to Hawai‘i, while Filipinos were brought over after the annexation of Hawai‘i in 1898 (Dorrance and Morgan 2000:4).

Throughout the years of the sugar plantation era, Maui once housed thirty-eight (38) sugar plantation companies, some short-lived, some which were bought-out by other companies, and some who were in it for the long haul.

> [..] the Pacific Commercial Advertiser excitedly described a similar development occurring on the island of Maui: “What a change has taken place in Waikapu within two years! Where there were a few taro -patches…a village has sprung up with its sugar mill and buildings, its waving cane fields and busy laborers, scattering industry, thrift, and contentment everywhere. Here, where a few hundred dollar’s worth of taro was formerly raised, fifty thousand dollars worth of sugar may now annually be made and sent to market [Takaki 1983:16-17]

Within the Nā Wai ‘Ehā, there were two main companies, there have been multiple sugar plantation companies, some small mills to bigger enterprises.

4.2.1.1 Small-scale Sugar Mill at Waiehu

George Wilfong reported in 1849 about a small-scaled sugar mill in Waiehu. This small mill is described as having a set of wooden rollers and being powered by animals.

> Perhaps 18 inches in diameter and two feet long, mounted vertically and driven usually by animal power, and a series of three open try pots bought from visiting whalers. Presumably, the cane was fed by hand, the juice being simply concentrated by successive boiling in the open kettles. [Wadsworth 1936]

Table. 2. LCAs within the project area (in **bold**) and the surrounding vicinity

LCA Number	Claimant	Acreage	Land Use
3275U	Kaiolani	7.53 acres	*Kalo*, *kula*, three *lo‘i*, and a house
3327:1	Naialaolao	2.36 acres	Greetings to the Land Commissioners: The Elele has said for me to state my claims for land. My house is there. At Omao I have 3 lo‘I at Omaa Two are 26 lo‘I at Puupalile are 43 lo‘I and one small hala tree clump. This is my little claim. A respectful farewell to the Land Commissioners. Naialaolao, Waiehu, Dec. 25, 1848
3432:1	Kula	3.53 acres	Greetings to the Land Commissioners: At Omao are 26 lo‘I, 3 hala clumps and 2 coconut trees. At Kahawai in Omao Two are 6 lo‘I, kula, and a house is there. At Puuopalile are 4 lo‘i. At Pahapaha is a pong named Kahakumaka. At Kuhimana is 1 lo‘i. At Pahapahawale, is a small kula and the house. Omao I, Omao II, Puuopalile 4, Pahapahawale 4. Kula, Waiehu, Dec. 25, 1848
3437	Kaliuula	6.7 acres	Greetings to the Land Commissioners: The Elele has told us to state our claims for lo‘I, kula, and lauhala. At Poino are 21 lo‘I, 1 kula and lauhala trees. That is my petition to you. Repectfully. Kaliuula, Waiehu 25 Dec 1847
3441:1	Kapoula	8.96 acres	Greetings to the Honorable Land Commissioners: The Elele has told us to state our claims to the Land Commissioners for our land: lo‘I, kula and house lot. The land is Omao in Waiehu. My land was from Kaliuula, a

LCA Number	Claimant	Acreage	Land Use
			total of 42 lo‘i. This is my claim for land. At Kukuialaimaka are 7 lo‘i. At Pahapahawale is 1 lo‘i. At Halelena are 2 lo‘i and 1 hala clump. That is my claim which is state d to you. Respectfully, Kapoula Waiehu, 23 Dec. 1847
3444	Kalopa, wahine	1.40 acres	Greetings to the land Commissioners: I hereby tell you of my 22 lo‘is at Omao. There are 2 dry lo‘i. Kalopa, Omao,Waiehu 28 Dec. 1847
8559B*M:20&21	**Lunalilo, William C.**	**Approximately 2,000**	**Not specified**

4.2.1.2 Waihe‘e Sugar Company

The Waihee Sugar Company held 800 acres of land that was used for sugar cultivation, producing approximately 1,000 tons annually (Dorrance and Morgan 2000:64) Starting in 1862, Waihee Sugar Company owned and managed by Linton Torbert from 1863-1865, then Samuel Alexander and Henry Baldwin until 1969. One of the last managers of the company was Capt. James Makee. Eventually, the Waihee Sugar Company was sold to Wailuku Sugar Company and “ceased to be an independent enterprise” (Dorrance and Morgan 2000: 64-65).

At first start, the Waihe‘e Sugar Company showed promise as the first production figures for the crop of 1865 yielded 757 tons of sugar and 45,000 gallons of molasses (Figure 10). An article published in the 3 December 1883 issue of The Honolulu Advertiser commenting on the sugar cane fields and their bright prospects mentions the opening of Waihe‘e Mill:

> The cane is green, fresh and growing vigorously. To look over the thousands [of] acres of flowering cane ripe for the mill is a beautiful sight. The Wailuku mill after a temporary suspension, is grinding and turning out a fine quality of sugar from cane which gives a highly satisfactory yield. The Waikapu Mill is also in full blast, and I understand the Waihee will commence to-day. The planters of Maui should be in high spirits. The prospect never looked brighter. [The Honolulu Advertiser 1883:2]

Remnants of the Waihe‘e Mill were still standing in 1958 (Figure 11).

4.2.1.3 Wailuku Sugar Company

The Wailuku Sugar Company began in 1862 by a group of partners, one of them being C. Brewer & Company and managed by Rev. Edward Bailey (Dorrance and Morgan 2000:65). As the years progressed, Wailuku Sugar Company expanded its operation by acquiring neighboring plantations and possible other LCAs around the area. By 1925, many of the LCAs within the vicinity were acquired the C. Brewer & Company and the Wailuku Sugar Company (Figure 12).

By 1939 it [Wailuku Sugar Company] was producing 20,475 tons of sugar from 4,450 acres under cultivation. In the 1970s, it averaged over 30,000 tons […] [Dorrance and Morgan 2000:66]

Throughout the years, production of sugar was morphing and started to include macadamia nuts, pineapple, and eventually consumed by urban development. By 1988, Wailuku Sugar Company shut down all its sugarcane operations (Dorrance and Morgan 2000:66).

4.2.2 Water Diversion

In order to maximize the growth of sugar production, many sugar plantation owners were looking for innovative ways to effectively grow and process sugar cane. Diverting water from the main water sources (streams) were being engineered as a means to help with sugar production.

In 1879, Claus Spreckels was achieved success from building the Haiku (Spreckels) Ditch linking East Maui water sources at Honomanu with his sugar fields in the central isthmus. By 1882, the Waihe‘e (Spreckels) Ditch was successfully engineered in West Maui, an endeavor that was not without complications:

> Rapid [p]rogress is being made with the Spreckels Waihee ditch, a large dam is being constructed high up in the Waihee gulch. Tunneling through the sand hills

1865. 1865.
Sugar and Molasses
—FROM THE—
WAIHEE PLANTATION.
CROP NOW COMING IN AND FOR SALE
in quantities to suit purchasers by
482-3m ALDRICH, WALKER & CO.

Figure 10. Advertisement for Sugar and Molasses from Waihe‘e Plantation in 1865 (The Pacific Commercial Advertiser 1865)

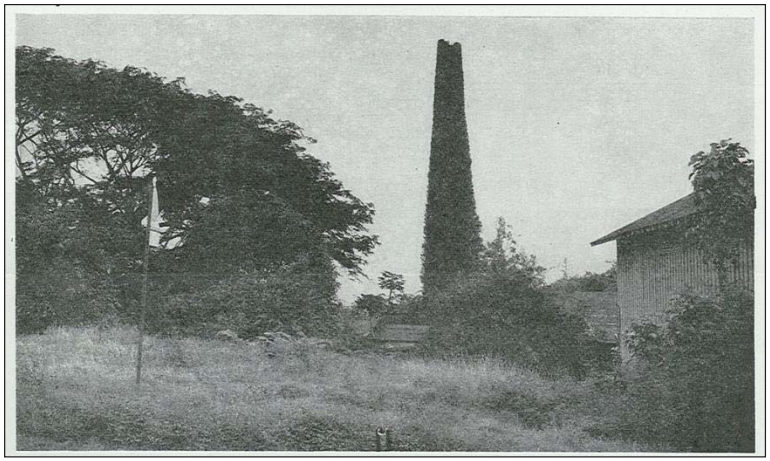

Figure 11. Smokestack and other remnants of Waihe‘e Mill in 1958 (HC&S Breeze 1958a)

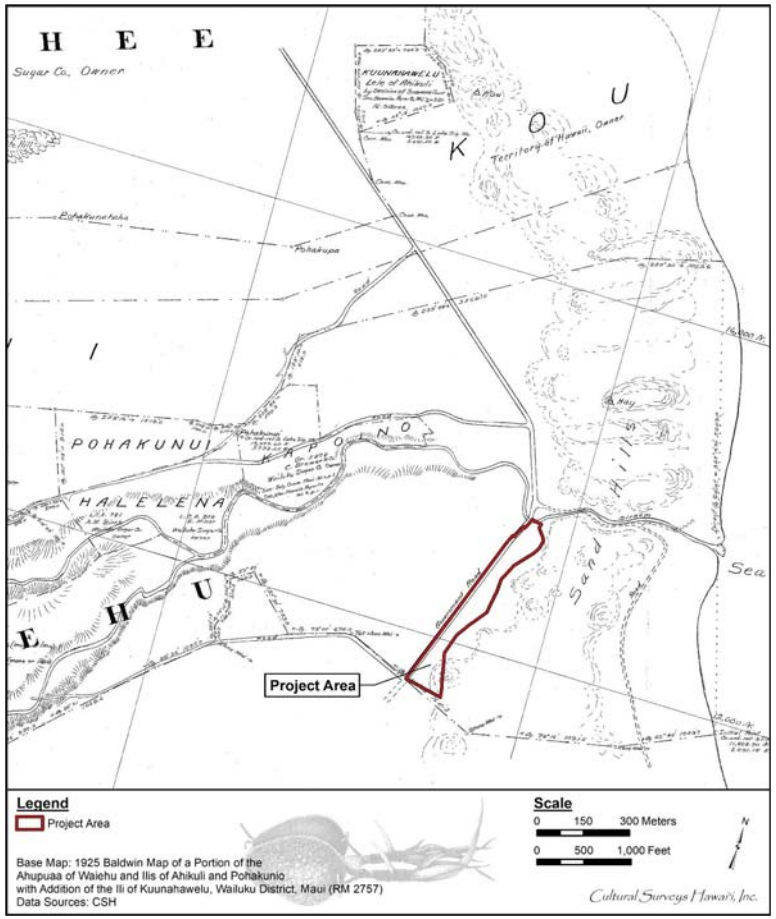

Figure 12. Portion of a Baldwin (1925) map of a portion of Waiehu Ahupua‘a indicating many of the former LCAs in Waiehu had been acquired by sugar companies

> was not a success, the men had finally to cut down through from the top of the hills until they got the level, then put in the pipes covered by an arched roof. The Spreckels mills now appear to be too far away from the cane, and the probabilities are that two more mills and works will be put up immediately, back of Kahului, distant about one and half miles. [The Honolulu Advertiser 1882:2]

The 15-mile-long ditch started at the 435 foot elevation of the Waihe‘e Stream, and carried 60 million gallons of water per 24-hour day (mgd) to the Wai‘ale Reservoir at the 214 foot elevation. In 1882, millions of gallons of water were released for Waikapū sugar fields (Adler and Spreckels 1966). Spreckels became the first to irrigate his fields by water from both the East and West Maui mountains (Wilcox 1996).

However, this new diversion of water created an issue amongst the residents of not only Waiehu, but all of Maui. By diverting waters from the freshwater streams, many Native Hawaiians were left with very little to no water to sustain their lands. A Native Hawaiian *kama‘āina* of Kula, Maui wrote about concerns of the sugar plantation industry to *Ka Nupepa Kuoka*, a Native Hawaiian newspaper.

> *Auwe! Pau Wailuku i ka mahiko. Ua hiki mai ma ko makou nei keena hana, he palapala na S. D. Hakuole, o Kula, Maui, e hai mai ana i ka pau loa o ka aina o Wailuku i ka mahina i ke ko. A ke hai hou mai nei no ke hoomaloo ia nei na loi kani kalo oe na haole, i wai e kanu ai i ke ko. A ke makau nei oia, e pau ana ka ai ana o na kanaka oia wahi i ka ai ana I ka poi, a e ai wale aku ana no paha i ka balena oolea hoeha niho, a [...] palaoa mama e maona ole aku na kanaka Hawaii. Oiai ua maa na kanaka i ka ai i ka poi.* [Ka Nupepa Kuokoa 1866]
>
> A letter by S.D. Hakuole, of Kula, Maui arrived at our office, declaring that the land of Wailuku is being lost due the cultivation of sugarcane. Furthermore, he states the current condition of once cultivated taro patches being dried up by the foreigners, where they are now planting sugarcane. Also, he fears that Hawaiians of that place will no longer be able to eat poi, and that there will probably only be hard crackers which hurt the teeth when eaten, a cracker to snack on, but does not stratify the hunger of the Hawaiian people. Let it be known that the Hawaiian people are accustomed to eating poi. [Translation provided by Hui o Nā Wai ‘Ehā n.d]

Another article from *Ka Nupepa Kuokoa* stated that

> *No Waikapu holookoa. He maikai no ka noho ana o ka aina; eia nae, ua hapa ka ulu nui ana o na mea kanu, no ka uuku o ka wai, i ka ua mea he nui o ka wela o ka la i keia mau la. Ua maloo na loi kalo, nakakaka ka lepo. O ka mahiko o Waikapu nei, aohe no he maloo o ke ko, no ke kamau iki no o kahi wai, a ke maloo uuku mai nei nae ma ke kauwahi.* [Ka Nupepa Kuokoa 1872]
>
> Waikapū is a pleasant place to live however the plants only grow half as well because of the insufficient supply of water, due to the drought these days. Taro patches have dried up, the earth has cracked. The surgarcane belonging to the plantation here in Waikapū has not dried up because they have a little water. Onlu in a few places do they dry. [Translation provide by Hui o Nā Wai ‘Ehā n.d.]

An article within Ka Lahui Hawaii in 1876 describes the river of Wailuku being spread out to reach the *lo‘i kalo* that stretch from ocean to the cliffs. The article then describes the affect of *lo‘i kalo*, the emergence of sugar cane, and the selling of land to foreigners.

> *‘O Wailuku ke kahawai i palahalaha no ka mai kala ana, no ka mea, he nui na kau papa loi, mai kai mai o Nehe, a komo i uka o na pali o Iao. I keia wa nae, ke hookamaaina maila ke ko, ma kahi o ke kalo, a ke ne mau maila ke ko e hoopiha i na loi. Me he mea la, he mau makahiki hou aku i koe, e pau loa ana paha na loi kalo, a he ko wale no. E lua no nae kumu e koe ai ka aaina aole paa i ke ko. 1. O ke aloha i ka poi kalo, ka ai makuahine o keia aina. 2. O ka aua i ka aina taro, aole e kuai a hoolimalima aku me ka haole.* [Ka Lahui Hawaii 1876]
>
> Wailuku is the river that is spread out for the farming of taro, because , the taro patches are many, from the ocean of Nehe, entering the cliffs of ‘Īao. However in this period of time, sugar is becoming acquainted with instead of taro, and sugarcane is nagging to fill the taro patches. It is as if there are a few years left and all the taro patches will be gone and there will only be sugarcane. 1. Love for poi from taro, the mother food of this land. 2. The withholding of taro land, not to be sold or leased to the foreigner. [Translation provided by Hui o Nā Wai ‘Ehā n.d]

A newspaper article published in 1883 mentions “rumors of a big water suit ahead, of the people Kuleana holders of Waiehu against Sir Claus Spreckels” (The Honolulu Advertiser 1883:2). Wailuku Sugar Company took over Waihe‘e Plantation in 1895, at which time, Waihe‘e (Spreckels) Ditch became a source of conflict and legal action.

The diversion of water to feed the sugar plantations created a shift in the livelihood of the residents of Maui, especially those living in Nā Wai ‘Ehā (Waikapū, Wailuku, Waiehu, and Waihe‘e). Established in 2003, Hui o Nā Wai ‘Ehā is an organization that was established and is determined to “address the negative impacts caused by dewatering of Nā Wai ‘Ehā Streams by Sugar Plantations and corporate water companies” (Hui o Nā Wai ‘Ehā, n.d)

> As the plantation industry began to flourish in Nā Wai ‘Ehā, then began the demise of the cultural landscape and Hawaiian way of life. Many families had to leave their homes and farmlands because the stream water resources that sustained them had diminished or completely disappeared. [Hui o Nā Wai ‘Ehā n.d]

4.3 Mid to Late 1900s

Much of land within and around the current project area was planted in commercial sugarcane until the late 1970 (Figure 13 through Figure 15)when there was a shift of plans to produce macadamia nut crops in the Waihe‘e and Waiehu areas (Tanji 1979a). Nearly 2,000 acres would be dedicated to macadamia nut crops. It was anticipated that by full production, these crops would yield about 7,000 pounds of macadamia nuts per acre while the Wailuku Sugar Company will still maintain 3,100 acres of land for sugarcane production. By 1988, the Wailuku Sugar Company mill closed after 125 years of sugar operation.

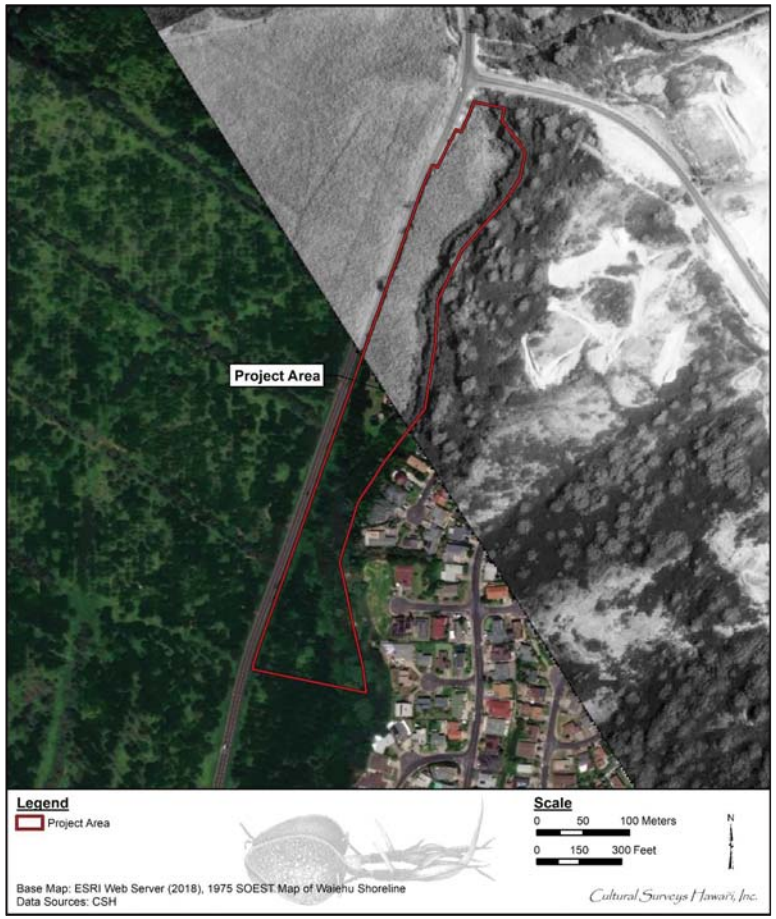

Figure 13. ESRI (2018) aerial image of the project area with a partial overlay of a 1975 photo (School of Ocean and Earth Science Technology [SOEST]) indicating the northern portion of project area with sugarcane

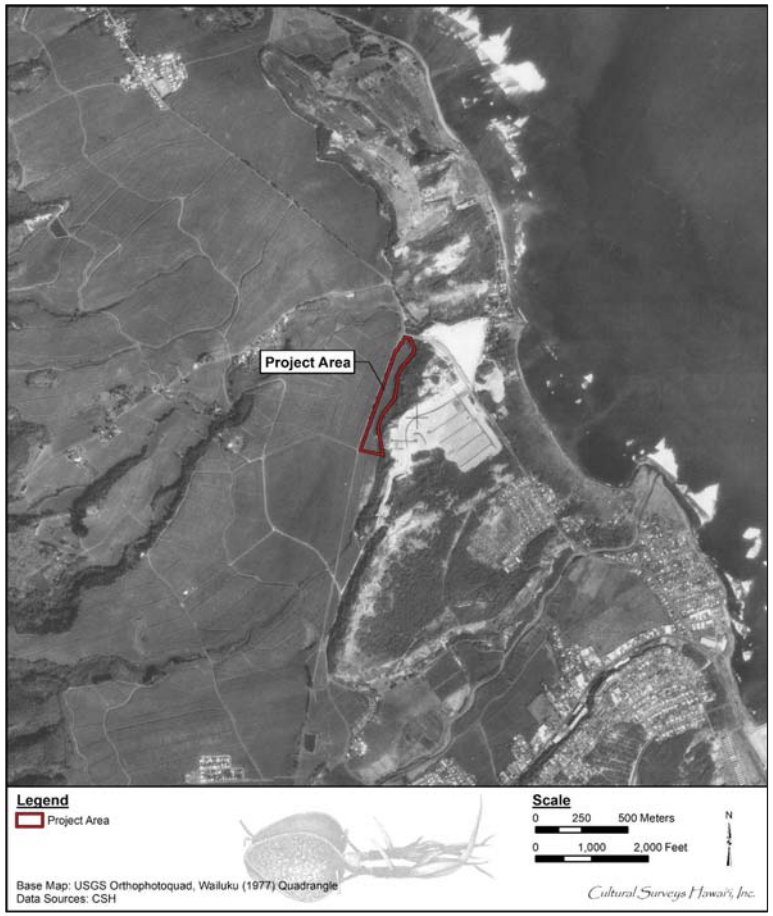

Figure 14. Aerial image showing the sugarcane fields and development around the project area in 1977 (U.S. Geological Survey 1977)

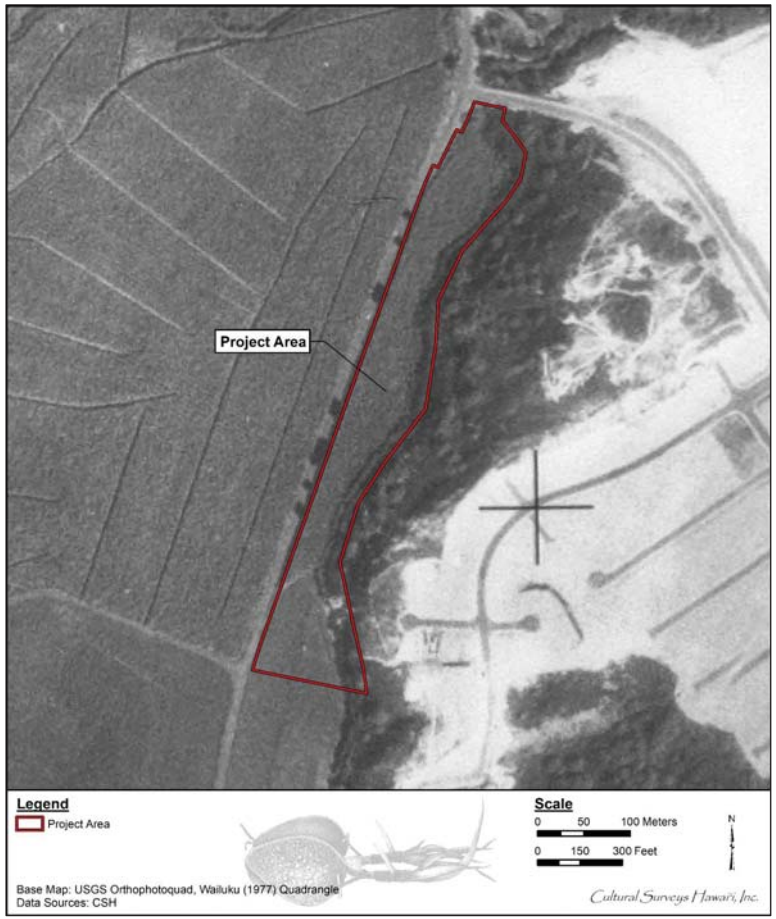

Figure 15. Zoomed in 1977 aerial image indicating project area and growth of sugarcane and other natural vegetation

4.3.1 Wailuku Agribusiness/Hawaiian Sugar and Company

The Wailuku Sugar Company transformed into the Wailuku Agribusiness and incorporated other productions such as macadamia nuts, pineapples, as well as leasing of lands to other companies (Hui o Nā Wai ‘Ehā, n.d).

> Macadamia nuts were commercially farmed at the current project area until at least the end of the twentieth century, however, processing cost were high as the macadamia nuts needed to be shipped to O‘ahu for processing. The cost to ship and process as well as the loss of macadamia nuts due to damage made for lesser yield than previously projected (The Honolulu Advertiser 1999). Unfortunately, signs for growth were not seen for Wailuku Agribusiness. An article published in the Honolulu Star-Bulletin dated 30 December 1999, shared that Wailuku Agribusiness Co. was shutting down its macadamia nut operations, stating that “the closure not only represents a loss of jobs, but is another sign of the challenge of running an agricultural operation in Hawai‘i” (Honolulu Star-Bulletin 1999). Wailuku Agribusiness began with 128,982 trees on 1,329 acres. Today only 66,674 trees on 678 acres are healthy. Formerly known as Wailuku Sugar Co., the venture grew sugar cane in central Maui for 116 years before decided to diversify and close its Wailuku Sugar Mill. Macadamia nuts were planted on land between Iao and Waihee valleys, and pineapple in other areas. Chumbly, a state senator from Maui, said the company is no longer a corporate farmer, but is “more of a landlord” for 23,000 acres of land it leases out for sugar and pineapple cultivation, and other activities. [Honolulu Star-Bulletin 1999]

In 2001, Wailuku Agribusiness sold 5,000 acres of prime agricultural lands to developers. However, “instead of returning the diverted water back into the streams, the plantation ditch and stream diversion system were retained by a new company that was formed in 2004 named Wailuku Water Company” (Hui o Nā Wai ‘Ehā, n.d).

Wailuku Water Company as well as other large land ownership companies, such as the Hawaiian Sugar and Commercial Company still maintain control and access to most of the water systems and streams.

> As of 2009, water continued to be diverted from streams in the Nā Wai ‘Ehā area for sugarcane irrigation in central Maui by Hawaiian Sugar and Commercial Company, for municipal and domestic uses, golf-course and landscape irrigation, maintaining pastures for cattle grazing, and other agricultural uses. [Oki et al. 2010:130]

4.4 Late Twentieth Century to Present

A Google Earth image from 2010 indicated what resembles a small-scale agricultural operation, which included access roads and an above ground water tank/reservoir (Figure 16). By 2013, there is noticeable land clearings, agricultural plots, access roads, paved areas, and structures (Figure 17). By 2016, the agricultural operations seems to have dwindled and/or ceased with some of the previous cleared and paved area now covered with natural vegetation (Figure 18).

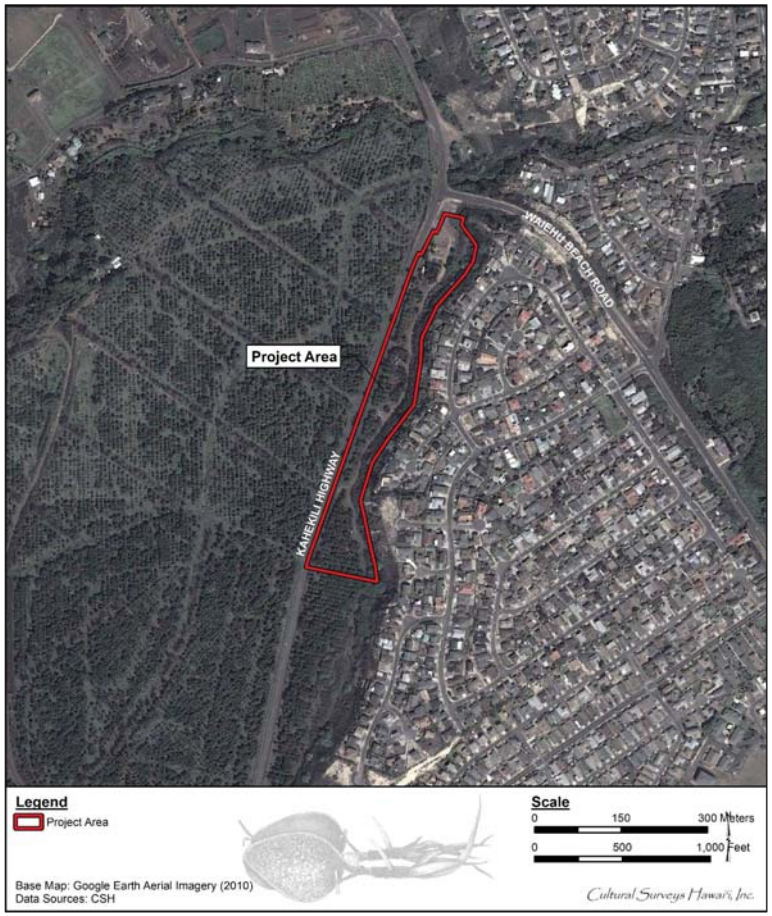

Figure 16. Aerial photo showing the project area in 2010 with groves of macadamia nut trees as well as what appears to be the beginning of an agricultural endeavor with access road and above water/reservoir (Google Earth 2010)

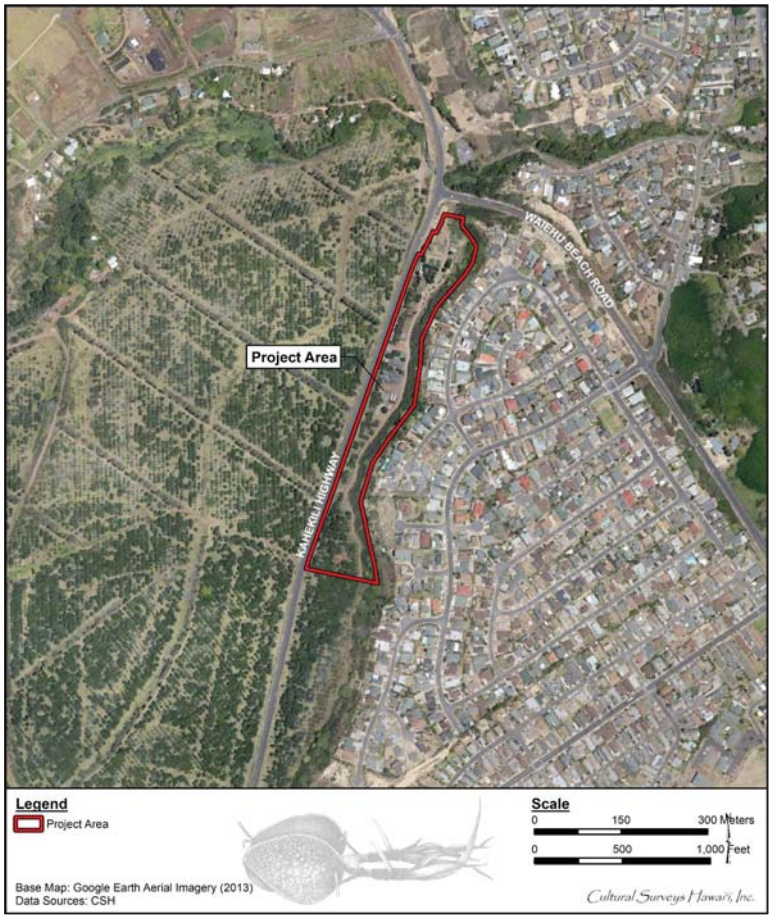

Figure 17. Aerial photo showing project area in 2013 with access roads, paved areas, structures, and agricultural plots (Google Earth 2013)

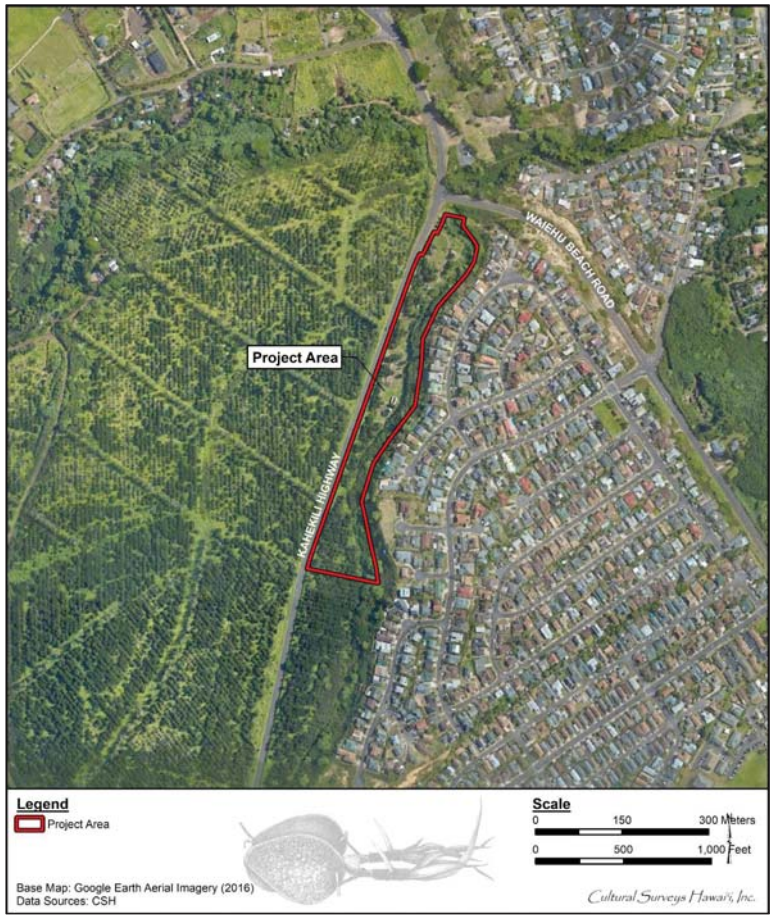

Figure 18. Aerial photo showing project area in 2016 (Google Earth 2016)

Many residents of Maui continue to fight for water rights and water access. An article in The Guardian published on 28 April 2016 stated that:

> Access to Maui's water resources is another big issue. Farmers on East Maui are trying to prevent A&B from making permanent the water use permits that have kept sugar cane bountiful and would be needed for their future diversification plans. On the west side, farmers are trying to reclaim access to streams that have been dammed and diverted for others including sugar company. Hokuao Pellegrino/s eco farm sits right next to one of the streams; it used to roar down the nearby mountain and out into the ocean but is now more sedate. He claims that the water and sugar companies have been water-banking for years and preventing farmers growing taro […]. [The Guardian 2016]

In 2015, the Hawai‘i Supreme Court ruled against the State Commission on Water Resource Management and provided clarity on decades-long issues with water diversion in central Maui which includes the streams in Nā Wai ‘Ehā. The decision that was made required the State Commission on Water Resource Management to uphold the laws on traditional and customary Native Hawaiian practices at streams as well as provide steps to protect these practices.

> As Native Hawaiian farmers and others pivot towards their next steps, all eyes are starting to focus on just how much water will be put back into the Waihe‘e River as well as the Waiehu, ‘Iao, and Waikapu streams, which together are known as Nā Wai ‘Ehā or "The four great waters." But the Nā Wai ‘Ehā case is just one of many struggles between plantations and farmers that for years have been undermining the rights that the Hawai‘i Supreme Court has found to be fundamental under the State Constitution. [Kamakako‘i n.d]

Section 5 Previous Archaeological Research

5.1 Previous Archaeological Research

Winslow M. Walker Walker (1931) conducted the earliest systematic archaeological study of the Waihe‘e area, which expanded earlier work for the Bernice Pauahi Bishop Museum by John F.G. Stokes (1916) and Thomas G. Thrum (1908, 1916, 1917, 1918) that focused on generating descriptive lists of traditional Hawaiian ceremonial structures (i.e., *heiau and ko‘a*). The earliest sites documented included traditional cultural burials on the long sandy ridge near the shore northeast of Waihe‘e Village, an adze grinding stone at Wawaekanaka, eight *heiau* at Waihe‘e, and a former fishpond at Kapoho, northeast of Waihe‘e Village. Walker (1931:71) also observed active taro fields and terraces in Waihe‘e.

In Waiehu, Walker (1931) identified five *heiau*: Halelau (Site 37), Kamakoa (Site 38), Malumaluakua (Site 39), Kukuikomo (Site 40), and Puukoa (Site 41). Sites 37 and 41 were both reported as destroyed. Site 38 was identified "in a grove of eucalyptus at about 600 ft. elevation" as "a group of curiously eroded stones which may have had sacred significance, but no trace of walls" was observed; this site was "[s]aid to be place of King Kamakokole where drums were heard on night of Kane" (Walker 1931:141). Walker (1931:142) describes Site 39 as "a level spot without evidences of walls or platforms" surrounded by a "grove of kukui trees" with a "large rock in the center [that] may have served for sacrificial purposes." Site 40 was identified as "[a]nother heiau without walls or platforms" located "on a ridge between North and South Waiehu Gulches" (Walker 1931:143). Kawailana, an 88-years-old native informant, related to Walker (1931:142) that "the heiaus near Waiehu were all built by Kahekili to Kane, and men and pigs were laid on the lele. In this region a heiau seems to mean merely a sacred spot not marked necessarily by either walls or platforms of stone." All *heiau* recorded by Walker (1931) in Waiehu were identified west and beyond the immediate vicinity of the current project area.

Between 1931 and 1976, only sporadic archaeological studies were undertaken in the Waiehu area. The National Historic Preservation Act in 1966 and HRS Chapter 6E, which established the Historic Preservation Program in 1976, mandated the historic preservation review of potential effects of proposed state projects (HRS 6E-8) and any project involving a permit, license, certificate, land use change, subdivision, or other entitlement for use, which may affect historic property (HRS 6E-42). Following the passage of the Act, archaeological studies occurred as a condition of development on a more frequent basis. However, only a few studies have been conducted within the project area vicinity (Table 2 and Figure 19). No historic properties have been previously identified within the current project area. Historic properties documented in the vicinity include confirmed and potential human burials, traditional and historic agricultural and habitation features (Figure 20).

5.1.1 Han (1982)

From 4 through 12 June 1981, Bernice Pauahi (B.P.) Bishop Museum conducted archaeological salvage excavations and mapped six sites in a portion of the Waiehu dune area (Han 1982), now known as Oceanview Estates Subdivision, which is northeast of the current project area This study was a follow-up to a previous B.P. Bishop Museum archaeological reconnaissance conducted in 1978 to test traditional claims that the area contained ancient burials and a limestone quarry.

Table 2. Previous archaeological studies within the project area (in **bold**) and vicinity

Reference	Type of Study	Location	Results (SIHP # 50-50-04-####)
Han (1982)	Archaeological salvage excavations	Oceanview Estates Subdivision	Identified four Bishop Museum sites: Ma-C10-17, limestone quarry, Ma-C10-18 and -19, human remains, and Ma-C10-20, scattered shell midden/ possible materials work area; further investigated previously identified Bishop Museum Site Ma-C10-15, human burial, and Ma-C10-16, terraced wall/historic habitation area
Kennedy (1989)	**Archaeological walk-through reconnaissance survey**	Wailuku Project District #3 and Piihana Project District #2 lands, which **included a southern portion of the current project area**	**Identified SIHP # -2985, rock mound/ possible burial, just outside southeast corner of current project area**; also identified SIHP # -2986, likely Chinese grave with marker, SIHP # - 2987, a small agricultural terrace complex, and Mahalani Cemetery (no SIHP #) further south (not seen on Figure 20)
Estioko-Griffin (1990)	Field Inspection	Waiehu Development Increment C	Examined SIHP # -2986 (likely grave marker) previously identified by Kennedy (1989) and inspected a burial exposed near a sand pit and other reported burials (all south of current project area vicinity/not depicted on Figure 20)
Folk and Hammatt (1992)	Archaeological survey and subsurface testing	Waiehu Beach Lots	Identified SIHP # -3115, two buried charcoal lenses radiocarbon dated from the 14th to 17th century
Fredericksen and Fredericksen (1999)	AIS	Waiehu Kou 2 Residential Development	Identified SIHP # -4731, a pre-Contact habitation area with two associated human burials (north of current project area vicinity/not depicted on Figure 20)
Donham (2003)	Archaeological inspection/ assessment	1376 Kakae Place, Oceanview Estates	No historic properties identified
Dega (2003)	Archaeological monitoring	921 Kualoa Place	No historic properties identified

Reference	Type of Study	Location	Results (SIHP # 50-50-04-####)
Wilson and Dega (2004)	AIS	Approximately 240 acres across Kahekili Highway from the current project area	Identified six historic properties, SIHP # -5522 -5527, and further documented previously identified SIHP # -1508, Spreckels Ditch; four were of these SIHPs were identified in the current project area vicinity: SIHP # -5522, sugarcane agriculture modifications, SIHP # -5523, basalt debitage; SIHP # -5524, isolated *Conus sp*. shell, and SIHP # -5525, clearing terrace and mound
Madeus and Fredericksen (2005)	AIS	2-acre parcel on Malaihi Road	Identified SIHP # -5739, a pre- and post-Contact agricultural and habitation complex; mentions SIHP # -4759, a habitation area remnant with three possible burials, which was identified by Xamanek Researches in a separate AIS conducted north of the project area (see Figure 20)
Dega (2006)	Archaeological monitoring	955 Puuloa Street	No historic properties identified
Lee-Greig et al. (2006)			Identified SIHP # -6081, historic era agricultural/habitation complex; SIHP # -6082, traditional/ historic cultural material scatter; and SIHP # -6083 is an abandoned *auwai;* further documented four features of SIHP # -5739 previously identified by Madeus and Fredericksen (2005)
Shefcheck and Dega (2008)	AIS	Current project area	No historic properties identified.

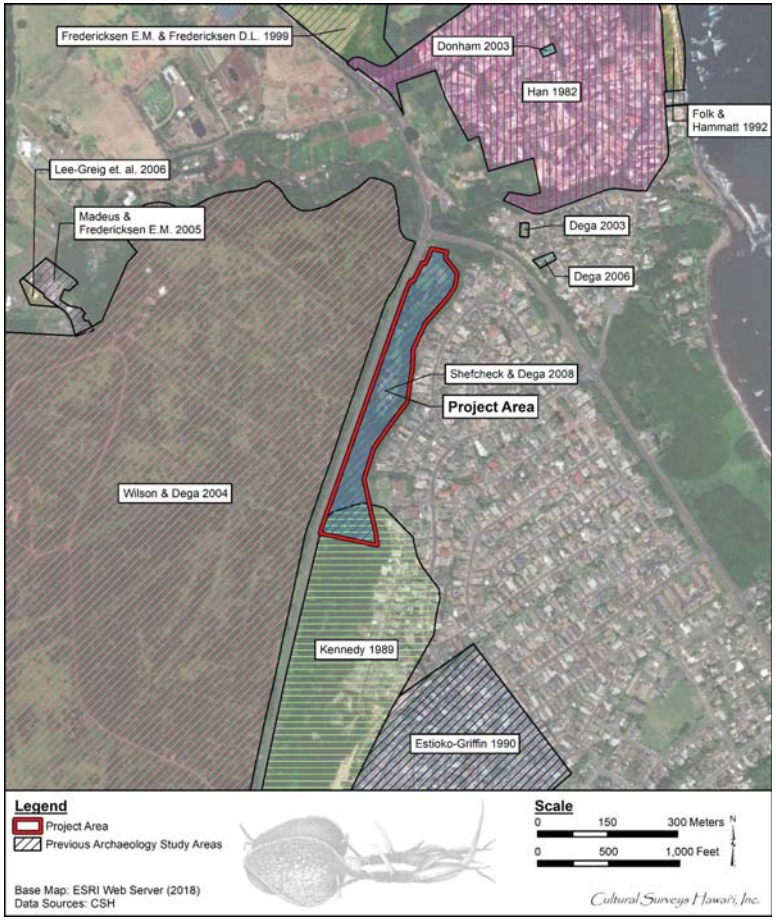

Figure 19. Esri (2018) aerial image showing previous archaeological studies conducted within the project area and vicinity

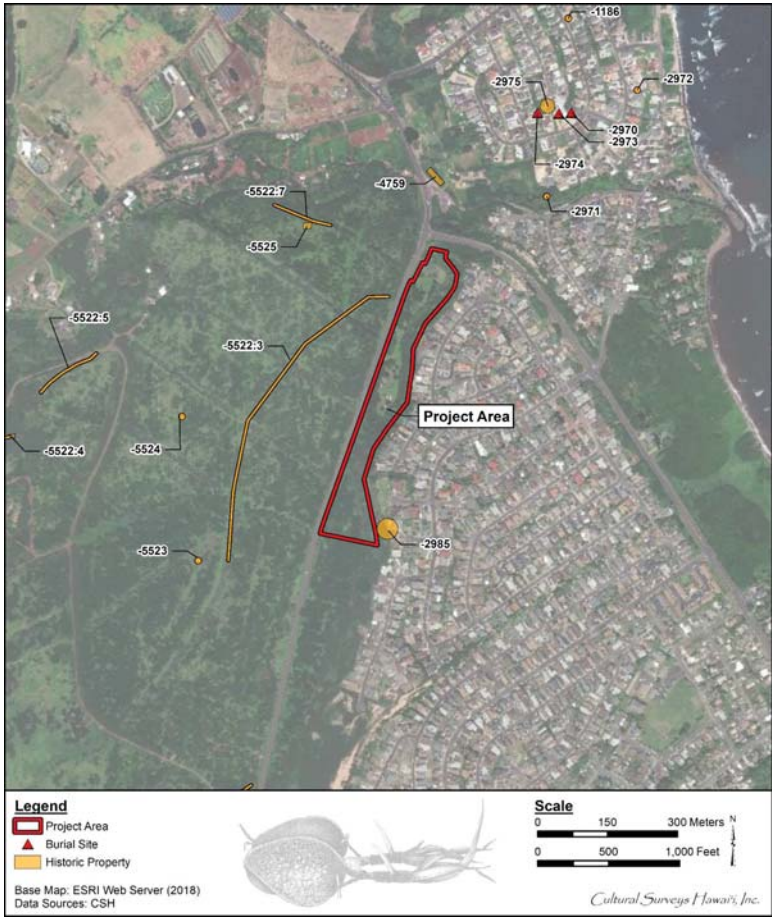

Figure 20. Esri (2018) aerial image showing the project area and locations of previously identified historic properties in the vicinity

Historic properties identified during both studies were initially designated Bishop Museum site numbers and were later designated SIHP #s. During the 1978 study, a human burial and a walled terrace were identified and designated as Bishop Museum Sites 50-Ma-C10-15 (SIHP # 50-50-04-2970) and 50-Ma-C10-16 (SIHP # -2971), respectively; a limestone quarry was not identified with any certainty at that time. During the excavations conducted in 1981, four additional sites were identified: 50-Ma-C10-17 through -20/ SIHP #s -2972 -2975. Site 50-Ma-C10-17 (SIHP # -2972) is the locus of the reputed limestone quarry, Sites 50-Ma-C10-18 and -19 (SIHP #s -2973 and -2974) are both scatters of fragmented human remains, and Site 50-Ma-C10-20 (SIHP # -2975) is a scattered shell midden and possible materials work area. At Site 50-Ma-C10-15 (SIHP # -2970), a human burial in a flexed position was disinterred during the 1981 study. Further investigation at Site 50-Ma-C10-16 (SIHP # -2971), walled terrace, determined the site to be an early to mid-1900s historic habitation area. In addition, an approximately 11.5-acre possible ancient fishpond (SIHP # -2976) was documented at the northeast corner of the subdivision (not depicted on Figure 20).

5.1.2 Kennedy (1989)

Between 1 and 7 January 1983, Archaeological Consultants of Hawaii, Inc. (ACH) conducted an archaeological walk-through reconnaissance survey (Kennedy 1989), which included a southern portion of the current project area. No historic properties were identified within the current project area; however, SIHP # -50-50-04-2985, a small rock mound interpreted as a potential burial site, was documented near the southeast corner of the project area (see Figure 20). In addition, ACH identified SIHP # -2986, a likely Chinese grave with a 'typically Chinese' marker (Kennedy 1989:5), SIHP # -2987, a small agricultural terrace complex, and Mahalani Cemetery (no SIHP #) further south, away from the immediate vicinity of the current project area (i.e., not depicted on Figure 20).

5.1.3 Estioko-Griffin (1990)

On 14 December 1990, the SHPD conducted a field inspection at Waiehu Development Increment C, a Housing Finance and Development Corporation (HFDC) construction site in Paukukalo (Estioko-Griffin 1990). The inspection included an examination of burials exposed at a sand mining pit and another area in which bone fragments were exposed during grubbing. In addition, a reported 'Japanese' grave previously identified by Kennedy (1989) as a likely Chinese grave (SIHP # -2986) was inspected. At least one individual within a burial pit was exposed "along the steep face of the sand mining pit" (Estioko-Griffin 1990:1). Due to safety concerns, mechanical excavation was recommended. An analysis of previously exposed fragments identified both animal and isolated human skeletal elements in an area also containing recent refuse. Subsurface testing was not recommended by the SHPD in this area, since it was slated to be filled with 20 to 30 ft of sand. Archaeological monitoring of grubbing with "small equipment" and "slow and controlled" grading was recommended for the area near where the burials were exposed (Estioko-Griffin 1990:2). The SHPD recommended that the marked Japanese or Chinese burial be relocated. No SIHP #s were identified in the immediate vicinity of the current project area (i.e., not depicted on Figure 20).

5.1.4 Folk and Hammatt (1992)

CSH conducted an archaeological survey and subsurface testing of Waiehu beach lots along the coast northeast of the current project area (Folk and Hammatt 1992). The study included a pedestrian survey and subsurface testing of nine trenches excavated by backhoe. No cultural

remains were identified during the surface survey. Two buried charcoal lenses were encountered during subsurface testing and designated SIHP # 50-50-04-3115. Radiocarbon analysis dated the lenses from the 14th to the 17th century. No cultural materials were observed in association with SIHP # -3115 or elsewhere during the study. No further archaeological work was recommended.

5.1.5 Fredericksen and Fredericksen (1999)

Between March and May 1999, Xamanak Researches conducted an archaeological inventory survey (AIS) of an approximately 1,110-m long by 18-m wide drainage and diversion easement corridor for the Waiehu Kou 2 Residential Development Project (Fredericksen and Fredericksen 1999). The AIS included a 100 percent pedestrian survey of the corridor and subsurface testing within the corridor and portions of two adjacent proposed retention basins. Seventy mechanically-excavated trenches and 18 manually-excavated units were tested. One historic property was identified during the study: SIHP # 50-50-04-4731.

SIHP # -4731 is interpreted as an extensive, pre-Contact habitation area, which is located along the *mauka* side of a large, coastal sand dune north of the current project area. During the AIS, two human burials, one child and one adult, were identified as associated with SIHP # -4731. A dog burial was also encountered within a test unit. Artifacts recovered during the study include lithics (flakes, cores, adze fragments, etc.), worked bone pieces and tools associated with fishhook manufacturing, shells and a drilled pig's tooth for adornment, over 300 pieces of volcanic glass, a fish bone awl and picks, and a "utilized shark tooth" (Fredericksen and Fredericksen 1999:53). Radiocarbon analyses of four charcoal samples indicate that SIHP # -4731 was inhabited from the 13th century through the 18th century. SIHP # -4731, deemed significant under Criteria A, D, and E, is located north, beyond the vicinity of the current project area (not depicted on Figure 20)

5.1.6 Donham (2003)

On 24 June 2003, Akahele Archaeology conducted an archaeological inspection for modification of a dwelling at 1376 Kakae Place in Oceanview Estates (Donham 2003). No historic properties were identified. Per consultation with the SHPD, the negative findings were published in an archaeological assessment report.

5.1.7 Dega (2003)

On 15 September 2003, Scientific Consultant Services, Inc. (SCS) conducted archaeological monitoring of residential construction on a parcel of private property 921 Kualoa Place (Dega 2003) within a neighborhood northeast of the present project area. SCS monitored the excavation of approximately 25 linear meters (80 linear ft) of trenches measuring approximately 60 cm (2 ft) wide with a maximum depth of 30 cmbs (approximately 12 in). No historic properties were encountered. Observed stratigraphy consisted of two stratigraphic layers: a silty clay fill overlying naturally deposited Jaucus sand. Full-time archaeological monitoring was recommended for any additional ground-disturbing projects within or near the parcel due to the known cultural sensitivity of the area, which includes nearby previously identified human burials.

5.1.8 Wilson and Dega (2004)

In 2004, SCS completed an archaeological inventory survey (AIS) of approximately 240 acres in Waiehu (Wilson and Dega 2004). This study area is located west of the current project area, on

the opposite, *mauka* side of Kahekili Hwy. The AIS included a 100 percent pedestrian survey and subsurface testing of mechanically-excavated trenches and manually-excavated test units. Six historic properties were newly identified: SIHP #s 50-50-07-5522 through -5527. In addition, one previously identified historic property, SIHP # -1508 (Spreckels Ditch), was also documented during the study.

SIHP # -5522 is described as sugarcane agricultural modifications. SCS identified seven cane field features comprising SIHP # -5522: 1) drainage ditch; 2) erosion control agricultural berms; 3) drainage ditch/ swale; 4) irrigation ditch with associated boulder mound; 5) motorized vehicle access dirt road; 6) piggery access dirt road; and 7) access graded dirt road. SIHP # -5523 represents an isolated lithics find of basalt debitage consisting of an interior flake, a polished flake, and a piece of volcanic glass. SIHP # -5524 marks the location of a worn, single, isolated *Conus sp.* shell interpreted as historic midden material; however, testing of the site was not conducted, and no other cultural materials were identified in association with the shell. SIHP # -5525 is a terrace and mound resulting from cane field clearing; SIHP # -5526 is the concrete and cinder block foundation remnants of a piggery; and SIHP # -5527 is a terrace complex consisting of five terraces likely associated with early historic agriculture.

No additional archaeological work was recommended for the historic properties identified during the study. SCS recommended archaeological monitoring for any land alterations occurring with 50 m (164 ft) of Kahekili Highway and noted a greater potential for encountering human burials within the northeastern portion of the study area, which is near cemeteries and sand dunes known to contain human burials.

5.1.9 Madeus and Fredericksen (2005)

In August 2005, Xamanek Researches, LLC conducted an AIS of approximately 2 acres fronting Malaihi Road and Waiehu Stream (Madeus and Fredericksen 2005). The study included a 100 percent pedestrian survey and the manual excavation of two 50 cm by 50 cm test units. One historic property was identified: SIHP # -50-50-04-5739, an agricultural and habitation complex consisting of 43 features. Thirty-five of these features are considered pre-Contact agricultural features used subsequently post-Contact, while the remaining eight features are interpreted as post-Contact features. Function determinations include 38 features used for agriculture and animal husbandry (35 agricultural terraces, one *auwai* (irrigation ditch), a concrete water trough, and a concrete animal pen or horse stable), four habitation features (historic house, two historic garages, and a sewer tank depression), and one feature of indeterminate function. The latter feature was a scatter of beach materials consisting of coral, cobbles, pebbles, and shell, which appeared to be imported during historic habitation, possibly for yard beautification purposes. No further archaeological work was recommended for the house, terraces, husbandry features, and scatter; the landowner agreed to preserve these features. Precautionary archaeological monitoring was recommended for ground disturbance associated with proposed construction on the parcel.

Within the previous archaeology discussion section of the AIS report, Madeus and Fredericksen (2005) discuss an AIS of the Waiehu Kou off-site sewer line previously conducted by Xamanek Researches in the year 2000. Neither CSH nor the SHPD has been able to locate the original report for this study. It is mentioned here since SIHP # -4759, “interpreted as a low-density habitation area remnant, which has at least 3 probable precontact burials associated with it,” was identified

approximately 150 m (492 ft) north of the current project area (Madeus and Fredericksen 2005:12). (see Figure 20).

5.1.10 Lee-Greig et al. (2006)

In 2006, CSH conducted an AIS of an approximately 0.50-acre private property on Malaihi Road (Lee-Greig et al. 2006) in a residential area west of the current project area. The study consisted of a surface survey and subsurface testing. Three historic properties were newly identified: SIHP #s -6081 through -6083. SIHP # -6081 is a historic era agricultural and habitation complex consisting of seven features, which include a lotus pond, a planting circle, habitation remnants represented by low terraces and a surface scatter of cultural materials, a water control feature, and a paved area of indeterminate function. SIHP # -6082 is a cultural material (traditional and historic) scatter of indeterminate function. SIHP # -6083 is an abandoned *auwai*. In addition to identifying the aforementioned historic properties, CSH further documented four features (three earthen terraces and one *auwai*) of SIHP # -5739 previously identified by Madeus and Fredericksen (2005). CSH determined that information available from the historic properties identified during the AIS were adequately recorded; as such, the project specific effect determination was “no historic properties affected,” and no additional archaeological work was recommended (Lee-Greig et al. 2006:62).

5.1.11 Dega (2006)

On 9 May 2006, SCS archaeologically monitored a private residential construction project on a parcel at 955 Puuloa Street (Dega 2006) in a neighborhood northeast of the current project area. All excavations for the project consisted of three foundation trenches, which were manually excavated. These approximately 30-cm (12-in) wide trenches were excavated to a maximum depth of 50 cmbs (approximately 20 in). Two trenches were approximately 10 m (33 ft) long, while the third trench measured approximately 8 m (26 ft) in length. No historic properties were identified. Two stratigraphic layers were observed: top soil fill overlying naturally deposited Pu‘uone sand. Due to the cultural sensitivity of the general area, including the nearby previous identification of human burials, SCS recommended full-time archaeological monitoring for any future ground-disturbing activities within or near the parcel.

5.1.12 Shefcheck and Dega (2008) (current project area AIS)

From 29 October through 2 November 2007, SCS conducted an AIS of the current 11.5-acre project area (Shefcheck and Dega 2008). The study included a pedestrian survey of the entire project area and representative subsurface testing of 17 mechanically-excavated trenches. At the time of the AIS, the parcel was vacant and scattered throughout with modern trash; the western portion of the project area contained “a grove of macadamia nut trees (*Macadamia integrifolia*)” within a “pre-existing macadamia nut orchard” (Shefcheck and Dega 2008:5). SCS noted that the area had previously been mined for sand by Hawaiian Cement and that the project area was used to stockpile materials during the construction of Waiehu Heights Subdivision. No historic properties were identified at or below the surface.

Two general patterns of stratigraphy were observed across the project area. Stratigraphy observed in the north portion of the project area consisted of a very dark grayish brown silt loam at 0 to 40 cmbs overlying a brown silt from 40 cmbs to base of excavation (BOE). Observed stratigraphy in the southern portion of the project area consisted of three strata: a very dark grayish

brown silt loam at 0 to 10 cmbs atop a brown silt extending from 10 to 120 cmbs overlying pale brown silty sand, identified as an original deposit of pu‘uone sand, at 120 cmbs to BOE.

SCS recommended the following for the current project area:

> The presence of sandy matrix and the high number of burials and other culturally significant subsurface deposits in the surrounding area suggest the likelihood for the discovery of archaeological sites, such as burials and/or habitation sites, in the subsurface deposits of the project area. Thus, a program of Archaeological Monitoring is recommended as a precautionary measure during all construction related ground altering activities [Shefcheck and Dega 2008:18]

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 Waiehu. CSH initiated its outreach effort in June 2020 through letters, emails, and/or telephone calls. CSH completed the community consultation in October 2020.

6.2 Community Contact Letter

Letters (Figure 21 and Figure 22) along with a map, an aerial photograph, and floor plans of the project were mailed with the following text:

> At the request of Highridge Costa Development Company (HCDC), Cultural Surveys Hawai‘i, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the Waiehu Affordable Housing Development Project, Waiehu Ahupua‘a, Wailuku District, Maui Island, TMK: [2] 3-3-001:106. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) topographic quadrangle map, a 2018 aerial photograph, and Tax Map Key [2] 3-3-01.
>
> **Proposed Project**
>
> The 100% affordable housing project will involve the construction of 120 residential units including 28 1-bedroom units, 64 2-bedroom units, and 28 3-bedroom units as well as a 6,262 ft² non-profit building, a 3,600 ft² community center, two parking stalls per each residential unit (240 total stalls), and 12 additional stalls for to the community center. The project is being developed in cooperation with Maui Economic Opportunity, Inc. (MEO) and Hale Mahaolu. The project will focus on providing housing for Maui residents earning 60% or less of the area median income.
>
> **Purpose of the CIA**
>
> The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

1860 Main Street Wailuku, Hawai'i 96793 Ph: (808) 242-9882
P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: WAIEHU 4 kkaapana@culturalsurveys.com www.culturalsurveys.com

June 2020

Aloha,

At the request of Highridge Costa Development Company (HCDC), Cultural Surveys Hawai'i, Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Waiehu Affordable Housing Development Project, Waiehu Ahupua'a, Wailuku District, Maui, TMK: [2] 3-3-001:106. The project area is depicted on a portion of the 1997 Wailuku U.S. Geological Survey (USGS) topographic quadrangle (Figure **1**), a 2018 aerial photograph (Figure **2**), and Tax Map Key [2] 3-3-01 (Figure **3**).

Proposed Project

The 100% affordable housing project will involve the construction of 120 residential units including 28 one-bedroom units, 64 two-bedroom units, and 28 three-bedroom units as well as a 6,262-square-foot (sq-ft) non-profit building, a 3,600 sq-ft community center, two parking stalls per each residential unit (240 total stalls), and 12 additional stalls for the community center. The project is being developed in cooperation with Maui Economic Opportunity, Inc. (MEO) and Hale Mahaolu. The project will focus on providing housing for Maui residents earning 60% or less of the area median income.

Purpose of the CIA

The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals knowledgable about this area. The research and interviews assist us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. 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* (Native-born) who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua'a* (traditional land division extending from the mountains to the sea) lands.**

Figure 21. Community Consultation Letter Page 1

WAIEHU 4 – CIA for the Waiehu Affordable Housing Development Project

Page 2

- **Any other cultural concerns the community might have related to Hawaiian or other ethnic cultural practices within or in the vicinity of the project area.**

If you contribute to this effort and with your permission, we would like to use your name in the report to give you proper credit.

Due to the current situation with COVID-19, CSH has temporarily halted in-person consultation as a necessary precaution. We are available to speak with you over the phone, by video chat, or you may also submit a written statement regarding the project, project area, and/or your knowledge of the area. If you prefer to submit a written statement, CSH is able to provide a questionnaire that you may use as a guideline or you may answer the questionnaire directly. Please choose what is convenient for you, though the questionnaire is not necessary. A pre-stamped envelope will be provided to send your statement back to us.

In following the stay-at-home order, we are working primarily from home and are available at any time through email. If you would prefer to meet in-person, we can schedule a date to meet with you after the stay-at-home order has been lifted. Your patience, understanding, and cooperation is greatly appreciated, and we pray for the safety of you and your loved ones.

If you are interested in participating in this study, please contact Kamuela Kaapana by email at kkaapana@culturalsurveys.com or by phone at (808) 262-9972.

Mahalo nui loa,

Kamuela Kaapana
Cultural Researcher

Figure 22. Community Consultation Letter Page 2

- **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* (Native-born) who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua’a* (traditional land division extending from the mountains to the sea) lands.**
- **Any other cultural concerns the community might have related to Hawaiian or other ethnic cultural practices within or in the vicinity of the project area.**

If you contribute to this effort and with your permission, we would like to use your name in the report to give you proper credit.

Due to the current situation with COVID-19, CSH has temporarily halted in-person consultation as a necessary precaution. We are available to speak with you over the phone, by video chat, or you may also submit a written statement regarding the project, project area, and/or your knowledge of the area. If you prefer to submit a written statement, CSH is able to provide a questionnaire that you may use as a guideline or you may answer the questionnaire directly. Please choose what is convenient for you, though the questionnaire is not necessary. A pre-stamped envelope will be provided to send your statement back to us.

In following the stay-at-home order, we are working primarily from home and are available at any time through email. If you would prefer to meet in-person, we can schedule a date to meet with you after the stay-at-home order has been lifted. Your patience, understanding, and cooperation is greatly appreciated, and we pray for the safety of you and your loved ones.

If you are interested in participating in this study, please contact Kamuela Kaapana by email at kkaapana@culturalsurveys.com or by phone at (808) 262-9972.

In most cases, two or three attempts were made to contact individuals, organizations, and agencies. Community outreach letters were sent to 50 individuals or groups, eight responded, and four of these *kama‘āina* and/or *kūpuna* met with CSH for more in-depth interviews, with one of these individuals requesting that their identity remain confidential.

6.3 Community Contact Table

Table 3 contains the 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 3. Community Contact Table

Name	Affiliation	Notes
Adams, Mark	Wai‘ehu Kou Phase II	Emailed letter and figures on 9 June 2020
Ahia, Noelani	Mālama Kakanilua	Emailed letter and figures on 9 June 2020
Aiwohi, Olinda	President, Paukukalo Hawaiian Homes Community Association	Mailed letter and figures on 9 June 2020
Alu Like Inc.	Ke Ola Pono No Na Kupuna Program Kumu Kahi – Elderly Services J. Walter Cameron Center	Mailed letter and figures on 9 June 2020
Ampong, Foster	Wailuku Moku Representative	Emailed letter and figures on 9 June 2020
Apana, Clare	Cultural Practitioiner; Mālama Kakanilua; Aha Moku Council Burial Committee	Emailed letter and figures on 9 June 2020
Carpio, Jay	Wailuku Community Managed Makai Area	Emailed letter and figures on 9 June 2020 Mr. Carpio replied on 10 June 2020 *Mahalo for reaching out and including us in this matter. Please let me know what time works best for you.* CSH replied on 10 June 2020 *Mahalo for reaching out to me. Yes, we can definitely set up a time to speak.* *Due to COVID-19, we are not conducting in-person interviews for the safety of all. Would you prefer a phone interview or a video chat, such as Zoom? Also, please let me know if there are any specific days of the week*

		and times that best work with your schedule to help plan a day to talk. *Also, once a meeting time is set up, I will be emailing you our CSH authorization form. This is a general form that ask for your permission for CSH to record the interview, publish your interview, and etc. You have the right to agree or decline permission. Also, if you agree to allow us to utilize your interview in the CIA report, we will always forward you a draft of your interview summary for review and final approval. Once the CIA report is published, we will give you a copy of your interview summary for your records.*
Central Maui Soil & Water Conservation District	-	Mailed and Emailed letter and figures on 9 June 2020
Daniels, Roland	*Kama‘āina*	Mailed letter and figures on 9 June 2020
Eaton, Antoinette “Toni”	Maui District Supervisor, Department of Hawaiian Home Lands	Mailed letter and figures on 9 June 2020
Farden, Hailama	President, Association of Hawaiian Civic Clubs	Mailed and Emailed letter and figures on 9 June 2020
Fisher, Scott	Chief Conservation Officer, Hawaiian Islands Land Trust (HILT)	Mailed and Emailed letter and figures on 9 June 2020
Hokoana, Lui K.	President, Central Mui Hawaiian Civic Club; University of Hawai‘i Maui College’s chancellor	Mailed and Emailed letter and figures on 9 June 2020
Holt-Padilla, Hokulani	*Kumu Hula*, Pā‘ū o Hi‘iaka/Cultural Specialist	Emailed letter and figures on 9 June 2020 *Ms. Holt-Padilla repiled on 9 June 2020*

		I would be happy to be interviewed about the project area as well as the surrounding areas. I would prefer an oral interview and would request a review of my interview before having it added to the official record. CSH replied on 9 June 2020 *Mahalo nui for your quick reply and willingness to participate in an interview.* *Due to COVID-19, we are not conducting interviews in-person for the safety of all parties. Would you prefer a phone interview or a video-interview such as Zoom? Also, to help with setting up an interview, do you have a preferences on the day of the week (M-F) and the time of day (morning or afternoon)?* *Just an FYI, before the interview, I will send you an Authorization Form. This is a general form which will ask you for your permission for CSH to record, to publish, and etc. You have the right to agree or decline. CSH will always give for you your interview summary (and transcription if necessary) for your review before being published. Once published, CSH will give you a copy of your interview summary as well as a recording (if your interview is recorded).* *Please let me know if you have any questions. Once I receive which type of interview you would prefer as well as the date(s) and time(s), I will send you some options and we can see what would best fit our schedules.* Ms. Holt-Padilla replied on 9 June 2020 with some dates and times. CSH replied on 10 June 2020 suggesting a day and time to speak.

		Conducted interview via phone on 15 June 2020 CSH emailed Ms. Holt-Padilla draft interview summary on 7 July 2020
Kahalehau, Clyde	Aha Moku, Wailuku	Emailed letter and figures on 9 June 2020
Kamai, Sir David	Ali‘i ‘Aimoku, Royal Order of Kamehameha I, Chapter IV Heiau O Kahikili (Maui)	Mailed and Emailed letter and figures on 9 June 2020
Kamaunu, Johanna	Maui/Lana‘i Burial Council - Wailuku	Emailed letter and figures on 9 June 2020
Kamaunu, Kaniloa	Aha Moku Council Wailuku Representative; Aha Moku Council Burial Committee	Emailed letter and figures on 9 June 2020 Mr. Kamaunu replied on 9 June 2020 *My name is Kaniloa Kamaunu with Aha Moku O' Wailuku let me know when you're able to speak* CSH replied on 10 June 2020 *Mahalo for reaching out to me. Yes, we can definitely set up a time to speak.* *Due to COVID-19, we are not conducting in-person interviews for the safety of all. Would you prefer a phone interview or a video chat, such as Zoom? Also, please let me know if there are any specific days of the week and times that best work with your schedule to help plan a day to talk.* *Also, once a meeting time is set up, I will be emailing you our CSH authorization form. This is a general form that ask for your permission for CSH to record the interview, publish your interview, and etc. You have the right to agree or decline permission. Also, if you agree to allow us to utilize your interview in the CIA report, we will always forward you a draft of your interview summary for review*

		and final approval. Once the CIA report is published, we will give you a copy of your interview summary for your records. CSH conducted a interview via phone with Mr. Kamaunu on 23 June 2020 CSH emailed Mr. Kamaunu on 31 July 2020 his interview summary for his review and approval.
Kamekona, Carol Lee	Ahahui Kaahumanu - Wailuku	Mailed letter and figures on 9 June 2020
Kapahulehua, Kimokeo	President, Hui O Wa‘a Kaula	Mailed and Emailed letter and figures on 9 June 2020
Kapu, Ke‘eaumoku	Chief Executive Officer, ‘Aha Moku O Maui	Mailed and Emailed letter and figures on 9 June 2020
Kapu, U‘ilani	Treasurer, Nā ‘Aikāne o Maui	Mailed and Emailed letter and figures on 9 June 2020
Kawaa, Luana	*Kama‘āīna*	Emailed letter and figures on 9 June 2020 Ms. Kawaa replied on 15 June 2020 *Mahalo for your email. I am interested in learning more about this project and sharing mana‘o.* CSH replied on 15 June 2020 *Mahalo nui for being interested in sharing manao.* *As the letter stated, for the safety of all parties, CSH has currently suspended face-to-face interviews due to COVID-19. Therefore, we can either conduct interviews via phone or video chat such as Zoom. Please let me know which one you prefer. Also, to help set up a meeting time that fits both our schedules, please let me know a day of the week (M-F) as well as some times (mornings or afternoons) that are convenient to talk story. Unfortunately, I am unable to meet*

		this Friday. However, I am available this Tuesday - Thursday. I am also pretty open next week as well. *Mahalo again for being willing to talk story with us. If you have any questions in the meantime, please feel free to contact me.* CSH emailed Ms. Kawa‘a on 23 July 2020 asking if she is still interested in talking story. Ms. Kawa‘a replied on 25 July 2020 that she is available on Monday, 27 July 2020 to talk story. CSH replied on 26 July 2020 if 11:00am or after will be a good time to call. CSH attempted two times on 27 July 2020 via phone call to reach Ms. Kawa‘a. CSH left two voice mails as well as sent an email to reschedule.
Kekahuna, Janice	Paukukalo Hawaiian Homestead Community Association	Emailed letter and figures on 9 June 2020
Kuloloio, Manuel	Cultural Descendant	Mailed and Emailed letter and figures on 9 June 2020 Mr. Kuloloio replied on 6 June 2020 *Aloha Kamuela,* *I am interested in your CIA for the below tasking in support of MEO.* CSH replied on 6 June 2020 *Aloha mai e Uncle Manny,* *Mahalo nui for getting back to me and expressing interest in participating in an interview for the WAIEHU 4 - CIA for the Waiehu Affordable Housing Development Project.* *As mentioned in my email and in the consultation letter, CSH has currently halted conducting face-to-face interviews during the COVID-19*

		pandemic. This is in the best interest of all parties to make everyone is healthy and safe. With that said, we can either meet via telephone call or video chat, such as Zoom. Please let me know which method you would prefer. Also, please share with me some days of the week and times that best fit your schedule. Interviews usually last at least an hour or so. *In the meantime, I have attached an Authorization and Release Form. This form informs the interviewee their rights as a participant as well as how the knowledge that is shared is used within CSH reports. If possible, please take some time to review.* *If you should have any questions, please feel free to contact me. Looking forward to hearing from you.* Mr. Kuloloio called CSH office on 22 July 2020. CSH returned call on 22 July 2020 to Mr. Kuloloio and talked on the phone about the project and other concerns in regards to use of interview summary. Mr. Kuloloio emailed CSH on 22 July 2020 in regards to updating the Authorization and Release form to reflect use of information during interview to only used for this WAIEHU 4 project. CSH repiled to Mr. Kuloloio on 23 July 2020 addressing concerns and updating form. CSH met with Mr. Kuloloio on 14 August 2020 via Zoom (video conference) and phone as there were some technical issues.
Lake-Farm, Sissy	Executive Director, Maui Museum/ Kumu	Mailed and Emailed letter and figures on 9 June 2020

	Hula, Nā Hanona Kūlike ‘o Pi‘ilani	
Lay, Ivan	Vice-Chair, Maui County Cultural Resources Commission	Mailed letter and figures on 9 June 2020
Lewis, Joseph Kūhiō	Chief Executive Officer, Council for Native Hawaiian Advancement	Mailed and Emailed letter and figures on 9 June 2020
Lindsey III, Edwin “Ekolu”	President, Maui Cultural Lands	Mailed and Emailed letter and figures on 9 June 2020 Mr. Lindsey replied on 15 June 2020 *In response to your Waiehu 4 request to gather information:* *We have no knowledge of pertinent information* *We do suggest contacting the following people, if you have not already done so* *Daniel Ornellas* *Daniel.l.ornellas@hawaii.gov His family has roots in the area* *Bobby Pahia* *They had lo’i close by* *Bega Family* *They also had lo’i close by.* *Not sure if the 1st hand generation is still around* *I have not contact info for Bobby or Bega Family. Betty Bega is the matriarch. Feel free to contact me if you have any questions.*
Maluo-Pearson, Kahulu	Cultural Programs Director, Maui Arts & Cultural Center	Mailed letter and figures on 9 June 2020
Manuel, Kaleo M.	Former DHHL Planner Deputy of State Water Commision	Emailed letter and figures on 9 June 2020

Martin, Martha	President, Native Hawaiian Plant Society	Mailed and Emailed letter and figures on 9 June 2020
Naauao, Brian Kaniela Nae‘ole	NHO	Mailed and Emailed letter and figures on 9 June 2020
Nakahashi, Ikaika	Cultural Historian, SHPD	Mailed and Emailed letter and figures on 9 June 2020
Nakanelua, Kyle	‘Aha Moku o Maui	Emailed letter and figures on 9 June 2020
Nakihei, Sarah	Maui Homestead Farmers and Ranchers Association	Emailed letter and figures on 9 June 2020
Namau‘u, Kili	*Kahu*, Punana Leo O Maui	Mailed letter and figures on 9 June 2020
Nekaifes, Maraea K.	Nekaifes ‘Ohana (NHO)	Mailed letter and figures on 9 June 2020
Nishiyama, Patty	Member, Nā Kūpuna o Maui	Mailed letter and figures on 9 June 2020
Office of Hawaiian Affairs		Per OHA – Maui: Send requests to said email address as this is the prefferred contact.
Oliveira, Roy	President, Wai‘ehu Kou Phase 3 Association	Mailed and Emailed letter and figures on 9 June 2020
Ornellas, Daniel	Kwong Fook Tong Waiehu Chinese Cemetery	CSH called on 8 September 2020, left voicemail. Mr. Ornellas retuned phone call to CSH on 30 September 2020 and conducted a brief phone interview. CSH sent interview summary, via email to Mr. Ornellas on 01 October 2020.
Pellegrino, Hokuao	Nohoana Farm Owner; Manager and Land Education Specialist for Kamehameha Schools Maui	Mailed and Emailed letter and figures on 9 June 2020

Phillips, Kealana	Burial Sites Specialist (Maui, Molokai, and Lanai)	Emailed letter and figures on 9 June 2020 Mr. Phillips replied on 13 June 2020 *I forwarded this e-mail to the individual burials council members.* CSH replied on 15 June 2020 *Mahalo nui for forwarding my email to the council members.*
Pua‘a, Mikiala and Kau	*Kama‘āina*, Kalo Farmer	Mailed letter and figures on 9 June 2020
Shimaoka, Thelma	Community Resources Coordinator, Office of Hawaiian Affairs	Mailed and Emailed letter and figures on 9 June 2020
Six, Janet Dr.	County Archaeologist	Emailed letter and figures on 9 June 2020
Sousa, Keoki	President, Kahuna La‘au Lapa‘au o Maui	Mailed letter and figures on 9 June 2020
Watanabe, Noelani	Maui, Vice-Chair, Native Hawaiian Historic Preservation Council (NHHPC)	Emailed letter and figures on 9 June 2020
Williams, Lahela	Executive Director, Hawaiian Community Assests Inc.	Mailed and Emailed letter and figures on 9 June 2020

6.4 *Kama‘āina* Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took the 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 be 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 Kumu Hōkūlani Holt-Padilla

On 15 June 2020, Cultural Surveys Hawai‘i (CSH) conducted a phone interview with Kumu Hōkūlani Holt-Padilla regarding the Wai‘ehu Affordable Housing Development project, to share her *‘ike* (knowledge) of the *ahupua‘a* (land division from mountain to sea) of Waiehu, any cultural practices that exist within the area, as well as any concerns for the proposed project.

Kumu Hōkūlani Holt-Padilla is a prominent *kumu hula* (hula master/teacher) of Pā‘ū o Hi‘iaka, a *hālau hula* (*hula* dance group). Kumu Hōkūlani is also the director of Ka Hikina O Ka Lā at the University of Hawai‘i, Maui College. Ka Hikina O Ka Lā is a specialized program “commited to increasing the participation of Native Hawaiians in higher education and guiding them to leadership roles in Science, Technology, Engineering, and Mathematics (STEM)” (University of Hawai‘i, n.d). For most of her life, Kumu Hōkūlani has lived on the island of Maui, growing up in Ka‘ehu. She later spent some of her years on O‘ahu to attend Kamehameha Schools but soon returned back to Maui to be with her *kūpuna* (elders). Kumu Hōkūlani’s *‘ohana* (family) has lived in the Ka‘ehu and Paukukalo area for at least six generations.

In remembering her childhood, Kumu Hōkūlani recalled that java plums (*Syzglum cumini*), guava (*Psidium guajava*), and Job’s tears (*Coix lacryma-jobi*) would grow along the Waiehu Stream. There would also be fresh water *‘ōpae* (shrimp) in the stream. Many *lo‘i kalo* (taro patches) were along the stream. Even to this day, many families who have lived in these areas for generations still use their *lo‘i kalo* for personal sustenance.

Kumu Hōkūlani also recalled gathering *lā‘au lapa‘au* (medicinal plants) of various sorts. *Ko‘oko‘olau* or *kōko‘olau* (*Bidens* spp.) grew on the sand dunes of Waiehu. This plant, which is endemic to Hawai‘i, was used to make tea as a general tonic or could be specifically used to help treat throat, stomach, and/or asthma-like symptoms. *‘Ihi‘ihi* or *‘ihi‘ihilauākea* (*Marsilea illosa*), a type of fern that resembles a four-leaf clover, grew in sandy soils and was very hearty. When chewed and swallowed, this clover will warm your chest; it was used to help ease breathing complications associated with asthma.

Kumu Hōkūlani continued to share that the waters from Waihe‘e to Kahului Harbor were excellent for various types of fishing. She explained that because of the structure of the reefs and the close distance between the shore, reef, and deep ocean, all styles of fishing practices, such as shoreline fishing, longshore fishing, and diving were easily accessible and practiced in these areas. Kumu Hōkūlani also recalled that turtles were once collected in these areas in the past, however, this is no longer practiced. Other ocean recreational activities like surfing were also prominent in these waters and were a favorite pasttime for many *ali‘i* (chiefs) who lived on Maui. Many of these fishing and ocean recreational practices continue today.

CSH inquired of Kumu Hōkūlani whether she knew any *mo‘olelo* (stories) or *ka‘ao* (legends) of the area. Kumu Hōkūlani directed CSH to *Sites of Maui* by Elspeth P. Sterling for various *mo‘olelo* or *ka‘ao* of the area. However, she did share a *mo‘olelo* that, to her knowledge, has not yet been published. She explained that there was a *wahine hi‘u i‘a* (mermaid) who frequently visited the waters of Waiehu. This *wahine hi‘u i‘a* would surface and sunbathe on a *pōhaku* (rock) named Maluhia, located *makai* (toward the sea) of the Waiehu Stream and that could be seen during low tide. However, a tidal wave changed the area and the *pōhaku* has not been seen since. A church in the area is also named Maluhia, possibly named after this *pōhaku*.

Kumu Hōkūlani continued to explain that most of the area *makai* of the project site was once sand dunes. Maui, in general, was known to have sand dunes that covered vast amounts of land. During the sugar plantation era, the majority of the sand dunes were destroyed and the sand was removed. These former sand dunes were then flattened to create land for sugar cultivation. As Kumu Hōkūlani explained that sand dunes were an important land feature for Native Hawaiians. It is within the sand that Native Hawaiians would bury the *iwi* (bones) of family members who had passed. With no laws protecting *iwi kūpuna* (ancestral bones) during the sugar plantation era, many undocumented *iwi kūpuna* were removed and disturbed. Since the project area is relatively close to the sand dunes, it is important to note that there may be *iwi kūpuna* within the area.

Also, due to the sugar companies having large landholdings in Waiehu, water from the Waiehu Stream was diverted for sugarcane production to help sustain crops. This left many Native Hawaiians with limited access to water, which made it difficult to sustain their *lo‘i* and other crops for daily survival. To this day, water access and water diversion has been a passionate concern for many Maui residents as water from Waiehu Stream, as well as other streams, is still being diverted to sustain other land areas of Maui.

CSH inquired with Kumu Hōkūlani if she had any suggestions or concerns about the project. Kumu Hōkūlani suggested that the developers be cognizant of weather patterns that occur throughout the area. It has been noted in the past that several tidal waves have devastated the area. The last big tidal wave, to Kumu Hōkūlāni‘s recollection, happened in 1959 or 1960. Other weather factors such as wind, rain, and the sun are also a concern. As mentioned earlier, many of the lands *makai* of the project area were sand dunes. Sand dunes are predominately created by the wind picking up the sand and carrying it to a certain place. Kumu Hōkūlani shared that Native Hawaiians named the wind of Waiehu Ho‘eha ‘ili (to hurt the skin). This wind name refers to the wind blowing the sand around. If you were to walk by as the wind blew, the wind would blow the sand and in turn, hurt your skin. This wind typically blows from *makai* to *mauka* (toward the mountain).

In regard to the development of the building, Kumu Hōkūlani inquired about the use of alternative energy. Kumu Hōkūlani mentioned that Wai‘ehu receives a lot of sun light toward the west. If the developer is interested in using alternative forms of energy, solar panels may possibly be a suitable choice.

6.4.2 Mr. Kaniloa Kamaunu

On 23 June 2020, Cultural Surveys Hawai‘i (CSH) conducted a phone interview with Kaniloa Kamaunu regarding the Waiehu Affordable Housing Development Project, to discuss his *‘ike* (knowledge) of the *ahupua‘a* (land division from mountain to sea) of Waiehu, any cultural practices that exist within the area, as well as, any concerns for the proposed project.

Mr. Kamaunu’s *‘ohana* (family) has been living within the Waiehu area for seven generations. He recalled that his mother used a different pronunciation of the area, saying, that to him, it sounded like she pronounced it, “Waihu,” with no real emphasis on the “e”. Growing up in Waiehu was like “country living”, according to Mr. Kamaunu, who reminisced about doing things such as hiking, exploring the streams, going into the mountains, where you could get fresh water *‘ōpae* (shrimp). He said that most families in Waiehu would work the land or go to the beach. Mr. Kamaunu stated that there were many *‘ohana* who were *kalo* (taro) farmers and that, “It was the main cultural practice [...] that is how you got your property, your water.” Mr. Kamaunu further explained that more *makai* (towards the sea) of the project area, there were both shallow and deep-water type *loko i‘a* (fishpond). He continued on to state that many of these practices still exist. The families living in the area are like his *‘ohana*, having been living in the area for multiple generations. Even to this day, you will find families still working in their *lo‘i* (taro patch) or going down to the *kai* (sea) to fish, which is why Mr. Kamaunu mentioned that Waiehu is also known as “a food basket [because you] can get food from the mountain to the sea.”

CSH inquired with Mr. Kamaunu if he knew of any past history about the area. He shared that Waiehu is part of what is more commonly known as “Nā Wai ‘Ehā” (The Four Waters). Wailuku, Waiehu, Waihe‘e, and Waikapū are the four *ahupua‘a* that make up Nā Wai ‘Ehā. He shared that at one time, Waiehu, as well as Waihe‘e, stood on its own and was not part of the Wailuku Moku. This area as well as other areas around Waiehu and Waihe‘e were once sand dunes. Mr. Kamaunu continued on that the sand dunes of Maui ran 12 miles long and 12 miles wide, almost like a desert. He also mentioned that even on the *mauka* (towards the mountain) side were sand dunes that were dug up and back-filled to eventually create land for development.

Mr. Kamaunu explained that the sand dunes were important to Native Hawaiians as many of them would bury their *‘ohana* in the sand. He shared that Waiehu and Waihe‘e were home to many *ali‘i* (chiefs). He shared that there are *ali‘i* (chiefs) burials in Waihe‘e. There may be some in Waiehu as well. Mr. Kamaunu also shared that many of these burials were destroyed with the sand dunes. He suspects that there may even be burials towards the *mauka* side.

In regard to the project, Mr. Kamaunu said that he appreciates that this project will be creating affordable housing for people as he sees this is a need for the community. However, some concerns that Mr. Kamaunu expressed were:

- How is “affordable housing” defined? Is it “affordable” for the local families who already live in the community?
- Who will these “affordable housing units” be sold to? Local families? Or outsiders?

Mr. Kamaunu explained that due to the high cost of living in Maui, and in Hawai‘i in general, many local families have multiple generations living in one household. He shared that both his children and grandchildren live in his house. As much as Mr. Kamaunu loves his *‘ohana*, he also wants to make sure that the future generations will be able to buy homes and live within in an affordable means. Mr. Kamaunu also added that it is people who already live in the community that need help with obtaining affordable housing. He would like to make sure that this development of affordable housing will be for the community and not for “outsiders” to move into an already densely populated community.

Mr. Kamaunu emphasized that the developers should take into consideration how this new development will affect and/or potentially affect the community and its lifestyle. Things such as

air quality, water access and use, run off, and traffic are just a few concerns that Mr. Kamaunu expressed.

In regard to water access and use, Mr. Kamaunu shared that this has always been a topic of discussion for many Maui residents. He explained that the water from the Waiehu aquifer not only takes care of Waiehu, but also gets pumped for use in other areas of Maui, like Ma‘alaea, Kīhei, and Makena. Adding additional housing units means an increase in population and therefore an increase in water use. It is important to keep in mind the source of the water and view water as a limited resource. Another concern in regard to water is the abundance of asphalt and concrete. Mr. Kamaunu shared that “more introduction of asphalt and cement affect the water cycle”. He continued on that more asphalt and concrete, especially within the parking lot area, will produce more run-off that will flow into the stream and eventually to the ocean.

Lastly, Mr. Kamaunu expressed that the developers should take into deep consideration the area itself and reflect upon, not only the physical impact of the affordable housing development (and all its components) but the community/cultural impact as well. Mr. Kamaunu is concerned that this type of development, even though it is providing affordable housing, may/will impact zoning regulations and traffic congestion. In regard to zoning, Mr. Kamaunu is concerned that by allowing bigger complexes to be built in this community it will set a precedence and open a gateway for other types of buildings, such as commercial, to be built in the community. As for traffic congestion, Mr. Kamaunu shared that traffic is already a problem for the community as there is only two ways in and out. By adding affordable housing to the community, this will increase the community’s population and in turn, both mobile and people traffic.

Mr. Kamaunu did want to emphasize that he is not against development, however, he just wants to be assured that this affordable housing development project is for the community in which it is being built in; that it will serve as an opportunity for local families of Waiehu to purchase units and continue to perpetuate the lifestyle of Waiehu.

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 Waiehu landscape. Excerpts from interviews are incorporated throughout this section where applicable.

7.1 Agriculture and Gathering Practices

Agricultural practices played a huge role in the livelihood of many Native Hawaiians. According to Handy and Handy:

> It is generally assumed that an oceanic people such as the Hawaiians lived mainly by fishing. Actually fishing occupied a very small part of the time and interest of the majority of Hawaiians. For every fisherman’s house along the coasts there were hundreds of homesteads of planters in the valleys and on the slopes and plains between the shore and forest. The Hawaiians, more than any other Polynesians, were a people whose means of livelihood, whose work and interests, were centered in the cultivation of the soil. The planter and his life furnish us with the key to his culture. [Handy and Handy 1972:vi]

7.1.1 *Ka Mahi‘ai Kalo* (Taro Farming)

A large number of *lo‘i kalo* have been identified within LCA records in Waiehu as well as the surrounding *ahupua‘a*. Kalo is considered a staple food for many Native Hawaiians. Besides the observed contributions to stamina and health, *kalo* was also believed to have derived from the first-born son of Wākea 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]

Kumu Hōkūlani Holt-Padilla shared that the lands of Waiehu consisted of a multitude of *lo‘i kalo* in the past, remembering that many *lo‘i kalo* could be seen along the Waiehu Stream. Even to this day, many families still use their *lo‘i kalo* which has been passed down through the generations.

Mr. Kamaunu, who can trance his *‘ohana* to living in Waiehu for seven generations recalled that growing up in Waiehu was like “country living;” going hiking, exploring by the streams, going into the mountains, and etc. Mr. Kaumnu emphasized that many *‘ohana* in Waiehu worked the land or go to the beach. Families in Waiehu were *kalo* farmers noting that “it was the main cultural practice […] that is how you got your property, your water.” Like Kumu Hōkūlani Holt-Padilla stated, Mr. Kamaunu also shared that many families to this day still work in their *lo‘i kalo* that was started generations ago.

7.1.2 *Ka Lā‘au Lapa‘au* (Hawaiian Herbal Medicine)

Native Hawaiians were skilled and knowledgeable about many plants and their uses to aid in the health of their people. There were many types of *kāhuna* who specialized in specific tasks focused on healing, such as *kahuna hāhā* (medical diagnosticians), *kahuna lapa‘au* (medical doctors), and *kahuna lā‘au lapa‘au* (herbalists) (Abbot 1992:98).

Kāhuna la‘au lapa‘au began their instruction at a young age. Even though they specialize in identifying and understanding the uses of different plants, the knowledge they possessed was extraordinary.

> A *kahuna lā‘au lapa‘au* begin his training at the age of five in the house of an elder expert in this field, perhaps his father but often another man. As he grew up, he received comprehensive instruction about the medicinal plants, their value and effect on the body, where they grew, how to gather, prepare, and administer them. Their knowledge spanned three disciplines we consider separate today – botany, pharmacology, and medicine. [Abbott 1992:98]

The knowledge of *lā‘au lapa‘au* has been passed down through multiple generations. Kumu Hōkūlani Holt-Padilla recalled gathering various *lā‘au lapa‘au* around Waiehu. *Ko‘oko‘olau* or *kōko‘olau* is a plant, which is endemic to Hawai‘i, used to make tea to help aid in treatment of throat, stomach, and/or asthma-like symptoms. Kumu Hōkūlani Holt-Padilla mentioned that this plant usually could be found growing alongside the sand dunes of Waiehu. Another plant, the *‘ihi‘ihi* or *‘ihi‘ihilauākea* was used to help ease breathing complications, such as those associated

with asthma. This plant is shaped like a four-leaf clover and is considered very heart and grew in sandy soils.

7.2 *Nā Wahi Pana a me Nā Mo‘olelo*

Waiehu is riddled with a multitude of land award claims, from individual *lo‘i* to larger land claims, such as Lunalilo’s 2,000 acre land claim. These land claims paint an imagery of the livelihood and lifestyle of the people of Waiehu. Many of these claims contained *lo‘i kalo* and *kula* which indicated evidence of subsistence and agricultural practices.

Also these land award claims included many place names of land area, regardless of the size of land. Naming of land was a significant practice for Native Hawaiians whether it was names for large land areas like an *ahupua‘a* or a smaller division such as *‘ili ‘āina* as well as individual land plots like *lo‘i kalo*. These names established the continuing connection of *kānaka* to *‘āina*.

7.2.1 Ka Mo‘olelo

Kumu Hōkūlani Holt-Padilla shared a *mo‘olelo* about a *wahine hi‘u i‘a* that would frequent the Waiehu area. When visiting Waiehu, this *wahine hi‘u i‘a* would surface and sunbathe on a *pōhaku*. This *pōhaku* was named Maluhia and located *makai* of the Waiehu Stream and could be seen during low tide. Unfortunately, this *pōhaku* was damaged during a tidal wave and has not been seen since.

A confidential interviewee shared that many *ali‘i* lived within the Waiehu and Waihe‘e area. One *mo‘olelo* that the confidential interviewee shared was stated by Kamakau. Alapa‘imaloiki and Kaulunae were sent by Kahekili, who was the reigning chief of Maui, to sail to Hawai‘i Island and request from Kamehameha I for canoes. Their mission was to sail to O‘ahu to make war on Kahahana, chief of O‘ahu. Alapa‘imaloiki was known to have a *loko i‘a* in Waihe‘e named Ko‘ahi.

7.3 Marine and Freshwater Resources

7.3.1 Freshwater Resources

Kumu Hōkūlani Holt-Padilla shared that many Waiehu residents utilized the Waiehu Stream as part of their daily livelihood. Many *lo‘i kalo* ran along the stream as fresh water access was important for this type of cultural practice. With *lo‘i kalo*, Kumu Hōkūlani Hot-Padilla also shared that along the Waiehu Stream she would gather java plums, guava, and Job’s tears as well as freshwater *‘ōpae*.

During a snorkel survey of the streams of Nā Wai ‘Ehā, Oki et al. (2010) shared that there was presence of native fauna in each of the streams (which include Waiehu). The native stream fauna that were seen requires unimpeded access to and from the ocean (Oki et al. 2010, 130-131).

> Native fauna observed in the Nā Wai ‘Ehā streams include the endemic mountain shrimp, ‘ōpaekala‘ole (*Atyoida bisulcate*); endemic gobies ‘o‘opu ‘alamo‘o (*Lentipes concolor*) and ‘o‘opu nōpili (*Sicyopterus stimpsoni*); the indigenous goby ‘o‘opu nākea (*Awaous guamensis*); and an endemic eleotrid, ‘o‘opu ‘akupa (*Eleotris sandwicensis*). [Oki et al. 2010:130]

7.3.1.1 Freshwater Access Rights

Freshwater access for the people of Waiehu, as well as the other *ahupua‘a* of Nā Wai ‘Ehā, is extremely important as it plays a role in their livelihood. At the start of the sugar plantation era, many of the sugar companies acquired large land holdings in Waiehu which lead the water from the Waiehu stream to be diverted for sugar cane production and to help sustain their crops. According to multiple interviewees, this action left many Native Hawaiians and Maui residents without the sufficient amount of fresh water to sustain their *lo‘i kalo* and other types of agricultural growth.

To this day, waters from Waiehu Stream as well as the other streams of Nā Wai ‘Ehā are still being diverted. A group called, Hui o Nā Wai ‘Ehā was formed in 2003 to protect the waters of the streams from further diversion. According to the group, even though the production of sugar and other agricultural production has drastically reduced, water is still be diverted by private owners, still leaving many residents without access to stream water for traditional cultural and sustainable practices.

7.3.2 Ocean Resources

7.3.2.1 Fishing Practices

Mr. Kamaunu described Waiehu as “a food basket [because you] can get food from the mountain to the sea.” As well as providing information about the *lo‘i kalo* up *mauka*, Mr. Kamaunu also shared about the *loko i‘a* that could be found towards makai. He shared that there were both shallow and deep water *loko i‘a* in Waiehu and that residents of Waiehu still utilized the sea for food subsistence and can be seen fishing and diving.

Kumu Hōkūlani Holt-Padilla shared similar knowledge about the ocean waters of Waiehu, describing the waters from Waihe‘e to Kahului excellent for various types of fishing. Kumu Hōkūlani explained that because of the reed structure and the close distance between shore, reef, and deep ocean allowed for all styles of fishing to be practiced. Fishing styles like shoreline fishing, longline fishing, and diving were practiced along this area. Other ocean recreational activities, like surfing were practiced as well. It has been shared that surfing was one of the favorite pastime for many *ali‘i*. All these practices are still continued today.

7.3.2.2 Limu Gathering

A confidential informant shared that his *‘ohana* practiced gathering *limu* along the waters of Waihe‘e. Learning from his *kūpuna*, the knowledge of identifying *limu* has been passed down from generation to generation. The informant wanted to stress the fact that it was vital to only gather from own area. You should not gather, fish, or hunt in another person’s *‘āina* as you are taking from their resources. You need to utilize and learn the resources of your own *‘āina.*

7.4 Burials

All of the interviewees shared information about the sand dunes that were prominent throughout Maui, including Waiehu. Mr. Kamaunu shared that the sand dunes of Maui ran 12 miles long and 12 miles wide, almost like a desert, where pervious sand dunes could be found both *mauka* and *makai* of the proposed project area. As Kumu Hōkūlani Holt-Padilla explained, sand dunes were an important land feature for Native Hawaiians. Sandy areas were an ideal spot for Natives Hawaiian to *kanu* (bury) the *iwi* of their family members who have passed.

Mr. Kamaunu also explained that Waiehu and Waihe‘e were home to many *ali‘i*. He knew of some burials located in Waihe‘e that were of *ali‘i*, and there may be some located in Waiehu as well.

Almost all interviewees shared information that many *iwi kūpuna* and *‘ilina* are now destroyed. During plantation era, sand dunes were dug up and back-filled to make land for development, such as sugar plantation. There were no laws at that time that protected the rights of *iwi kūpuna*, as Kumu Hōkūlani Holt-Padilla shared. Therefore it is hard to determine who or how many *iwi kūpuna* were destroyed during that time, however, it is important to note this history as there may still be *iwi kūpuna* within the area. Mr. Kamaunu also shared similar sentiment about the continued existence of *iwi kūpuna* with in the area, with a possibility of some being *mauka* of the project area.

Section 8 Summary and Recommendations

8.1 Results of Background Research

Background research for this study yielded the following results, presented in approximate chronological order:

8. Waiehu Ahupua‘a was once an independent land district and did not reside in any other *moku*. Along with Waihe‘e Ahupua‘a, the *moku* was referred to as Nā Poko (Sterling 1998:91).
9. Waiehu Ahupua‘a is a part of what is more commonly known as Nā Wai ‘Ehā (The Four Waters) which consists of Waikapū, Wailuku, Waiehu, and Waihe‘e. These areas were made famous for their freshwater streams.
10. Niukūkahi and ‘A‘awa were famous surfing spots in Waiehu Ahupua‘a that we frequently visited by many Maui *ali‘i*. Other famous surfing spots include Kehu and Ka‘ākau of Wailuku and Pala‘ie and Kahahawai of Waihe‘e.
11. Traditional history describes Waiehu as a place of abundance; from the mountain to the sea. Residents of Waiehu had bountiful access to freshwater to help feed their *lo‘i kalo* and their *kula*. The waters of Waiehu provided opportunity for various fishing practices and ocean recreational activity.
12. Waiehu is known to have many Land Claim Awards referencing many *‘ili ‘āina*, *lo‘i kalo*, and *kula*. The project area resides within LCA 8559B*M which was granted to William C. Lunalilo. This LCA document includes approximately 2,000 acres of land in Waiehu, however ,it does not specify definitive boundaries or land use for this *‘āpana*.
13. In the mid-1800s, Waiehu was known to have a small-scale sugar mill. In Waihe‘e, there was the Waihe‘e Sugar Company. These two sugar plantations once produced sugar on their own until eventually being absorbed under the Wailuku Sugar Company.
14. Since the start of the sugar plantation, water diversion has been an issue amongst the residents of Maui, including Waiehu and the other *ahupua‘a* of Nā Wai ‘Ehā. Water was being diverted from the streams of Nā Wai ‘Ehā in order to irrigate the sugar fields, leaving many Native Hawaiian and other residents with little to no access of water. The diversion of water affected many Native Hawaiians and other residents’ ability to farm *kalo* and other produce.

8.2 Results of Community Consultations

CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants in order to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Community outreach letters were sent to 73 individuals or groups; five responded, two provided written testimony, and two of these *kama‘āina* and/or *kūpuna* met with CSH for more in-depth interview. Consultation was received from community members as follows:

1. Kumu Hōkūlani Holt-Padilla, *kama‘āina* of Waiehu, Kumu Hula of Pā‘ū o Hi‘iaka, and Director of Ka Hikina O Ka Lā
2. Kaniloa Kamaunu, *kama‘āina* of Waiehu
3. Confidential Informant
4. Daniel Ornellas, *kama‘āina* of Waiehu, representing Kwong Fook Tong Chinese Cemetery.

8.3 Identification of Cultural Practices

Community consultation conducted as part of this CIA has identified the following cultural, historical, and natural resources where cultural practices (including traditional and customary native Hawaiian rights) are being exercised in Waiehu Ahupua‘a:

1. All interviewees shared various cultural practices that are still practiced both *mauka* and *makai*. There are many *kama‘āina* who continue to farm *kalo* as well as *kama‘āina* who still fish.
2. A confidential informant shared about gathering *limu* along the edges of Waihe‘e as there were a vast variety of *limu* that grew within the area.
3. All participants mentioned the sand dunes that are both *makai* and *mauka* of the project area. The sand dunes were vast and were predominantly recognized as a place where *kūpuna* would bury those who have passed.

Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following cultural practices within Waiehu Ahupua‘a:

1. *Kalo* farming
2. Fishing
3. *Limu* gathering
4. Burial practices

No on-going cultural practices were identified within the project area during community consultation for this CIA. However, the project area is located adjacent to an inland sand dune complex where numerous human burials have been documented. The project area is also located in the general vicinity of on-going subsistence-based *kalo* farms.

8.4 Identification of Impacts to Cultural Practices

No impacts to on-going cultural practices were identified within the project area during community consultation for this CIA. Consultation has identified a number of concerns related to the environment and the broader community:

1. Kumu Hōkūlani Holt-Padilla suggested that the project developers should be cognizant of the weather patterns that occur throughout the area, such as wind, rain, and sun. The wind Ho‘ēha ‘ili refers to the wind blowing up the sand around and if you should walk by, your skin would be hurt by the sand being blown in the wind. She shared that this wind blows typically blows from makai to *mauka*.
2. Kumu Hōkūlani Holt-Padilla also shared about past weather conditions that have devasted the area. Tidal waved has hit Waiehu on several occasions. To her recollection, the last one

being in 1959 or 1960. Even though there have been no recent tidal waves, the possibility and awareness should be taken into consideration.

3. Mr. Kamaunu shared that an increase of development and population has the potential to increase noise and traffic pollution which will affect air quality, community living, and lifestyle.
4. All interviewees shared their thoughts, memories, and opinions about the water diversion issue that has been going on for over a century. Many of them shared that this issue has left many Native Hawaiian families with limited access to water which presented a very difficult challenge in sustaining their *lo'i kalo* and other agricultural practices.
5. Mr. Kamaunu as well as the other interviewees shared that the water that is being diverted is used to sustain other areas of Maui. It is important to note that water, as Mr. Kamaunu shared, is a limited source. With an increase in population and housing in Waiehu, water usage will increase and the source of water will be stretched thin.
6. Mr. Kamaunu mentioned that an increase of concrete and asphalt affects the water cycle and the healthiness of the water. By an increase of concrete and asphalt (such as the parking lot of the project) has the potential of generating more run-off and debris which will flow into the stream and ocean.
7. Mr. Kamaunu also expressed concern on the "who" this affordable housing is for as well as how is "affordable housing" defined. Mr. Kamaunu shared that the community is made up of multiple generations of local residents. Many of these *kama'āina* are living in multigenerational homes due to the high cost of living. Will these "affordable housings" go to local residents or are for outsiders to come in?

8.5 Mitigation Recommendations

Based on the results of community consultation and CSH's expertise in conducting cultural impact assessments, the following actions are recommended to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups:

1. A number of concerns expressed by the community during consultation do not relate specifically to on-going cultural practices within the project area, but nonetheless should be considered during project planning and development. These concerns include:
    a. Awareness of weather patterns
    b. Awareness of potential for impacts from tidal events
    c. Community impacts from an increase in noise and traffic
    d. Community impacts from an increase in water usage
    e. Community impacts from runoff as a result of an increase in asphalt/concrete surfaces
    f. Understanding the need for truly affordable housing for local Maui residents
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.

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PHASE 1 ENVIRONMENTAL SITE ASSESSMENT AND PHASE 2 SUBSURFACE INVESTIGATION REPORTS

APPENDIX

I

PARTNER
Engineering and Science, Inc.

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

Southeast Corner of Kahekili Highway & Waiehu Beach Road
Maui Island, Hawaii 96793

Report Date: July 2, 2020
Partner Project No. 20-283903.1

Prepared for:

Highridge Costa Development Company, LLC
330 West Victoria Street
Gardena, California 90248

PARTNER
Engineering and Science, Inc.

July 2, 2020

Mr. Harrison Herzberg
Highridge Costa Development Company, LLC
330 West Victoria Street
Gardena, California 90248

Subject: Phase I Environmental Site Assessment
Southeast Corner of Kahekili Highway & Waiehu Beach Road
Maui Island, Hawaii 96793
Partner Project No. 20-283903.1

Dear Mr. Harrison Herzberg:

Partner Engineering and Science, Inc. (Partner) is pleased to provide the results of the *Phase I Environmental Site Assessment* (Phase I ESA) report of the abovementioned address (the "subject property"). This assessment was performed in conformance with the scope and limitations as detailed in the ASTM Practice E1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

This assessment included a site reconnaissance as well as research and interviews with representatives of the public, property ownership, site manager, and regulatory agencies. An assessment was made, conclusions stated, and recommendations outlined.

We appreciate the opportunity to provide environmental services to you. If you have any questions concerning this report, or if we can assist you in any other matter, please contact me at 310-765-7271.

Sincerely,

Lyly Churchill, MA
Relationship Manager

2154 Torrance Blvd., Suite 200, Torrance, CA 90501 ◊ Phone 800-419-4923 ◊ Fax 866-928-7418

EXECUTIVE SUMMARY

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in accordance with the scope of work and limitations of ASTM Standard Practice E1527-13, the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312) and set forth by Highridge Costa Development Company, LLC for the property located at Southeast Corner of Kahekili Highway & Waiehu Beach Road in Wailuku, Maui County, Hawaii (the "subject property"). The Phase I Environmental Site Assessment is designed to provide Highridge Costa Development Company, LLC with an assessment concerning environmental conditions (limited to those issues identified in the report) as they exist at the subject property.

Property Description

The subject property is located on the southeast corner of Kahekili Highway and Waiehu Beach Road within a residential area of Maui County. Please refer to the table below for further description of the subject property:

Subject Property Data	
Address:	Southeast Corner of Kahekili Highway & Waiehu Beach Road, Wailuku, Hawaii
Property Use:	Vacant
Land Acreage (Ac):	13.248 Ac
Number of Buildings:	None
Assessor's Parcel Number (APN):	330011060000
Current Tenants:	Vacant
Site Assessment Performed By:	Josh Barton of Partner
Site Assessment Conducted On:	June 8, 2020

The subject property is generally vacant land with water storage tanks, sheds, water well pump, and planter boxes located throughout the property. The property appears to have been most recently used for agricultural purposes. There are currently no onsite operations. The property consists of various species of trees and native grasses. According to Mr. Don Medeiros, key site manager, the property was formerly used to grow native Hawaiian fruits and vegetables.

According to available historical sources, the subject property appears to have been used agriculturally by 1922, and developed with an orchard by 2010 to 2019. The subject property is currently unused, but the structures remain.

The immediately surrounding properties consist of wooded land and a cemetery to the north across Waiehu Beach Road; undeveloped wooded land to the south; a residential neighborhood to the east; and undeveloped wooded land to the west across Kahekili Highway.

According to online research and topographic map interpretation, the depth to groundwater in the vicinity of the subject property is inferred to be approximately 3 to 15 feet below ground surface (bgs) and groundwater flow is inferred to be toward the northeast.

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. The following was identified during the course of this assessment:

- The subject property was historically used for agricultural purposes. There is a potential that typical agricultural chemicals such as pesticides, herbicides, and fertilizers may have been used and stored on-site. Because residential development is proposed, the possible historical use of agricultural chemicals use is a REC.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- Partner did not identify any controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- Partner did not identify any historical recognized environmental conditions during the course of this assessment.

An *environmental issue* refers to environmental concerns identified by Partner, which do not qualify as RECs; however, warrant further discussion. The following was identified during the course of this assessment:

- Partner observed a possible water well located in a wooden shed structure. The presence of this well provides access to groundwater, which could result in future environmental exposure and liabilities.
- The drainage ditch along or adjacent to the eastern perimeter is a mapped Riverine habitat according to the United States Fish & Wildlife Service. A comprehensive wetlands survey would be required in order to formally determine actual wetlands on the subject property.

Conclusions, Opinions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of Southeast Corner of Kahekili Highway & Waiehu Beach Road in Wailuku, Maui County, Hawaii (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed evidence of a recognized environmental condition and environmental issues in connection with the subject property. Based on the conclusions of this assessment, Partner recommends the following:

- Prior to residential development, a limited subsurface investigation should be conducted in order to determine the presence or absence of historical agricultural chemicals onsite.
- The possible water well located in the wooden shed structure should be decommissioned in accordance with application regulations.

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Appendix B Historical/Regulatory Documentation
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1.0 INTRODUCTION

Partner Engineering and Science, Inc. (Partner) has performed a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of ASTM Standard Practice E1527-13 and the Environmental Protection Agency Standards and Practices for All Appropriate Inquiries (AAI) (40 CFR Part 312) for the property located at Southeast Corner of Kahekili Highway & Waiehu Beach Road in Wailuku, Maui County, Hawaii (the "subject property"). Any exceptions to, or deletions from, this scope of work are described in the report.

1.1 Purpose

The purpose of this ESA is to identify existing or potential Recognized Environmental Conditions (as defined by ASTM Standard E1527-13) affecting the subject property that: 1) constitute or result in a material violation or a potential material violation of any applicable environmental law; 2) impose any material constraints on the operation of the subject property or require a material change in the use thereof; 3) require clean-up, remedial action or other response with respect to Hazardous Substances or Petroleum Products on or affecting the subject property under any applicable environmental law; 4) may affect the value of the subject property; and 5) may require specific actions to be performed with regard to such conditions and circumstances. The information contained in the ESA Report will be used by Client to: 1) evaluate its legal and financial liabilities for transactions related to foreclosure, purchase, sale, loan origination, loan workout or seller financing; 2) evaluate the subject property's overall development potential, the associated market value and the impact of applicable laws that restrict financial and other types of assistance for the future development of the subject property; and/or 3) determine whether specific actions are required to be performed prior to the foreclosure, purchase, sale, loan origination, loan workout or seller financing of the subject property.

This ESA was performed to permit the *User* to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. §9601) liability (hereinafter, the "*landowner liability protections*," or "*LLPs*"). ASTM Standard E1527-13 constitutes "*all appropriate inquiry* into the previous ownership and uses of the *property* consistent with good commercial or customary practice" as defined at 42 U.S.C. §9601(35)(B).

1.2 Scope of Work

The scope of work for this ESA is in accordance with the requirements of ASTM Standard E1527-13. This assessment included: 1) a property and adjacent site reconnaissance; 2) interviews with key personnel; 3) a review of historical sources; 4) a review of regulatory agency records; and 5) a review of a regulatory database report provided by a third-party vendor. Partner contacted local agencies, such as environmental health departments, fire departments and building departments in order to determine any current and/or former hazardous substances usage, storage and/or releases of hazardous substances on the subject property. Additionally, Partner researched information on the presence of activity and use limitations (AULs) at these agencies. As defined by ASTM E1527-13, AULs are the legal or physical restrictions or limitations on the use of, or access to, a site or facility: 1) to reduce or eliminate potential exposure to hazardous substances or petroleum products in the soil or groundwater on the subject

property; or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment. These legal or physical restrictions, which may include institutional and/or engineering controls (IC/ECs), are intended to prevent adverse impacts to individuals or populations that may be exposed to hazardous substances and petroleum products in the soil or groundwater on the property.

If requested by Client, this report may also include the identification, discussion of, and/or limited sampling of asbestos-containing materials (ACMs), lead-based paint (LBP), mold, and/or radon.

1.3 Limitations

Partner warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work. These methodologies are described as representing good commercial and customary practice for conducting an ESA of a property for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist on the subject property conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. Partner believes that the information obtained from the record review and the interviews concerning the subject property is reliable. However, Partner cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. The conclusions presented in the report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed-upon services or the time and budgeting restraints imposed by the Client. No other warranties are implied or expressed.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

This practice does not address requirements of any state or local laws or of any federal laws other than the all appropriate inquiry provisions of the LLPs. Further, this report does not intend to address all of the safety concerns, if any, associated with the subject property.

Environmental concerns, which are beyond the scope of a Phase I ESA as defined by ASTM include the following: ACMs, LBP, radon, and lead in drinking water. These issues may affect environmental risk at the subject property and may warrant discussion and/or assessment; however, are considered non-scope issues. If specifically requested by the Client, these non-scope issues are discussed in Section 6.3.

1.4 User Reliance

Highridge Costa Development Company, LLC engaged Partner to perform this assessment in accordance with an agreement governing the nature, scope and purpose of the work as well as other matters critical to the engagement. All reports, both verbal and written, are for the sole use and benefit of Highridge Costa Development Company, LLC. Either verbally or in writing, third parties may come into possession of this report or all or part of the information generated as a result of this work. In the absence of a written agreement with Partner granting such rights, no third parties shall have rights of recourse or recovery

whatsoever under any course of action against Partner, its officers, employees, vendors, successors or assigns. Any such unauthorized user shall be responsible to protect, indemnify and hold Partner, Client and their respective officers, employees, vendors, successors and assigns harmless from any and all claims, damages, losses, liabilities, expenses (including reasonable attorneys' fees) and costs attributable to such Use. Unauthorized use of this report shall constitute acceptance of and commitment to these responsibilities, which shall be irrevocable and shall apply regardless of the cause of action or legal theory pled or asserted. Additional legal penalties may apply.

1.5 Limiting Conditions

The findings and conclusions contain all of the limitations inherent in these methodologies that are referred to in ASTM E1527-13.

Specific limitations and exceptions to this ESA are more specifically set forth below:

- Interviews with past or current owners, operators and occupants were not reasonably ascertainable and thus constitute a data gap. Based on information obtained from other historical sources (as discussed in Section 3.0), this data gap is not expected to alter the findings of this assessment.
- Information relative to deed restrictions and environmental liens, a title search, and completion of the AAI User Questionnaire from the Report User was not provided at the time of the assessment.
- Partner was not able to document the historical use of the subject property prior to 1922. The following sources were reviewed during the course of this assessment and found to be limited: aerial photographs were not available prior to 1950; city directories were not available prior to 1992; topographic maps prior to 1922 were not reasonably ascertainable from local agencies; and other historical sources such as fire insurance maps did not provide coverage of the subject property. This data failure is not considered critical and does not change the conclusions of this report, as the 1950 aerial photograph revealed the subject property to be undeveloped or agricultural land. In addition, the adjacent and surrounding areas are shown mostly as farmland.
- Partner submitted Freedom of Information Act (FOIA) requests to Hawaii Department of Health – Safe Drinking Water Branch (DOH-SDWB) for information pertaining to hazardous substances, underground storage tanks, releases, inspection records, etc. for the subject property and/or adjacent properties. As of this writing, this agency has not responded to Partner's request. Based on information obtained from other historical sources, this limitation is not expected to alter the overall findings of this assessment.

Due to time constraints associated with this report, the Client has requested the report despite the above-listed limitations.

2.0 SITE DESCRIPTION

2.1 Site Location and Legal Description

The subject property is located at the southeast corner of Kahekili Highway and Waiehu Beach Road. According to the Maui County Assessor, the subject property is legally described as LOT 1-C Paukukalo Large-Lot Subdivision Por GR 3343, and ownership has been vested in Maui Economic Opportunity Inc. since 2006.

Please refer to Figure 1: Site Location Map, Figure 2: Site Plan, Figure 3: Topographic Map, and Appendix A: Site Photographs for the location and site characteristics of the subject property.

2.2 Current Property Use

The subject property is generally vacant land with water storage tanks, sheds, water well pump, and planter boxes located throughout the property. The property appears to have been most recently used for agricultural purposes. There are currently no onsite operations. The property consists of various species of trees and native grasses. According to Mr. Don Medeiros, key site manager, the property was formerly used to grow native Hawaiian fruits and vegetables.

The subject property is designated for agriculture development by Maui County.

The subject property was not identified in the regulatory database report of Section 4.2.

2.3 Current Use of Adjacent Properties

The subject property is located within a residential area of Maui County. During the vicinity reconnaissance, Partner observed the following land use on properties in the immediate vicinity of the subject property:

Immediately Surrounding Properties	
North:	Waiehu Beach Road beyond which is wooded land and a cemetery
South:	Undeveloped wooded land
East:	A residential neighborhood
West:	Kahekili Highway beyond which is undeveloped wooded land

No adjacent properties were identified in the regulatory database report of Section 4.2.

2.4 Physical Setting Sources

2.4.1 Topography

The United States Geological Survey (USGS) *Wailuku, Hawaii* Quadrangle 7.5-minute series topographic map was reviewed for this ESA. According to the contour lines on the topographic map, the subject property is located at a range of approximately 60 to 160-feet above mean sea level (MSL). The contour lines in the area of the subject property indicate the area is sloping moderately toward the northwest. Improvements, with the exception of roadways, are not depicted on the 2013 map. The subject property is depicted agriculturally on the 1997 with no specific improvements.

A copy of the most recent topographic map is included as Figure 3 of this report.

2.4.2 Hydrology

According to topographic map interpretation, the direction of groundwater flow in the vicinity of the subject property is inferred to be toward the northeast. The nearest surface water in the vicinity of the subject property is the Waiehu Stream located approximately 110-feet north of the subject property. A drainage ditch runs along the eastern perimeter of the property. No other settling ponds, lagoons, surface impoundments, wetlands or natural catch basins were observed at the subject property during this assessment.

According to available information, a public water system operated by the Maui County Department of Water Supply serves the subject property vicinity. According to available information, shallow groundwater directly beneath the subject property may be utilized for domestic purposes. The sources of public water for the Wailuku System (central/south Maui) are primarily groundwater sources as well as surface waters.

Information specific to the subject property regarding the depth to groundwater and direction of groundwater flow was not available for the subject area. However, according to information obtained from online research, depth to the high-water table is anticipated between 3 and 15 feet below ground surface (bgs).

2.4.3 Geology/Soils

According to the U.S. Geological Survey, the geologic formation underlying the soils at the subject property is the Kula Volcanic rock from the Pleistocene series, specifically from lava flows.

Based on information obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey online database, the subject property is mapped as Molokai silty clay loam. These soils formed in material weathered from basic igneous rock and is found on smooth slopes. The soil is well drained, and slightly acidic to neutral. Permeability is moderate, runoff is low, and erosion hazard is slight. These soils are used for sugarcane, pineapple, pasture, wildlife habitat and residential sites. The natural vegetation consists of kiawe, ilima, uhaloa, feather fingergrass and buffelgrass. Slopes range from 0 to 3 percent.

2.4.4 Flood Zone Information

Partner performed a review of the Flood Insurance Rate Map, published by the Federal Emergency Management Agency. According to Community Panel Number 1500030383E, dated September 25, 2009, the subject property appears to be located in Zone X, an area located outside of the 100-year and 500-year flood plains.

A copy of the reviewed flood map is not included in Appendix B of this report.

3.0 HISTORICAL INFORMATION

Partner obtained historical use information about the subject property from a variety of sources. A chronological listing of the historical data found is summarized in the table below:

Historical Use Information

Period/Date	Source	Description/Use
1922-1950	Topographic Maps	Undeveloped or agricultural land
1950-circa 2019	Aerial Photographs, Interviews, Topographic Maps	Agricultural land, with an orchard and small structures appearing since 2010
Present	Aerial Photographs, Interviews	Vacant with small structures remaining

The subject property was historically used for agricultural purposes. There is a potential that typical agricultural chemicals such as pesticides, herbicides, and fertilizers may have been used and stored on-site. Because residential development is proposed, sampling pertaining to the historical agricultural use is recommended.

3.1 Aerial Photograph Review

Partner obtained available aerial photographs of the subject property and surrounding area from Environmental Data Resources (EDR) and from Google Earth (as noted) on June 8, 2020. The following was observed on the subject property and adjacent properties during the aerial photograph review:

Date: 1950 ***Scale: 1"=500'***

Subject Property: The property appears to be mostly agricultural. A ditch runs along the eastern perimeter of the property.
North: Appears to be developed with small structures such as residences and wooded land.
South: Appears to be developed for agriculture use.
East: Appears to be undeveloped land
West: Appears to be agriculture land beyond a road

Date: 1976 ***Scale: 1"=500'***

Subject Property: No significant changes visible
North: Appears to be wooded land beyond a road
South: No significant changes visible
East: Appears to be graded for residential development beyond wooded land
West: No significant changes visible

Date: 2010*, 2011* ***Scale: 1"=500'***

Subject Property: The property appears to contain orchards with cleared areas and small structures. A round water tank is located on the central portion of the property.
North: No significant changes visible
South: Appears to be wooded land
East: Developed with a residential neighborhood
West: No significant changes visible

Date: 2012*, 2013*, 2016* ***Scale: 1"=500'***

Subject Property: Appears to be developed with orchards, agriculture structures including water tank,

Date: 2012*, 2013*, 2016* ***Scale: 1"=500'***

sheds, planting beds, and pathways.
North: No significant changes visible
South: No significant changes visible
East: No significant changes visible
West: No significant changes visible
*Images viewed from Google Earth.

Copies of select aerial photographs are included in Appendix B of this report.

3.2 Fire Insurance Maps

Sanborn map coverage was not available for the subject property.

A copy of the Certified Sanborn Map Report is included in Appendix B.

3.3 City Directories

City directories were not identified for the subject property. Properties in the vicinity area identified as residential listings.

Copies of reviewed city directories are included in Appendix B of this report.

3.4 Historical Topographic Maps

Partner reviewed historical topographic maps obtained from EDR on June 5, 2020. The following was observed on the subject property and adjacent properties during the topographic map review:

Date: 1922

Subject Property: Appears to be undeveloped with a railroad track along or adjacent to the eastern perimeter
North: Appears to be undeveloped
South: Appears to be undeveloped with a possible railroad track
East: Appears to be undeveloped
West: Appears to be undeveloped beyond a road

Date: 1955, 1961

Subject Property: Appears to be undeveloped
North: Appears to be wooded land followed by a road and cemetery. A stream tracks east to west at the northern perimeter of the subject property.
South: Appears to be undeveloped
East: Appears to be undeveloped
West: Appears to be undeveloped beyond a highway

Date: 1983, 1997, 2013

Subject Property: No significant changes depicted
North: Appears to be vacant land and a cemetery beyond a road
South: No significant changes depicted
East: Appears to be developed with a residential neighborhood
West: No significant changes depicted

Copies of reviewed topographic maps are included in Appendix B of this report.

4.0 REGULATORY RECORDS REVIEW

4.1 Regulatory Agencies

4.1.1 State Department

Regulatory Agency Data	
Name of Agency:	Hawaii Department of Health – Office of Hazard Evaluation and Emergency Response (DOH-HEER)
Point of Contact:	Ms. Rosa Lu
Agency Address:	2385 Waimano Home Road, Pearl City, Hawaii
Agency Phone Number:	(808) 586-4249
Date of Contact:	June 9, 2020
Method of Communication:	Faxed Request
Summary of Communication:	No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the DOH-HEER.

4.1.2 Health Department

Regulatory Agency Data	
Name of Agency:	Hawaii Department of Health - Solid and Hazardous Waste (DOH-SHWB)
Point of Contact:	Ms. Amy Susana
Agency Address:	2827 Waimano Home Road, Pearl City, Hawaii
Agency Phone Number:	(808) 586-4226
Date of Contact:	June 9, 2020
Method of Communication:	Faxed Request
Summary of Communication:	No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the DOH-SHWB.

4.1.3 Fire Department

Regulatory Agency Data	
Name of Agency:	Maui Fire Department (MFD)
Point of Contact:	Mr. Paul Haake
Agency Address:	313 Manea Place, Wailuku, Hawaii
Agency Phone Number:	(808) 876-4690
Date of Contact:	June 9, 2020
Method of Communication:	Faxed Request
Summary of Communication:	No records regarding hazardous substance use, storage or releases, or the presence of USTs and AULs on the subject property were on file with the MFD.

4.1.4 Regional Water Quality Agency

Regulatory Agency Data	
Name of Agency:	Hawaii Department of Health – Safe Drinking Water Branch (DOH-SDWB)
Point of Contact:	Norris Uehara
Agency Address:	2385 Waimano Home Road, Pearl City, Hawaii
Agency Phone Number:	(808) 586-4258
Date of Contact:	June 9, 2020
Method of Communication:	Faxed Request
Summary of Communication:	As of the date of this report, Partner has not received a response from the DOH-SDWB for inclusion in this report.

4.1.5 Building Department

Regulatory Agency Data	
Name of Agency:	Maui Building Department (MBD)
Agency Address:	700 Halia Nakoa Street, Wailuki, Hawaii
Agency Phone Number:	(808) 270-7735
Date of Contact:	June 24, 2020
Method of Communication:	Online
Summary of Communication:	The MBD online database indicates several permits dating from as early as 1973. The mapping tool indicates that the subject property is part of a larger parcel where permit information was found. Many permits are associated with a subdivision. There is a permit for well and tank site from 1996 and 1977. No other details are given. Based on the larger parcel, aerial photograph showing the subject property as undeveloped or agricultural land during this time frame, and the tank most likely being associated with a water well, these findings do not represent an environmental concern.

4.1.6 Planning Department

Regulatory Agency Data	
Name of Agency:	Maui County Planning Department (MCPD)
Agency Address:	One Main Plaza, 2200 Main Street, Wailuku, Hawaii
Agency Phone Number:	(808) 270-7735
Date of Contact:	June 24, 2020
Method of Communication:	Online
Summary of Communication:	According to records reviewed, the subject property is zoned AG for agriculture development by Maui County.

4.1.7 Assessor's Office

Regulatory Agency Data	
Name of Agency:	Maui County Real Property Tax (MCRPT)
Agency Address:	100 Ainoa Street, Kaunakakai, Hawaii
Agency Phone Number:	(808) 270-7297
Date of Contact:	June 24, 2020
Method of Communication:	Online
Summary of Communication:	According to records reviewed, the subject property is identified by

Regulatory Agency Data	
	Assessor Parcel Number (APN) 330011060000 and has been owned by Maui Economic Opportunity Inc. since 2006. The parcel measures 11.476-acres.

Copies of pertinent documents are included in Appendix B of this report.

4.2 Mapped Database Records Search

Information from standard federal, state, county, and city environmental record sources was provided by Environmental Data Resources, Inc. (EDR). Data from governmental agency lists are updated and integrated into one database, which is updated as these data are released. The information contained in this report was compiled from publicly available sources and the locations of the sites are plotted utilizing a geographic information system, which geocodes the site addresses. The accuracy of the geocoded locations is approximately +/-300 feet.

Using the ASTM definition of migration, Partner considers the migration of hazardous substances or petroleum products in any form onto the subject property during the evaluation of each site listed on the radius report, which includes solid, liquid, and vapor.

4.2.1 Regulatory Database Summary

Radius Report Data

Database	Search Radius (mile)	Subject Property	Adjacent Properties	Sites of Concern
Federal NPL or Delisted NPL Site	1.00	N	N	N
Federal CERCLIS Site	0.50	N	N	N
Federal CERCLIS-NFRAP Site	0.50	N	N	N
Federal RCRA CORRACTS Facility	1.00	N	N	N
Federal RCRA TSDF Facility	0.50	N	N	N
Federal RCRA Generators Site (LQG, SQG, CESQG)	0.25	N	N	N
Federal IC/EC Registries	0.50	N	N	N
Federal ERNS Site	Subject Property	N	N	N
State/Tribal Equivalent NPL	1.00	N	N	N
State/Tribal Equivalent CERCLIS	1.00	N	N	N
State/Tribal Landfill/Solid Waste Disposal Site	0.50	N	N	N
State/Tribal Leaking Storage Tank Site	0.50	N	N	N
State/Tribal Registered Storage Tanks (UST/AST)	0.25	N	N	N
State/Tribal Voluntary Cleanup Sites (VCP)	0.50	N	N	N
State/Tribal Spills	0.50	N	N	N
Federal Brownfield Sites	0.50	N	N	N
State Brownfield Sites	0.50	N	N	N
EDR MGP	Varies	N	N	N
EDR US Hist Auto Station	Varies	N	N	N
EDR US Hist Cleaners	Varies	N	N	N

4.2.2 Subject Property Listings

The subject property is not identified in the regulatory database report.

4.2.3 Adjacent Property Listings

The adjacent properties are not identified in the regulatory database report.

4.2.4 Sites of Concern Listings

No sites of concern are identified in the regulatory database report.

4.2.5 Orphan Listings

No orphan listings are identified in the regulatory database report.

A copy of the regulatory database report is included in Appendix C of this report.

5.0 USER PROVIDED INFORMATION AND INTERVIEWS

In order to qualify for one of the *Landowner Liability Protections (LLPs)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the *Brownfields Amendments*), the *User* must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. The *User* should provide the following information to the *environmental professional*. Failure to provide this information could result in a determination that *all appropriate inquiries* is not complete. The *User* is asked to provide information or knowledge of the following:

- Review Title and Judicial Records for Environmental Liens and AULs
- Specialized Knowledge or Experience of the User
- Actual Knowledge of the User
- Reason for Significantly Lower Purchase Price
- Commonly Known or *Reasonably Ascertainable* information
- Degree of Obviousness
- Reason for Preparation of this Phase I ESA

Fulfillment of these user responsibilities is key to qualification for the identified defenses to CERCLA liability. Partner requested our Client to provide information to satisfy User Responsibilities as identified in Section 6 of the ASTM guidance.

Pursuant to ASTM E1527-13, Partner requested the following site information from Highridge Costa Development Company, LLC (User of this report).

User Responsibilities				
Item	**Provided By User**	**Not Provided By User**	**Discussed Below**	**Does Not Apply**
AAI User Questionnaire			**X**	
Title Records, Environmental Liens, and AULs			**X**	
Specialized Knowledge			**X**	
Actual Knowledge			**X**	
Valuation Reduction for Environmental Issues			**X**	
Identification of Key Site Manager	**Section 5.1.3**			
Reason for Performing Phase I ESA	**Section 1.1**			
Prior Environmental Reports		**X**		
Other				**X**

5.1 Interviews

5.1.1 Interview with Owner

The owner of the subject property since 2006, identified as Maui Economic Opportunity Inc., was not available to be interviewed at the time of the assessment.

5.1.2 Interview with Report User

Please refer to Section 5.2 below for information requested from the Report User.

5.1.3 Interview with Key Site Manager

Mr. Dan Medeiros, key site manager, indicated that he had no information pertaining to any pending, threatened, or past litigation relevant to hazardous substances or petroleum products in, on, or from the subject property; any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or any notices from a governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products.

5.1.4 Interviews with Past Owners, Operators and Occupants

Interviews with past owners, operators and occupants were not conducted since information regarding the potential for contamination at the subject property was obtained from other sources.

5.1.5 Interview with Others

As the subject property is not an abandoned property as defined in ASTM 1527-13, interview with others were not performed.

5.2 User Provided Information

5.2.1 Title Records, Environmental Liens, and AULs

Partner was not provided with title records or environmental lien and AUL information for review as part of this assessment.

5.2.2 Specialized Knowledge

No specialized knowledge of environmental conditions associated with the subject property was provided by the User at the time of the assessment.

5.2.3 Actual Knowledge of the User

No actual knowledge of any environmental lien or AULs encumbering the subject property or in connection with the subject property was provided by the User at the time of the assessment.

5.2.4 Valuation Reduction for Environmental Issues

No knowledge of valuation reductions associated with the subject property was provided by the User at the time of the assessment.

5.2.5 Commonly Known or Reasonably Ascertainable Information

The User did not provide information that is commonly known or *reasonably ascertainable* within the local community about the subject property at the time of the assessment.

5.2.6 Previous Reports and Other Provided Documentation

No previous reports or other pertinent documentation was provided to Partner for review during the course of this assessment.

6.0 SITE RECONNAISSANCE

The weather at the time of the site visit was sunny and clear. Refer to Section 1.5 for limitations encountered during the field reconnaissance and Sections 2.1 and 2.2 for subject property operations. The table below provides the site assessment details:

Site Assessment Data	
Site Assessment Performed By:	Josh Barton
Site Assessment Conducted On:	June 8, 2020

The table below provides the subject property personnel interviewed during the field reconnaissance:

Site Visit Personnel for Southeast Corner of Kahekili Highway & Waiehu Beach Road (Subject Property)			
Name	**Title/Role**	**Contact Number**	**Site Walk* Yes/No**
Mr. Don Medeiros	Key Site Manager	(808) 268-4183	Yes*

* Accompanied Partner during the field reconnaissance activities and provided information pertaining to the current operations and maintenance of the subject property

No potential environmental concerns were identified during the onsite reconnaissance.

6.1 General Site Characteristics

6.1.1 Solid Waste Disposal

Solid waste is not generated at the subject property. No evidence of illegal dumping of solid waste was observed during the Partner site reconnaissance.

6.1.2 Sewage Discharge and Disposal

Sanitary discharges are not present on the subject property. No wastewater treatment facilities or septic systems were observed or reported on the subject property.

6.1.3 Surface Water Drainage

Storm water is removed from the subject property primarily by percolation into soils.

The drainage ditch along or adjacent to the eastern perimeter is a mapped Riverine habitat according to the United States Fish & Wildlife Service. A comprehensive wetlands survey would be required in order to formally determine actual wetlands on the subject property. No additional surface impoundments, wetlands, natural catch basins, settling ponds, or lagoons are located elsewhere on the subject property. No drywells were identified on the subject property.

6.1.4 Source of Heating and Cooling

Heating and cooling systems are not present.

6.1.5 Wells and Cisterns

Partner observed a possible water well located in a wooden shed structure. This feature consists of a cast concrete slab with metal piping protruding from the top. Piping from this feature tracks to a poly above

ground water storage tank. The property has historically been used to grow native fruits and vegetation. No other aboveground evidence of wells or cisterns was observed during the site reconnaissance.

6.1.6 Wastewater

Domestic wastewater is not generated at the subject property. No industrial process is currently performed at the subject property.

6.1.7 Septic Systems

No septic systems were observed or reported on the subject property.

6.1.8 Additional Site Observations

No additional general site characteristics were observed during the site reconnaissance.

6.2 Potential Environmental Hazards

6.2.1 Hazardous Substances and Petroleum Products Used or Stored at the Site

No hazardous substances or petroleum products were observed on the subject property during the site reconnaissance.

6.2.2 Aboveground & Underground Hazardous Substance or Petroleum Product Storage Tanks (ASTs/USTs)

Partner observed one large circular metal holding tank without a top. The structure was formerly used for rainwater storage. Currently, vegetation is growing out of the structure. Adjacent to this structure is located a poly storage tank for water. This tank is located near a shed that contains what appears to be a well pump. There are also two 225-gallon poly totes for water storage along the western perimeter of the property. Based on the former contents and use, the tanks do not represent an environmental concern.

6.2.3 Evidence of Releases

No spills, stains or other indications that a surficial release has occurred at the subject property were observed.

6.2.4 Polychlorinated Biphenyls (PCBs)

No potential PCB-containing equipment (transformers, oil-filled switches, hoists, lifts, dock levelers, hydraulic elevators, etc.) was observed on the subject property during Partner's reconnaissance.

6.2.5 Strong, Pungent or Noxious Odors

No strong, pungent or noxious odors were evident during the site reconnaissance.

6.2.6 Pools of Liquid

No pools of liquid were observed on the subject property during the site reconnaissance.

6.2.7 Drains, Sumps and Clarifiers

No drains, sumps, or clarifiers, other than those associated with storm water removal, were observed on the subject property during the site reconnaissance.

6.2.8 Pits, Ponds and Lagoons

No pits, ponds or lagoons were observed on the subject property.

6.2.9 Stressed Vegetation

No stressed vegetation was observed on the subject property.

6.2.10 Additional Potential Environmental Hazards

No additional environmental hazards, including landfill activities or radiological hazards, were observed.

6.3 Non-ASTM Services

6.3.1 Asbestos-Containing Materials (ACMs)

Due to the lack of development, ACMs were not considered within the scope of this assessment.

6.3.2 Lead-Based Paint (LBP)

Due to the lack of development, LBP was not considered within the scope of this assessment.

6.3.3 Radon

Radon is a colorless, odorless, naturally occurring, radioactive, inert, gaseous element formed by radioactive decay of radium (Ra) atoms. The US EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, according to the table below:

EPA Radon Zones		
EPA Zones	**Average Predicted Radon Levels**	**Potential**
Zone 1	Exceed 4.0 pCi/L	Highest
Zone 2	Between 2.0 and 4.0 pCi/L	Moderate
Zone 3	Less than 2.0 pCi/L	Low

It is important to note that the EPA has found homes with elevated levels of radon in all three zones, and the US EPA recommends site-specific testing in order to determine radon levels at a specific location. However, the map does give a valuable indication of the propensity of radon gas accumulation in structures.

Radon sampling was not conducted as part of this assessment. Review of the US EPA Map of Radon Zones places the subject property in Zone 3. Based upon the radon zone classification, radon is not considered to be a significant environmental concern.

6.3.4 Lead in Drinking Water

According to available information, a public water system operated by the County of Maui Department of Water Supply serves the subject property vicinity. However, the subject property does not appear to be connected to the municipal system. According to information obtained from the 2018 Water Quality Report, shallow groundwater beneath the subject property is not utilized for domestic purposes. According to the County of Maui Department of Water Supply and the 2018 Annual Water Quality Report, water supplied to the subject property is in compliance with all State and Federal regulations pertaining to

drinking water standards, including lead and copper. Water sampling was not conducted to verify water quality.

6.3.5 Mold

Molds are microscopic organisms found virtually everywhere, indoors and outdoors. Mold will grow and multiply under the right conditions, needing only sufficient moisture (e.g.in the form of very high humidity, condensation, or water from a leaking pipe, etc.) and organic material (e.g., ceiling tile, drywall, paper, or natural fiber carpet padding).

Due to the lack of development, mold was not considered within the scope of this assessment

6.4 Adjacent Property Reconnaissance

The adjacent property reconnaissance consisted of observing the adjacent properties from the subject property premises. No items of environmental concern were identified on the adjacent properties during the site assessment, including hazardous substances, petroleum products, ASTs, USTs, evidence of releases, PCBs, strong or noxious odors, pools of liquids, sumps or clarifiers, pits or lagoons, stressed vegetation, or any other potential environmental hazards.

7.0 FINDINGS AND CONCLUSIONS

Findings

A *recognized environmental condition (REC)* refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: due to release to the environment; under conditions indicative of a release to the environment; or under conditions that pose a material threat of a future release to the environment. The following was identified during the course of this assessment:

- The subject property was historically used for agricultural purposes. There is a potential that typical agricultural chemicals such as pesticides, herbicides, and fertilizers may have been used and stored on-site. Because residential development is proposed, the possible historical use of agricultural chemicals use is a REC.

A *controlled recognized environmental condition (CREC)* refers to a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. The following was identified during the course of this assessment:

- Partner did not identify any controlled recognized environmental conditions during the course of this assessment.

A *historical recognized environmental condition (HREC)* refers to a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls. The following was identified during the course of this assessment:

- Partner did not identify any historical recognized environmental conditions during the course of this assessment.

An *environmental issue* refers to environmental concerns identified by Partner, which do not qualify as RECs; however, warrant further discussion. The following was identified during the course of this assessment:

- Partner observed a possible water well located in a wooden shed structure. The presence of this well provides access to groundwater, which could result in future environmental exposure and liabilities.
- The drainage ditch along or adjacent to the eastern perimeter is a mapped Riverine habitat according to the United States Fish & Wildlife Service. A comprehensive wetlands survey would be required in order to formally determine actual wetlands on the subject property.

Conclusions, Opinions and Recommendations

Partner has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of Southeast Corner of Kahekili Highway & Waiehu Beach Road in

Wailuku, Maui County, Hawaii (the "subject property"). Any exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

This assessment has revealed evidence of a recognized environmental condition and environmental issues in connection with the subject property. Based on the conclusions of this assessment, Partner recommends the following:

- Prior to residential development, a limited subsurface investigation should be conducted in order to determine the presence or absence of historical agricultural chemicals onsite.
- The possible water well located in the wooden shed structure should be decommissioned in accordance with application regulations.

8.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Partner has performed a Phase I Environmental Site Assessment of the property located at Southeast Corner of Kahekili Highway & Waiehu Beach Road in Wailuku, Maui County, Hawaii in conformance with the scope and limitations of the protocol and the limitations stated earlier in this report. Exceptions to or deletions from this protocol are discussed earlier in this report.

By signing below, Partner declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR §312. Partner has the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. Partner has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared By:

Josh Barton
Environmental Professional

Reviewed By:

Jared Eudell
Senior Author

9.0 REFERENCES

Reference Documents

American Society for Testing and Materials, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, ASTM Designation: E1527-13.

Environmental Data Resources (EDR), Radius Report, June 2020

Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, accessed via internet, June 2020

United States Department of Agriculture, Natural Resources Conservation Service, accessed via internet, June 2020

United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, accessed via the internet, June 2020

United States Environmental Protection Agency, EPA Map of Radon Zones (Document EPA-402-R-93-071), accessed via the internet, June 2020

United States Geological Survey, accessed via the Internet, June 2020

United States Geological Survey Topographic Map, 7.5 minute series, accessed via internet, June 2020

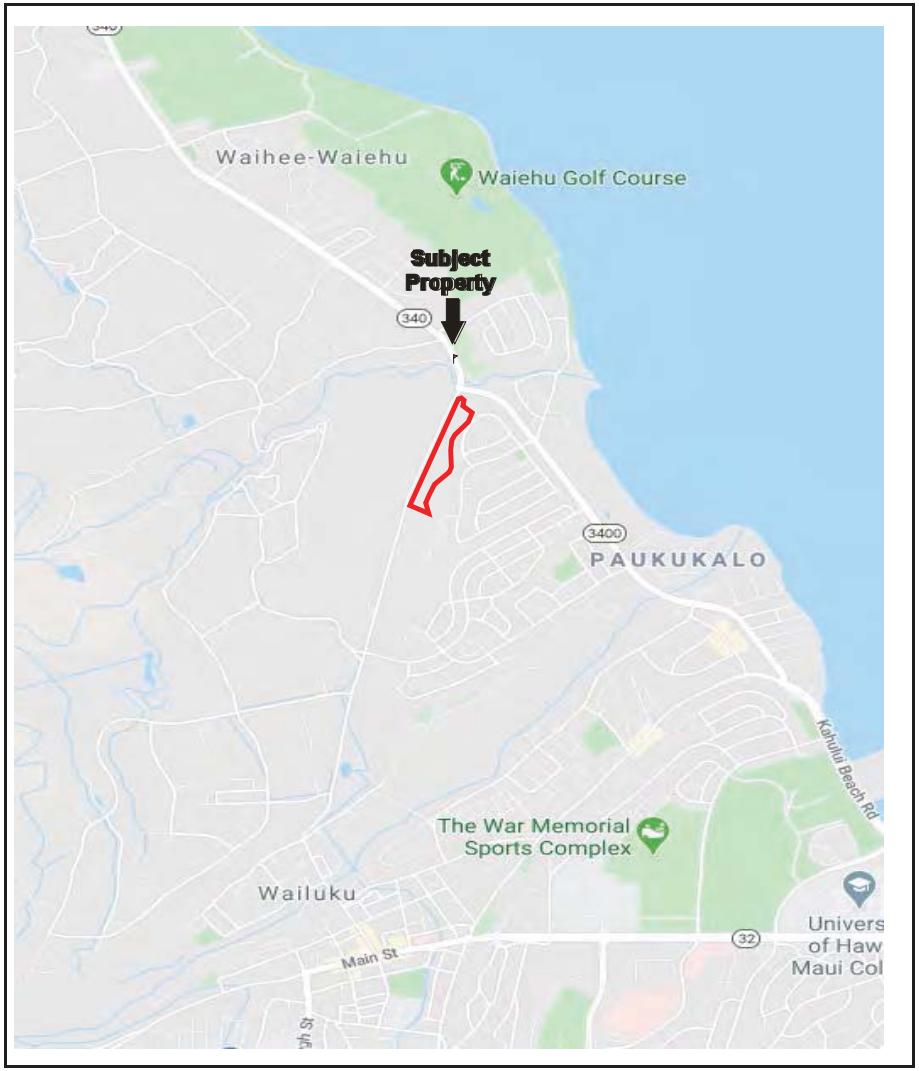
FIGURES

1 SITE LOCATION MAP

2 SITE PLAN

3 TOPOGRAPHIC MAP

PARTNER



N

Drawing Not To Scale

KEY:
Subject Property

FIGURE 1: SITE LOCATION MAP
Project No. 20-283903.1

PARTNER

N

GROUNDWATER FLOW

KEY:
Subject Property
Well Pump and Storage Tank

FIGURE 2: SITE PLAN
Project No. 20-283903.1

PARTNER

N

USGS 7.5 Minute *Wailuku, Hawaii* Quadrangle
Created: 2013

KEY:
Subject Property

FIGURE 3: TOPOGRAPHIC MAP
Project No. 20-283903.1

PARTNER

APPENDIX A: SITE PHOTOGRAPHS

PARTNER

1. View of subject property grounds looking south

2. View of subject property grounds looking west

3. View of subject property grounds looking north

4. View of subject property grounds looking south

5. Storage containers at south end of property

6. Water collection tanks

7. Possible water well

8. Water storage totes

9. Aquaponic beds

10. Debris

11. Portable shed building

12. Property grounds with thatch roof structure

13. East side of property looking south

14. Property grounds with thatch roof structure

15. Ditch with vegetation growth along north and eastern perimeters of property

16. Subject property grounds looking south

17. Subject property ground with portable shed structure

18. Adjacent property to the north

19. Adjacent property to the west

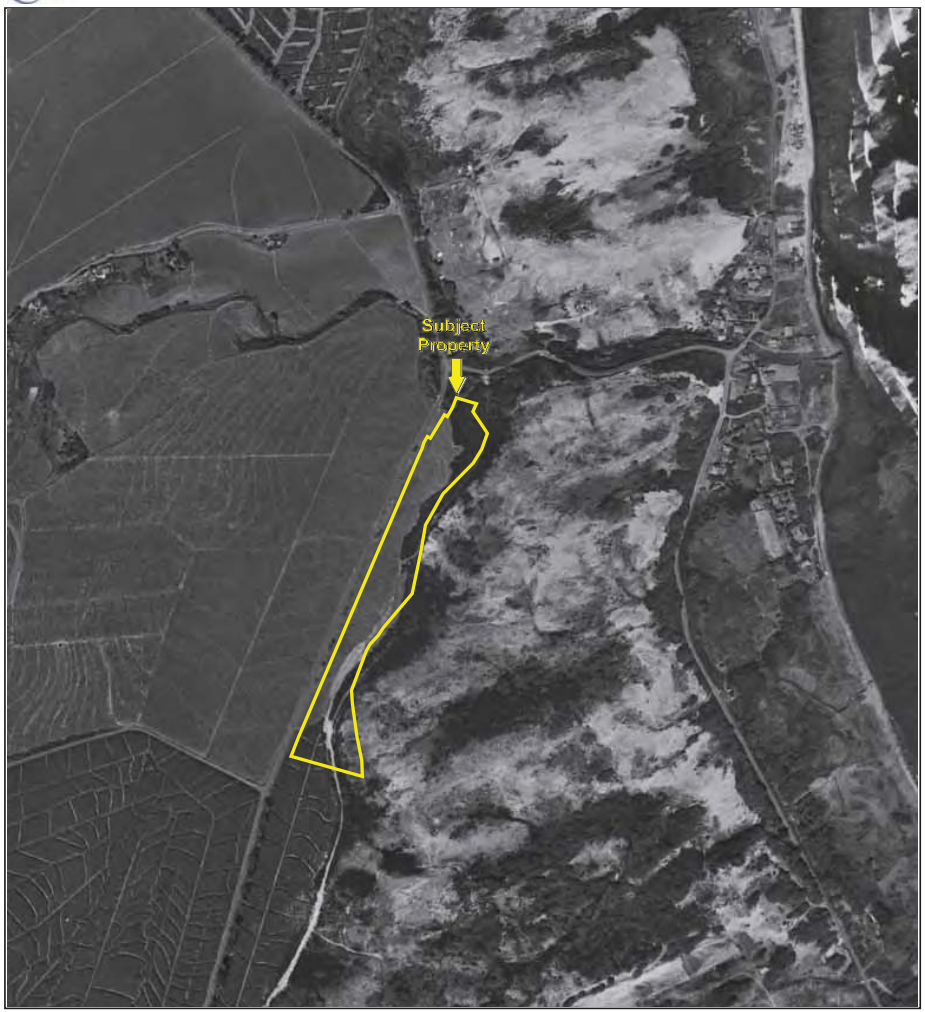
20. Adjacent intersection to the northwest

21. Adjacent properties to the east

22. Adjacent property to the south

APPENDIX B: HISTORICAL/REGULATORY DOCUMENTATION

Aerial Photograph Year: 1950



500 1000 2000

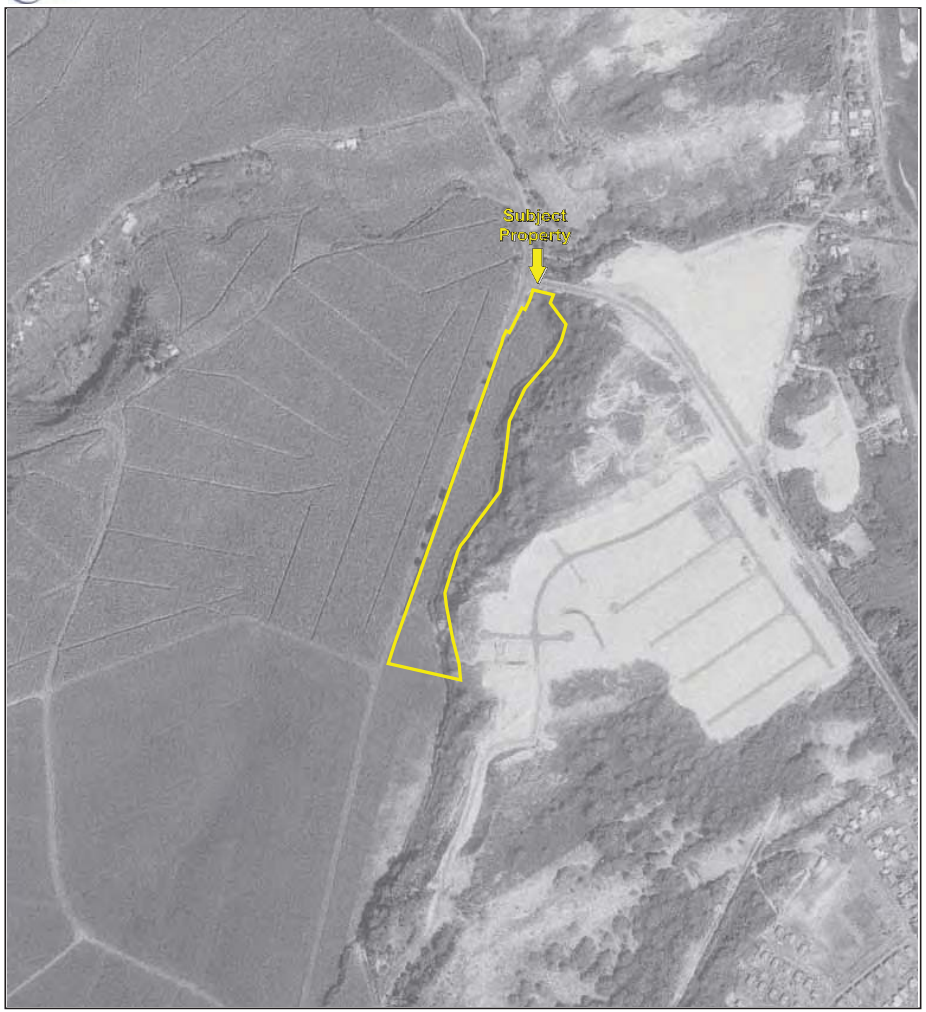
N

Key: Subject Property

APPENDIX B: AERIAL PHOTOGRAPHS
Project No. 20-283903.1

PARTNER

Aerial Photograph Year: 1976



500 1000 2000

N

Key: Subject Property

APPENDIX B: AERIAL PHOTOGRAPHS
Project No. 20-283903.1

PARTNER

SE Corner of Kahekili Hwy & Waiehu Beach Rd.

SE Corner of Kahekili Hwy & Waiehu Beach Rd.

Wailuku, HI 96793

Inquiry Number: 6084367.3

June 05, 2020

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

06/05/20

Site Name:	Client Name:
SE Corner of Kahekili Hwy & W	Partner Engineering and Science, Inc.
SE Corner of Kahekili Hwy & W	2154 Torrance Blvd, Suite 200
Wailuku, HI 96793	Torrance, CA 90501-0000
EDR Inquiry # 6084367.3	Contact: Cindy Sallee

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The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 1355-4825-BC41

PO # 20-283903.1

Project 20-283903.1

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 1355-4825-BC41

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

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SE Corner of Kahekili Hwy & Waiehu Beach Rd.
SE Corner of Kahekili Hwy & Waiehu Beach Rd.
Wailuku, HI 96793

Inquiry Number: 6084367.5
June 05, 2020

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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Executive Summary

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City Directory Images

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with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2017	☑	☐	EDR Digital Archive
2014	☑	☐	EDR Digital Archive
2010	☑	☐	EDR Digital Archive
2005	☑	☐	EDR Digital Archive
2000	☑	☐	EDR Digital Archive
1995	☑	☐	EDR Digital Archive
1992	☑	☐	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

SE Corner of Kahekili Hwy & Waiehu Beach Rd.
Wailuku, HI 96793

Year	CD Image	Source
KAHEKILI HWY		
2017	pg A2	EDR Digital Archive
2014	pg A6	EDR Digital Archive
2010	pg A11	EDR Digital Archive
2005	pg A16	EDR Digital Archive
2000	pg A20	EDR Digital Archive
1995	pg A23	EDR Digital Archive
1992	pg A27	EDR Digital Archive
WAIEHU BCH RD		
1995	pg A24	EDR Digital Archive
WAIEHU BEACH RD		
2017	pg A4	EDR Digital Archive
2014	pg A9	EDR Digital Archive
2010	pg A14	EDR Digital Archive
2005	pg A18	EDR Digital Archive
2000	pg A21	EDR Digital Archive
1995	pg A26	EDR Digital Archive
1992	pg A28	EDR Digital Archive

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2017

1913	BECRAFT, JAMIE J
1925	JOHNSON, JEFFREY R
1933	KAAHUI, KAHEKILI
1939	YIP, WARREN M
1945	ANDRIN, DAVID
1953	ANAKALEA, ELIZABETH K
1956	KAMAUNU, P
1957	HILARIO, PEDRO A
1975	NAKAMURA, KARL M
1980	BALBERDI, EVELYN J
1987	YAMANAKA, KEITH K
1991	MANGLICMOT, WESLEY F
1994	SHEEHAN, CLAIRE M
1999	CONNORS, MELISSA E
2003	PIANO, JULIA S
2007	HARADA, CLIFFORD H
2011	FUKUNAGA, MELVIN T
2012	BORTZ, WADE R
2021	PERREIRA, FRANK
2025	LAVAKA, AKESA
2041	DADEZ, MARCELO S
2042	JOYO, LAWRENCE J
2053	TAYLAN, SERVANDO
2062	PALAKIKO, RICHARD
2068	PARIS, J
2069	TOM, PAMELA K
2070	PATINA INTERIOR DESIGN
	VASSILICOS, STEFANIE A
2072	AGPAOA, HOKUALII
2075	KAILIHIWA, VALERIE U
2080	APO, PAUL W
2108	KINA, QUENTIN L
2110	BIO, ELMER C
	MOHAN, SHAUN
2120	GOO, JEFF M
2155	IDEOKA, MERLE Y
2161	WALLACE, JOSEPH M
2239	TEXEIRA, NOEL S
2315	CHANG, CORDELL
2345	SUZUKI, SHAUNA
2525	BROWN MD D
	BROWN, DAVID H
	DAVID H BROWN MD
2535	NAGANUMA, SCOTT
2555	TAMALIS, MICHAEL A
2585	KOKI, LAWRENCE T
2609	CABILES, DERRICK
	SINGER, DENNIS
2611	ALO, CLARENCE H
2644	FREITAS, WILLIAM B

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2017 (Cont'd)

3220	MENDES, ALBERT L
	MENDES, ERNEST R
3225	NILES, WILLIAM R
3400	MEDEIROS, KELLY M
	MENDES, MELVIN A
	NOBRIGA, RANDY K
	SEELY, JAY T
3450	CAMP, MALUHIA
3460	MENDES, ALBERT
3499	HOOPII, RICHARD K
3500	SANTOS, JOANN
3530	FERREIRA, ANGELESE
	MENDES RANCH & TRAIL RIDES
3600	PERREIRA, WILLIAM J
3656	ANDRADE, KAWAHAMAE D
3660	TEXEIRA, KELLEY K
3700	CURTIS, BRENDA
4625	MOLINA, MARCO
4890	BANDIT TRUCKING

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2017

200	BB TRUCKING & STORAGE
	LYNDEN INTERNATIONAL
	VOLVO
240	ALOHA HOUSE INC
250	ABC CORPORATION
	HISAMOTO BODY & FENDER INC
	MIYAKE CONCRETE ACCESSORIES INC
	R P L EQUIPMENT LLC
253	RED ROAD TELECOM
263	DEREGO, BRADLEY S
	DUARTE, LEONA P
270	GIULIETTA SWENSON PSYD
	HAWAII BEHAVIORAL HEALTH LLC
	JON BETWEE MD
	KARAOKE COOL II
	MAUI CHAMP CLINIC INC
	MAUI TRIBE PRODUCTIONS
	RAYS DELI & LOUNGE
	SANDYS LOUNGE
	SHELL
	STATE OF HAWAII
	SUPER STOP
	SUSAN BROWN MA
	THE IRIS BEAUTIQUE
	WATERCRESS
286	DELATORRE, RICARDO D
293	PARTIN, JESSICA
295	HIRAIDE, JAY J
301	SATO, IWAO A
321	ANDAYA, ANDREW V
	CORRALES, MARIO
	HONOKAUPU, LINDA
324	PEROS REAL ESTATE APPRAISALS
	PEROS REALTY COMPANY INC
331	GRIMES, JEFFERY L
341	AGONOY, REYNALDO M
344	KAILI, SHEREEN
	KAUHAAHAA, CORI
351	RODRIGUES, ALFRED J
358	OCEAN FRONT SCREENS
	TUMBAGA, JOHNATHEN
361	MAEDA, HEIDI M
371	YATSUSHIRO, JANE A
372	TOMS MINI MART
380	ALEJANDRO, JAN B
381	PANALIGAN, ADAM S
	SAKUTORI, NANCY Y
390	AGCAOILI, FREDDIE T
391	HERMAN, GARY J
403	TAKABAYASHI, EARL

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2017 (Cont'd)

409	KAWAMOTO, ERIC L
427	FRANCISCO, MICHAEL A
432	DOOR OF FAITH CHURCHWAILUKU
	TENGAN, JUNE J
435	BELLA, ELLA
	SANTOS, JOYCE
	TACDERAN, JUSTINIANO C
446	DRAPIZA, RAVIDA D
	RAVIDA, DOMINGO D
464	IGLESIA NI CRISTO
600	BADILLO, MARCOS
	NEFULDA, LORENZO K
603	PLUNKETT, JOSHUA
616	RUIZ, ARTHUR A
621	SADO, DOUGLAS M
628	FRANCO, BLISS K
	FRANCO, CARISSA E
	FRANCO, DAVID U
	FRANCO, JOE
	HOWLAND, BRIAN D
633	HERRICK, TIM K
634	ANDERSON, GERALD C
	DAQUIS, KATHLEEN C
	GREENWOOD, BRUCE W
	GREENWOOD, JULIA A
	MACMILLIN, AARON
	SNIFFEN, SHANNAN L
641	WAIPA, T
647	HIMALAYA, TRENSON
650	YI, GIOUNG
655	HOOKANO, STEPHANIE
658	HANO, ELEANOR K
	TADAKI, ALMA K
663	HOKOANA, LUI K
668	GAUTUSA, SOLI
	HAYES, BRENT C
	MAGANA, VICENTE G
	ROSAGA, LATOYA
781	STANT, HENRY H

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2014

338	KAIWI, JULIA H
1913	BECRAFT, JAMIE J
1919	DIAS, WILFRED N
1925	APERTO, MICHAEL
1933	TAPURO, NICKY N
1939	YIP, WARREN M
1945	ANDRIN, DAVID
1953	ANAKALEA, VICTORIA L
1956	KAMAUNU, P
1957	HILARIO, PEDRO A
1961	BASBAS, LAURALEE
1962	CARRIER, SHANNON J
1975	NAKAMURA, KARL M
1980	BALBERDI, EVELYN J
1981	OCCUPANT UNKNOWN,
1987	YAMANAKA, KEITH K
1988	OCCUPANT UNKNOWN,
1991	MANGLICMOT, WESLEY F
1994	SHEEHAN, CLAIRE M
1999	PARESA, GEORGE N
2003	PIANO, JULIA S
2005	TEXEIRA, JERRY
2007	HARADA, CLIFFORD H
2011	FUKUNAGA, MELVIN T
2012	BORTZ, WADE R
2025	LAVAKA, AKESA
2035	TARIO, CAROL
2038	OHTA, CHRIS
2041	DADEZ, MARCELO S
2042	VALLESTEROS, ALEXANDER
2047	SALTIBAN, WALFREDO J
2048	KELLY, CHRISTOPHER
2053	TAYLAN, SERVANDO
2062	PALAKIKO, KANANI
2068	BROTHERTON, IVY
2069	TOM, PAMELA K
2070	WUERTZ, STEFANIE
2072	OCCUPANT UNKNOWN,
2075	KAILIHIWA, VALERIE U
2078	OCCUPANT UNKNOWN,
2080	APO, ANDREW
2108	KINA, QUENTIN L
2110	BIO, ELMER C
2120	GOO, AVERY
	GOO, JAMES
	GOO, JEFF M
2155	BIVINS, TANYA L
	CARLES, WILLIAM K
	IDEOKA, MERLE Y
2161	WALLACE, JOSEPH M

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2014 (Cont'd)

2229	SARASIN, BRYAN C
2239	TEXEIRA, NOEL S
2295	KANA, JACOB H
2299	OCCUPANT UNKNOWN,
2315	CLELAND, NING W
2335	NAGANUMA, MAUREEN
2525	BROWN DAVID H MD
	BROWN, DAVID H
	OCCUPANT UNKNOWN,
2535	NAGANUMA, STANLEY A
2555	TAMALIS, MICHAEL A
2570	OCCUPANT UNKNOWN,
2585	KOKI, LAWRENCE T
2609	OCCUPANT UNKNOWN,
2611	ALO, CLARENCE H
	OCCUPANT UNKNOWN,
2644	FREITAS, WILLIAM B
2672	CERIZO, FRANCISCO A
3220	MENDES, ALBERT L
	WIGGERS, MARVIN
3225	NILES, WILLIAM R
3400	MENDES, MELVIN A
	SEELY, JAY T
3450	CAMP, MALUHIA
3473	SATO, RONALD
3484	COSTON, JOHN K
3492	DUDOIT, KARLEE
3499	KENOLIO, HERBERT
3500	SANTOS, JOANN
3530	MENDES RANCH & TRAIL RIDES INC
	MENDES, ALLAN J
3600	PERREIRA, WILLIAM J
3656	ANDRADE, KAWAHAMAE D
3658	DUNN, COLIN A
3660	KAILIEHU, ALFRED
	TEXEIRA, KELLEY K
3700	WINN, PETER
4625	MOLINA, MARCO
4890	FLINT, MICHAEL T
4892	OCCUPANT UNKNOWN,
4896	STROJ, DRAZENA
4900	GRAY, JEFF J
	OCCUPANT UNKNOWN,
	RODRIGUES, ROBERT
4910	RODRIGUES, ANTHONY J
4920	ANCHETA, ROSENDO V
4933	KERR, EDGAR D
4980	WEAVER, FLOYD E
5030	OCCUPANT UNKNOWN,
	TURNBULL STUDIOS & SCULPTURE GARDEN

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2014 (Cont'd)

7465 OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2014

200 BB TRUCKING & STORAGE
LYNDEN INTERNATIONAL
MAUI GREENS MARKET INC
PYAWAFAY, DARWIN
240 ALOHA HOUSE INC
250 ABC CHEMICAL CORPORATION
HISAMOTO BODY & FENDER INC
MIYAKE CONCRETE ACCESSORIES INC
R P L EQUIPMENT LLC
253 BOWMAN TERMITE & PEST MANAGEMENT LLC
270 FINANCE INSURANCE LTD
HALEAKALA GROUP LLC
HAWAII BEHAVIORAL HEALTH LLC
IRIS BEAUTIQUE THE
KARAOKE COOL II
MAUI CHAMP CLINIC INC
MAUI CHILD & ADOLESCENT MENTAL HEALT
MAUI TRIBE PRODUCTIONS
MAUI WOWIE INC
RAYS DELI & LOUNGE
SALON BY GINGER
SANDYS LOUNGE
STATE OF HAWAII GOVERNMENT
SUPER STOP
SWENSON GIULIETTA MD
WAIEHU SHELL
WATERCRESS
273 COSARE, DARREL D
293 FOSBINDER, JAMES H
OCCUPANT UNKNOWN,
295 HIRAIDE, JAY J
298 OCCUPANT UNKNOWN,
301 SATO, IWAO A
310 OCCUPANT UNKNOWN,
321 ANDAYA, ANDREW V
324 PEROS REAL ESTATE APPRAISALS
PEROS REALTY COMPANY INC
331 OCCUPANT UNKNOWN,
341 AGONOY, REYNALDO M
351 RODRIGUES, ALFRED J
358 NAKAYAMA, MILES
371 YATSUSHIRO, JANE A
372 TOMS MINI MART
380 SYLVA, BRANDON L
381 PANALIGAN, ADAM S
SAKUTORI, NANCY Y
390 AGCAOILI, FREDDIE T
391 HERMAN, GARY J
OCCUPANT UNKNOWN,
394 OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2014 (Cont'd)

403	TAKABAYASHI, EARL
409	KAWAMOTO, ERIC S
415	OCCUPANT UNKNOWN,
420	MORNINGSTAR, MATILDA
421	SPELLICY, TIMOTHY
427	FRANCISCO, MICHAEL A
432	DOOR OF FAITH CHURCHWAILUKU
	TENGAN, JUNE J
434	OCCUPANT UNKNOWN,
435	BELLA, ELLA
	GUILLERMO, MERCEDES
	SABLE, JEUS
	STAMPER, VILMA
	TACDERAN, JUSTINIANO C
446	RABIDA, DOMINGO D
464	IGLESIA NI CRISTO
	VERGARA, GLORIA
480	OCCUPANT UNKNOWN,
484	OCCUPANT UNKNOWN,
580	EUGENIO, GILBERT
600	BADILLO, MARCOS
	FAULVE, DANILO S
	NEFULDA, LORENZO K
603	HOOPAI, MELECIA K
616	BUCHWALD, JEFFREY A
	OCCUPANT UNKNOWN,
621	SADO, JOSHUA
625	OCCUPANT UNKNOWN,
628	GURNEY, RENEE
	LAVAKA, TEVITA N
	YOUNG, KAREN B
633	ROCK, BRANDON
634	DAQUIS, KATHLEEN C
	HAMILTON, VAN U
	MACMILLIN, AARON
	OCCUPANT UNKNOWN,
641	CHUN, DEBORAH G
647	HIMALAYA, TRENSON
658	HANO, ELEANOR K
	OCCUPANT UNKNOWN,
	TADAKI, ALMA K
663	HOKOANA, LUI K
668	CRUZ, MICHAEL C
	MAGANA, VICENTE G
	ROSAGA, LATOYA
781	STANT, HENRY H
810	CHURCH OF CHRIST MAUI
	WATTS, TOM T

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2010

338	KAIWI, JULIA H
1905	MURAKAMI, PARIS J
1913	OCCUPANT UNKNOWN,
1919	DIAS, WILFRED N
1925	APERTO, MICHAEL
1933	OCCUPANT UNKNOWN,
1939	YIP, WARREN M
1945	ANDRIN, DAVID
1949	OCCUPANT UNKNOWN,
1953	ANAKALEA, RAMSAY K
1956	MOKU, SARAH E
1957	HILARIO, PEDRO A
1961	OCCUPANT UNKNOWN,
1962	MEDEIROS, KANANI N
1980	BALBERDI, EVELYN J
1988	LAI, DARLENE L
1991	MANGLICMOT, WESLEY F
1999	PARESA, GEORGE N
2003	AMBROSE, LAURITA P
2005	OCCUPANT UNKNOWN,
2007	HARADA, CLIFFORD H
2011	FUKUNAGA, MELVIN T
2012	ACANG, IMELDA
2025	SUGIKI, MILTON S
2035	TARIO, CAROL
2038	OHTA, CHRISTOPHER
2041	DADEZ, MARCELO S
2042	VALLESTEROS, ALEXANDER
2047	SALTIBAN, WALFREDO J
2048	CORREA, EDITH H
2053	TAYLAN, SERVANDO
2062	OCCUPANT UNKNOWN,
2068	OCCUPANT UNKNOWN,
2069	TOM, CLAYTON N
2070	OCCUPANT UNKNOWN,
2072	AGUINALDO, JOEL P
2075	KAILIHIWA, VALERIE U
2085	NUNES, CHARLES J
2108	AYERS, ALAMA
2110	KINA, DAVIDA P
2120	GOO, DIANNAH E
	GOO, JEFFREY M
	GOO, WILLIE
2125	WAIHEE SCHOOL
2155	BIVINS, TANYA L
2161	KAILIEHU, A
2229	SARASIN, BRYAN C
2239	TEXEIRA, NOEL S
2295	KANA, JACOB H
2315	CHANG, CORDELL

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2010 (Cont'd)

2315	LOKELAINI OHANA
2345	APO, GORDAN K
2525	BROWN, DAVID H
	KOEBBERLING, KATHLYN
2535	BREWSTER, MITZI P
2555	CAMPEN, ROBERT
2570	KANUHA, CROSBY L
2575	OCCUPANT UNKNOWN,
2580	ARAKAWA, JANET T
2585	KOKI, LAWRENCE T
2609	OCCUPANT UNKNOWN,
2611	BENIOFF, LINDA
	BLANCHE, MICHAEL L
2644	FREITAS, KAU Z
3220	CORDEIRO, CLARENCE F
	MENDES, ERNEST R
	PAISHON, DAYTON K
3225	NILES, WILLIAM R
3400	LEMA, C
	MAUI FRESH FISH
	MEDEIROS, KELLY
	MENDES, MELVIN A
3450	OCCUPANT UNKNOWN,
3460	JOHNSON, A
	PRISTINE CLEANING ON MAUI
3473	SATO, RONALD
3476	CHANG, CHRISTOPHER K
3483	NAKOA, DOREEN
3484	COSTON, JOHN K
3499	HAWAIIAN CONGREGATIONAL CHURCH
	KENOLIO, HERBERT
3500	CHRISTENSEN, HAROLD J
3530	MENDES RANCH & TRAIL RIDES
	MENDES, ALLAN J
3600	PERREIRA, WILLIAM J
3658	DUNN, COLIN A
3660	ANDRADE, KAWAHAMAE K
	KAILIEHU, INA
4625	MOLINA, MARCO
4890	BANDIT TRUCKING
	ROCK, ANDREA
4892	RODRIGUES, ANTHONY J
4896	STROJ, ROBERT
4900	AJR LIMITED
	GRAY, JEFF J
	OCCUPANT UNKNOWN,
4910	RODRIGUES, ANTHONY J
4920	ANCHETA, ROSENDO V
4933	KERR, EDGAR D
4980	WEAVER, FLOYD E

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2010 (Cont'd)

5030	OCCUPANT UNKNOWN,
	TURNBULL STUDIOSSCULPTURE GDN

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2010

200	ALL ISLAND EQUIPMENT
	HISCO INC
202	JEGO, YVES P
250	ABC CORP
	ALOHA HOUSE INC
	HISAMOTO BODY & FENDER INC
	MIYAKE CONCRETE ACCESSORIES
	RPL EQUIPMENT LLC
253	BOWMAN TERMITE & PEST CONTROL
263	BISSEN-MELTON, DEBRA
270	BROWN SUSAN
	CHILD & ADOLESCENT MENTAL HLTH
	DONNAS LOUNGE
	ENDERBODIES DAY SPA
	EPIC INC
	IRIS BEAUTIQUE
	JACKIES HAIR STUDIO LLC
	JON BETWEE LTD
	MAUI CHAMP CLINIC INC
	MAUI FIRST TO WORK
	PATCH PEOPLE ATTENTIVE TO CHLD
	RAYS DELI & LOUNGE
	SUPER STOP
	SWENSON GIULIETTA PHD
273	KELIIHOOMALU, JEROME K
281	SASSY ELEGANCE BOUTIQUE
293	FOSBINDER, JAMES
	OCCUPANT UNKNOWN,
	TREVINO, RICHARD C
295	CARVALHO, ISABELLE F
301	SATO, IWAO A
302	VERSOLAS PLATE LUNCH
310	OCCUPANT UNKNOWN,
311	FOSBINDER, JAMES H
321	ANDAYA, ANDREW V
	LADERA, MARIANNE K
324	PEROS REAL ESTATE APPRAISALS
331	YANAGI, IRENE S
344	CARROLL, PUALANI
351	RODRIGUES, ALFRED J
358	OCEAN FRONT SCREENS
	WHITNEY, KEONI
361	OCCUPANT UNKNOWN,
371	YATSUSHIRO, JANE A
372	TOMS MINI MART
380	SYLVA, BRANDON L
381	SAKUTORI, NANCY Y
391	OCCUPANT UNKNOWN,
394	OCCUPANT UNKNOWN,
403	TAKABAYASHI, RICHARD Y

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2010 (Cont'd)

415	OCCUPANT UNKNOWN,
420	MORNINGSTAR, MATILDA
421	NAEOLE, JOSEPH K
427	FRANCISCO, MICHAEL A
432	DOOR OF FAITH CHURCHWAILUKU
	ISAIAH ACADEMY FOR EXCELLENCE
	TENGAN, JUNE J
434	OCCUPANT UNKNOWN,
435	GUILLERMO, MERCEDES
	STAMPER, VILMA
	TACDERAN, JUSTINIANO C
446	RAVIDA, ROLAND D
464	IGLESIA NI CRISTO
	IGLESIA, NI
484	OCCUPANT UNKNOWN,
580	SMITH, LORIN A
600	NEFULDA, LORENZO K
	STAUFFER, JONATHAN
603	PLUNKETT, JAMES J
616	BUCHWALD, JEFFREY A
	OCCUPANT UNKNOWN,
	RUIZ, ARTHUR A
621	SADO, DOUGLAS M
625	OCCUPANT UNKNOWN,
628	BROWN, ERIC K
	LAVAKA, TEVITA N
	TAUKEIAHO, UNALOTO
	YOUNG, KAREN
633	MASUDA, KAZUNORI
634	ALIPIO, TEODORO R
	BAISA, BRADLEY
	MACMILLIN, AARON
641	CHUN, DEBORAH G
647	HERNANDEZ, NOEMI
655	HAO, JACK K
658	HANO, ELEANOR K
663	HOKOANA, LUI
668	CRUZ, MICHAEL C
	GAUTUSA, CAROLYN
	MAGANA, VICENTE G
	RODRIGUES, FRANK C
781	STANT, HENRY H
810	CHURCH OF CHRIST MAUI

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2005

140	TAMALIS, MICHAEL
146	THOMPSON, GARY
1905	MURAKAMI, JAMES T
1913	BECRAFT, JAMIE J
1919	KAHAE, DEANNA L
1925	GALARITA, JOSEPH T
1939	YIP, GARY S
1945	ANDRIN, DAVID
1949	OCCUPANT UNKNOWN,
1953	ANAKALEA, MICAH M
1956	OCCUPANT UNKNOWN,
1957	HILARIO, PEDRO A
1961	KAHOLOKULA, JARED L
1962	DEMATTOS, RITA
1980	BALBERDI, EVELYN J
1988	LAI, MILTON B
1991	MANGLICMOT, WESLEY A
1994	PASCUA, KATHERINE E
1999	PARESA, GEORGE N
2003	OCCUPANT UNKNOWN,
2005	OCCUPANT UNKNOWN,
2007	HARADA, MITSUO W
2011	FUKUNAGA, MELVIN T
2012	OCCUPANT UNKNOWN,
2017	OSHIRO, SCOTT
2021	OCCUPANT UNKNOWN,
2025	SUGIKI, MILTON S
2035	OCCUPANT UNKNOWN,
2038	OHTA, FRANCIS M
2041	DADEZ, MARCELO S
2047	SALTIBAN, DARRELL J
2048	OCCUPANT UNKNOWN,
2062	MEDEIROS, JAMES A
2068	ACOB, SARAH C
2069	TOM, CLAYTON N
2075	KAILIHIWA, VALERIE U
2078	OCCUPANT UNKNOWN,
2080	OCCUPANT UNKNOWN,
2108	MARTIN, DORIS
2120	GOO, EVELYN B
	GOO, JEFFREY
	OCCUPANT UNKNOWN,
2125	MAUI SCHOOL DISTRICT
2155	CARLES, WILLIAM K
	OCCUPANT UNKNOWN,
2161	OCCUPANT UNKNOWN,
2295	KANA, JACOB H
2525	BROWN, DAVID H
2535	OCCUPANT UNKNOWN,
2555	TAMALIS, MICHAEL A

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2005 (Cont'd)

2570	KANUHA, CROSBY L
2575	OCCUPANT UNKNOWN,
2585	KOKI, LAWRENCE T
2609	OCCUPANT UNKNOWN,
2611	BENIOFF, LINDA
	OCCUPANT UNKNOWN,
2644	FREITAS, KAU Z
3220	CORDEIRO, CLARENCE F
	OCCUPANT UNKNOWN,
3225	NILES, WILLIAM
3400	MENDES, MELVIN A
	OCCUPANT UNKNOWN,
3460	DAY, MARIA
3470	BONNELL, JACOB
3476	CHANG, CHRISTOPHER K
	KAUKINI FARM
3483	NAKOA, DOREEN
3484	COSTON, JOHN K
3492	PALEKA, KALANI
3499	OCCUPANT UNKNOWN,
3500	KUAMOO, MARGARET
3520	HOOPII, RICHARD K
3530	MENDES TRAIL RIDES
	MENDES, ALLAN J
4890	BANDIT TRUCKING
	OCCUPANT UNKNOWN,
4900	AJR LIMITED
	GRAY, JEFF
	OCCUPANT UNKNOWN,
	RODRIGUES, ANTHONY J
4980	OCCUPANT UNKNOWN,
5030	OCCUPANT UNKNOWN,
	TURNBULL STUDIOS & SCULPTURE GARDEN

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2005

200	ALOHA TEAK N TINGS
	ALOHA TEAK N TINGS LLC
	HAWAII EXPRESS MOVING SERVICES
	PREMIER RELOCATION & TRANSPORT
202	KAYA, KYOHEE
250	ABC CORP
	KRYSER CORP
	MY MOTORCYCLE
	R P L EQUIPMENT LLC
	STRUCTURAL CON BNDING RSTRTN
253	BOWMAN TERMITE & PEST CONTROL
	OCCUPANT UNKNOWN,
263	BISSEN, RUDY
270	AMERICAN INCOME LIFE INSUR
	BEN EMPL & SUPP SERVICES DIVISION
	HALEAKALA GROUP LLC
	INSIGHTS TO SUCCESS FIRST TO W
	IRIS BEAUTIQUE THE
	LEGACY MORTGAGE INC
	MAUI PACIFIC INC
	PATCHPEOPLE ATTENTIVE TO CHILDREN
	RAYS DELI & LOUNGE INC
	SPORTSWEAR MAUI INC
	SUPERSTOP
273	OCCUPANT UNKNOWN,
286	BURROWS, EVANETTE B
293	OCCUPANT UNKNOWN,
295	NOCK, BENJAMIN
298	YOSHIDA, WAYNE
301	SATO, IWAO A
302	CAOILE VARIETY STORE
310	OCCUPANT UNKNOWN,
321	ANDAYA, P V
324	PEROS REALTY CO INC
331	OCCUPANT UNKNOWN,
344	OCCUPANT UNKNOWN,
351	JOANNS BARBERING & STYLING
	RODRIGUES, ALFRED J
358	MIN, ROBERT K
371	YATSUSHIRO, TAMIO
372	TOMS MINI MART
380	SYLVA, BRANDON L
381	SAKUTORI, NANCY Y
391	BARUT, RODNEY
394	OCCUPANT UNKNOWN,
403	TAKABAYASHI, RICHARD Y
415	TATEYAMA, KENJI T
427	FRANCISCO, MICHAEL A
432	DOOR OF FAITH CHURCH
	ISAIAH CENTER FOR EXCELLENCE

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2005 (Cont'd)

432	TENGAN BARBARA PASTOR
	TENGAN, BARBARA Y
435	PENA, EVELYN
464	OCCUPANT UNKNOWN,
484	BROOME, KIMBERLY R
580	SEVILLA, DUKE A
600	BALOALOA, FLORDELINO T
	CABATBAT, RONALD
	NEFULDA, LORENZO
	NETO, LUIZ
	SULTENFUSS, ROBERT J
	WILLIAMS, ROBIN
603	PLUNKETT, JAMES J
616	BUCHWALD, JEFFREY A
	RUIZ, ARTHUR A
621	SADO, DOUGLAS M
625	KAHOOHANOHANO, ADRIAN K
628	ANDREWS, CHRISTINE
	DELFINO, BIENVENIDO
633	CRAVALHO, JUSTIN
634	BAISA, BRADLEY
	OCCUPANT UNKNOWN,
641	CHUN, DEBORAH G
646	KAHAE, MOSES L
	KEKIWI, EDWARD J
	KIM, HYUN S
	LEE, MICHAEL
650	LEE, MICHAEL M
655	DELACRUZ, L
658	LAVALLEE, ROYAL H
663	HOKOANA, J M
668	CRUZ, MICHAEL C
	OCCUPANT UNKNOWN,
	RODRIGUES, FRANK C
781	STANT, HENRY
810	CHURCH OF CHRIST MAUI

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 2000

93	HORNTHRUN, KEO
131	KANA, JACOB
140	TAMALIS, MICHAEL
146	PATTON, SARA
	THOMPSON, GARY
1925	GALARITA, MOMI
1945	ANDRIN, DAVID
1949	OCCUPANT UNKNOWN,
1957	HILARIO, PEDRO A
1981	BAGLEY, KEVIN
1988	LAI, MILTON B
1994	OCCUPANT UNKNOWN,
2003	ASUNCION, LENORA K
2007	OCCUPANT UNKNOWN,
2012	MALARY, JAMES
	MCMEEN, KEVIN
	PEDERSEN, ROBERT H
2025	VERDADERO, FAUSTO B
2035	OCCUPANT UNKNOWN,
2038	OHTA, FRANCIS M
2041	DADEZ, MARCELO
2042	JOYO, JAMIE
2047	OCCUPANT UNKNOWN,
2075	KAILIHIWA, VALERIE U
2085	OCCUPANT UNKNOWN,
2108	MARTIN, DORIS
2110	OCCUPANT UNKNOWN,
2120	GOO, WILLIE
2525	DOLAN, MIKE R
2535	OCCUPANT UNKNOWN,
2555	OCCUPANT UNKNOWN,
2644	FREITAS, WILLIAM B
3225	NILES, C M
3483	OCCUPANT UNKNOWN,
3520	HOOPII, LEROY
3530	MENDES, ALAN

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2000

200	WATER GARDENS OF HAWAII
250	ABC CHEMICAL CORPORATION
	HISAMOTO BODY & FENDER INCORPORATED
	HONDA MAUI MOTORCYCLE
	L & M BROTHERS INCORPORATED
	MAUI REFRIGERATION SERVICE INCORPORATED SHOP
	MIYAKE CONCRETE ACCESSORIES INCORPORATED
	STRUCTURAL CONCRETE BONDING & RESTORATION INCORPORATED
253	GUSHIKEN, RICHARD K
263	BISSEN, RUDY
270	DONNAS
	OCCUPANT UNKNOWN,
273	OCCUPANT UNKNOWN,
293	SMITH, MAXFRAN
295	CARVALHO, I F
301	SATO, IWAO
302	PAUKUKALO STORE
310	TOKUNAGA, SOLOMAN
321	CLAVERIA, CARIDAD
	VALDEZ, ESTELA C
324	OCCUPANT UNKNOWN,
331	OCCUPANT UNKNOWN,
344	REBOLLEDO, HERBERT
351	RODRIGUES, ALFRED
358	OCCUPANT UNKNOWN,
361	OCCUPANT UNKNOWN,
371	YATSUSHIRO, TAMIO
372	TOMS MINI MART
380	ALEJANDRO, JAN B
390	ACIO, NELSON
391	FUKUHARA, K C
394	OCCUPANT UNKNOWN,
403	TAKABAYASHI, R
408	OCCUPANT UNKNOWN,
409	TOM, F L
415	TATEYAMA, KENJI T
421	OCCUPANT UNKNOWN,
427	CARIAGA, V
	FRANCISCO, MICHAEL
432	DOOR OF FAITH CHURCH WAILUKU
	DOOR OF FAITH CHURCH WAILUKU PARSONAGE RES
	TENGAN BARBARA PASTOR
	TENGAN, J J
435	M B SALES UNLIMITED
464	IGLESIA NI CRISTO CHURCH OF CHRIST PARSONAGE
	IGLESIA NI CRISTO CHURCH OF CHRIST WAILUKU
580	EUGENIO, GILBERT
600	NEFULDA, LORENZO
	TORRICER, JEROME L
603	OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 2000 (Cont'd)

616	LINTAO, A D
	RUIZ, OFELIA
621	DOUGS TRUCKING EQUIPMENT & REPAIR
	SADO, DOUGLAS
625	DUTRO, L K
633	OCCUPANT UNKNOWN,
634	MALIN, EDELIZA B
	OMONDANG, LE ANN
646	TOKUNAGA, MOMI
647	OCCUPANT UNKNOWN,
650	KOKA, SIOSIFA A
663	HOKOANA, LEROY
668	OCCUPANT UNKNOWN,
781	STANT, HENRY
810	CHURCH OF CHRIST MAUI

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 1995

7	ANAKALEA, LILIU
17	OCCUPANT UNKNOWNN
20	OCCUPANT UNKNOWNN
25	OCCUPANT UNKNOWNN
30	KOBAYASHI, DAVID
93	OCCUPANT UNKNOWNN
95	OCCUPANT UNKNOWNN
97	OCCUPANT UNKNOWNN
131	KANA, JACOB
139	OCCUPANT UNKNOWNN
146	LAMANTIA, T
	MARINO, D
1988	LAI, MILTON B
2012	GALLAGHER, DAVID
3056	SARASIN, BRYAN
3330	FARRELL, L
3466	STAFFORD, J

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BCH RD 1995

101	OCCUPANT UNKNOWNN
185	MAEDA, JAMES T
186	ROSS, LORENZO
250	METHENY, TERRELL
253	GUSHIKEN, JOSEPH K
263	BISSEN, RUDY
270	CHO, JOY S
280	POTTER, RODNEY F
283	ALO, LOU A
286	BARKLIE, GAYLE
293	KOAHOU, WILLIAM SR
	TACKER, BILL
295	AQUINO, B
	HAYES, GREG
301	SATO, IWAO
310	TOKUNAGA, SOLOMAN
321	CABACUNGAN, DONATO S
324	YI, YOUNG H
331	YANAGI, KEEN
341	FABELLA, ROMELL
344	REBOLLEDO, MACARIA
351	CALHOUN, THOMAS M
358	OCCUPANT UNKNOWNN
361	SUZUKI, KAZUO
380	OCCUPANT UNKNOWNN
381	SAKUTORI, BRANDON E
390	TACDERAN, L
	WILLIAMS, DAN
391	FUKUHARA, K C
394	OCCUPANT UNKNOWNN
403	TAKABAYASHI, R
408	OCCUPANT UNKNOWNN
409	WONG, GEORGE S
415	TATEYAMA, KENJI T
427	FRANCISCO, MICHAEL
432	TENGAN, J J
435	ABRAHAM, ANTONIA
	BORJA, F C
446	RAYOAN, CONNIE
	RUIZ, LORETTA
464	OCCUPANT UNKNOWNN
480	KAMEYA, CHOZEN
484	OCCUPANT UNKNOWNN
600	BALOALOA, P
	BORGES, RICHARD
	DUDOIT, M
	GOROSPE, ANGIE
	NEFULDA, M
	TORRICER, JEROME L
616	LINTAO, A D

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BCH RD 1995 (Cont'd)

616	RUIZ, OFELIA
621	OCCUPANT UNKNOWNN
625	DUTRO, KEALA
628	DELFINO, V S
633	MASUDA, ANNA
634	MALIN, EDELIZA B
	MORREIRA, FRANK A
	OMONDANG, LEANN
646	TOKUNAGA, MOMI
647	AMIZAVALLE, S
655	HAO, DRAKE P
658	DOUGLAS, DAVID J
668	DAVIS, S J
781	STANT, HENRY

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 1995

200	Y HATA & CO LTD
250	ABC CORP
	E T IGE CONSTRUCTION INC
	K RAYS SECRETARIAL SVC
	KMVI
	L & M BROTHERS INC
	MAUI REFRIGERATION SVC INC
	MAUI STYLE WHOLESALE NATURAL
	MIYAKE CONCRETE ACCESSORIES
	RICHARDS AUTO REPAIR
	SPORTS IN MOTION
	STRUCTURAL CONCRETE BONDING
270	CLUB OKAMI
	IRIS BEAUTIQUE
	MAUI COMMERCIAL PHOTO INC
	MAUI PACIFIC INC
	NORWEST FINANCIAL CORP
	RAYS DELI & OKAZUYA
	SUPER STOP
	UNITED KOREAN SOCIETY OF MAUI
	WAIEHU CHEVRON
283	TERMINIX INTERNATIONAL
	TERMINIX INTERNATIONAL CO LTD
302	PAUKUKALO STORE
372	SHIMA POI SHOP
464	IGLESIA NI CRISTO
600	WAIEHU GENERAL STORE
621	DOUGS TRUCKING EQUIP

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

KAHEKILI HWY 1992

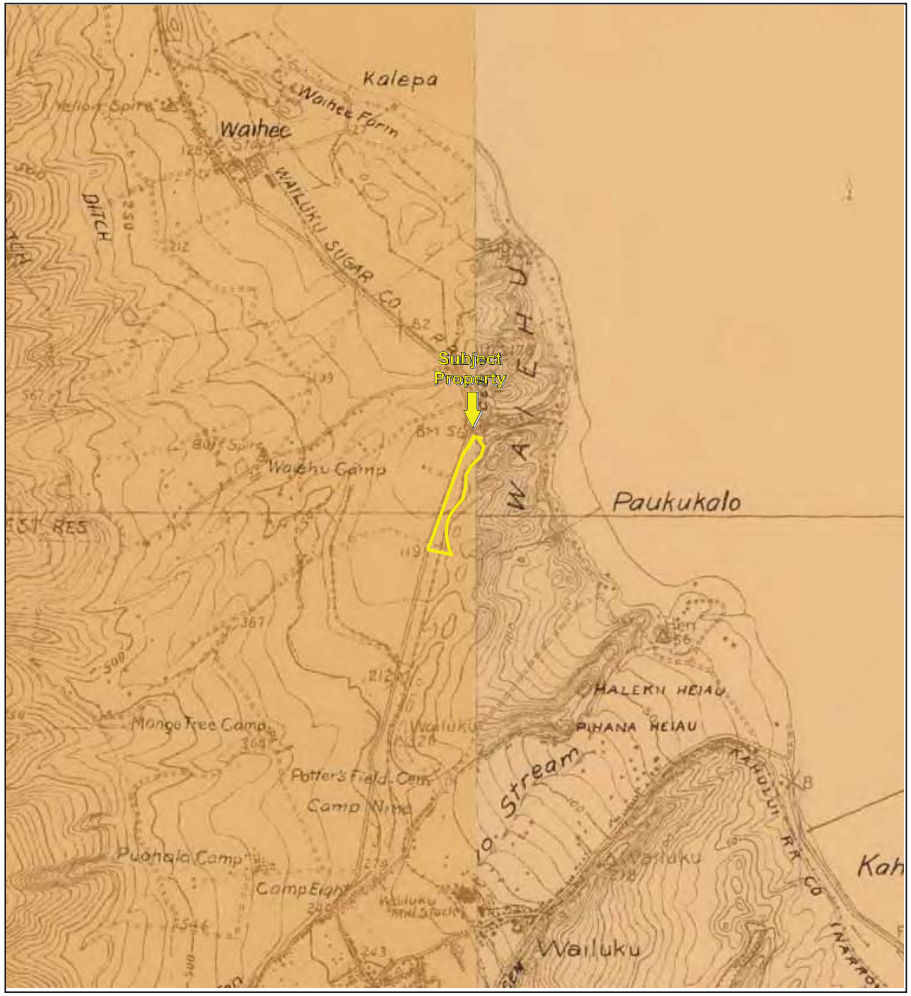
7	ANAKALEA, LILIU
20	GILMORE, HAMLIN
30	KOBAYASHI, DAVID
93	MANUEL, NIEMAL K
95	TEXEIRA, JOHN
97	VICARS, DANIEL
131	KANA, JACOB
147	PUAA, DANIEL K
1988	LAI, MILTON B
3330	FARRELL, L

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

WAIEHU BEACH RD 1992

28	PEREZA, JAMES S
65	TRAN, DUNG A
185	MAEDA, JAMES T
253	GUSHIKEN, JOSEPH K
263	BISSEN, RUDY
270	WAIEHU, CHEVRON
295	DAVIS, LUTHER
301	SATO, IWAO
310	TOKUNAGA, SOLOMAN
321	HAUPU, G K
324	YI, YOUNG H
331	YANAGI, KEEN
341	MAGLIBA, S
351	NISHIHARA, MITSUYO
358	NAKAGAWA, MICHAEL M
361	SUZUKI, KAZUO
380	LENT, ROBERT L
390	TACDERAN, L
391	FUKUHARA, K C
403	TAKABAYASHI, R
408	ABRAHAM, SUSANA B
415	TATEYAMA, KENJI T
427	FRANCISCO, MICHAEL
432	TANGAN, B
	TENGAN, SHUICHI
435	BORJA, F C
446	RAYOAN, CONNIE
480	KAMEYA, CHOZEN
600	BALOALOA, P
	CAMBRA, WAYNE L
	FONG, K
	GOROSPE, ANGIE
616	COCKETT, DELL
	RUIZ, OFELIA
621	SADO, DOUGLAS
625	DUTRO, L K
634	MORREIRA, FRANK A
646	FAFOA, MELE T
	TOKUNAGA, MOMI
647	VALLE, IDA H
658	DOUGLAS, DAVID J
663	HOKOANA, LEROY
668	BRANN, SCOTT
	DAVIS, S J
781	STANT, HENRY
4354	ABRAHAM, ANTONIA

Topographic Map Year: 1922



TP, PAIA, 1922, 7.5-minute
W, WAILUKU, 1922, 7.5-minute

0 Miles 0.25 0.5 1 1.5

N

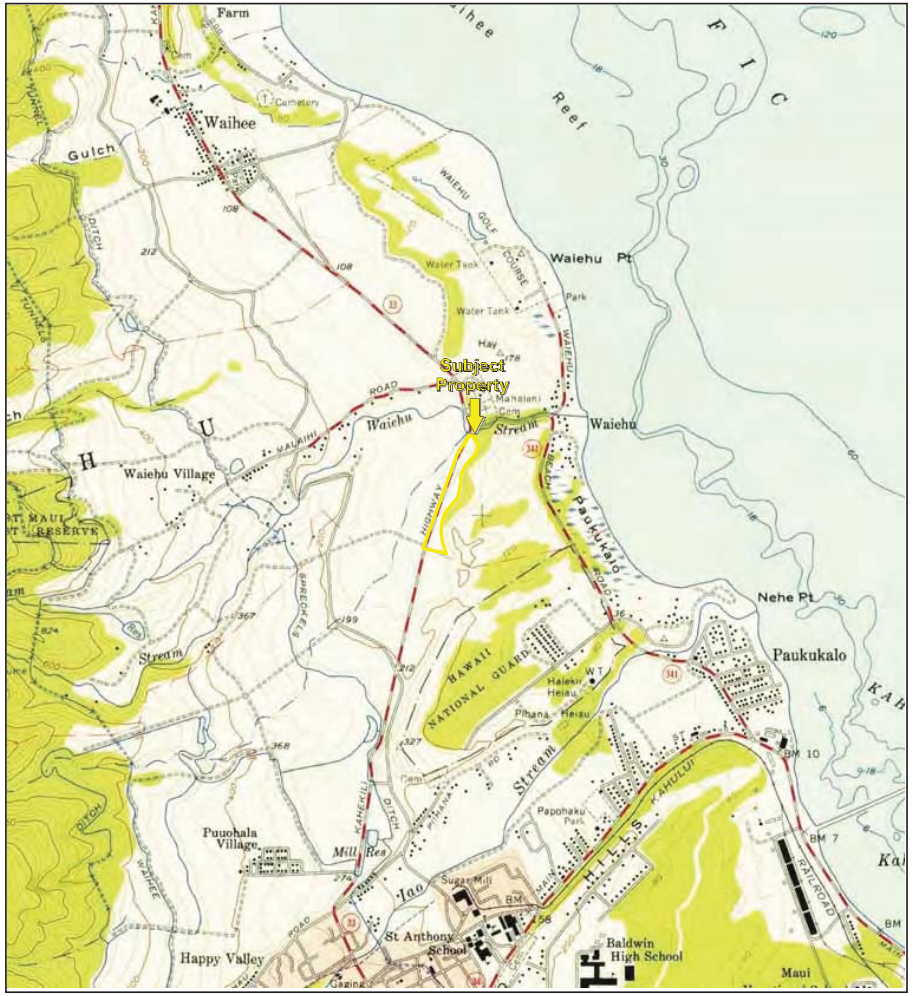
Key: Subject Property

APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

Topographic Map Year: 1955



TP, Wailuku, 1955, 7.5-minute

0 Miles 0.25 0.5 1 1.5

N

Key: Subject Property

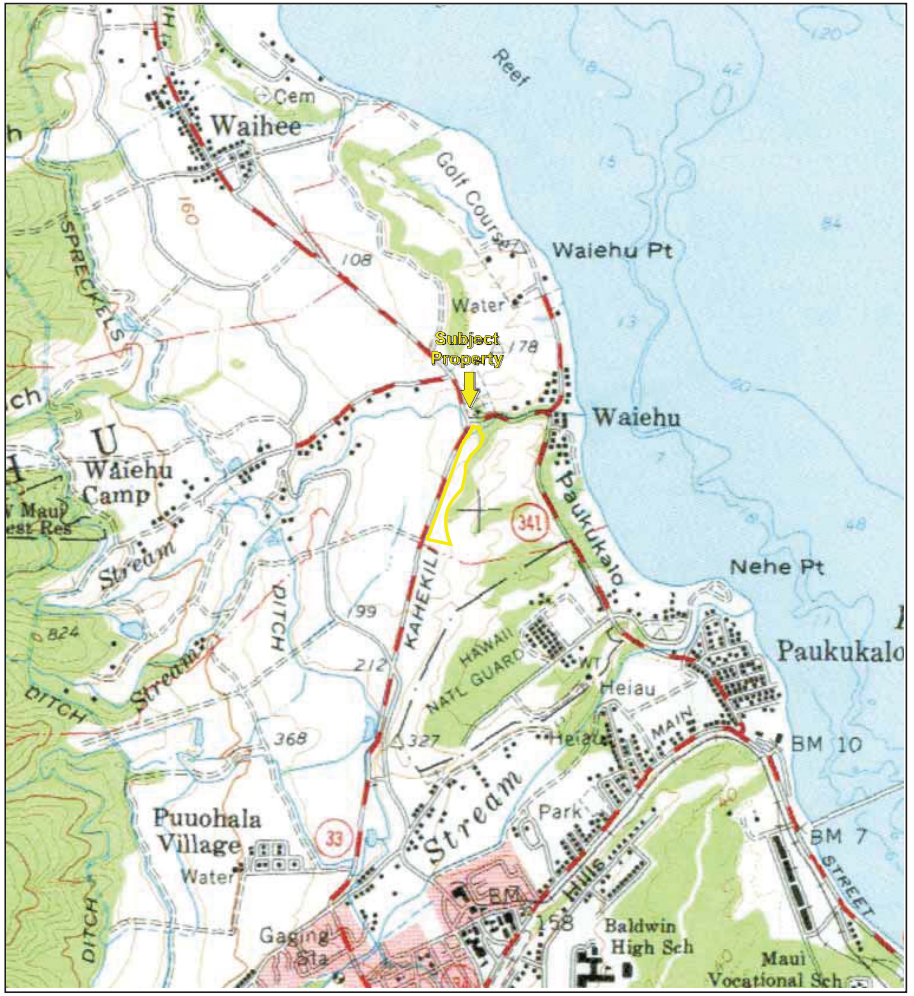
APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

6084367 - 4

Topographic Map Year: 1961



TP, MAUI, 1961, 15-minute

0 Miles 0.25 0.5 1 1.5

N

Key: Subject Property

APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

6084367 - 4

Topographic Map Year: 1983

TP, Wailuku, 1983, 7.5-minute

0 Miles 0.25 0.5 1 1.5

N

Key: Subject Property

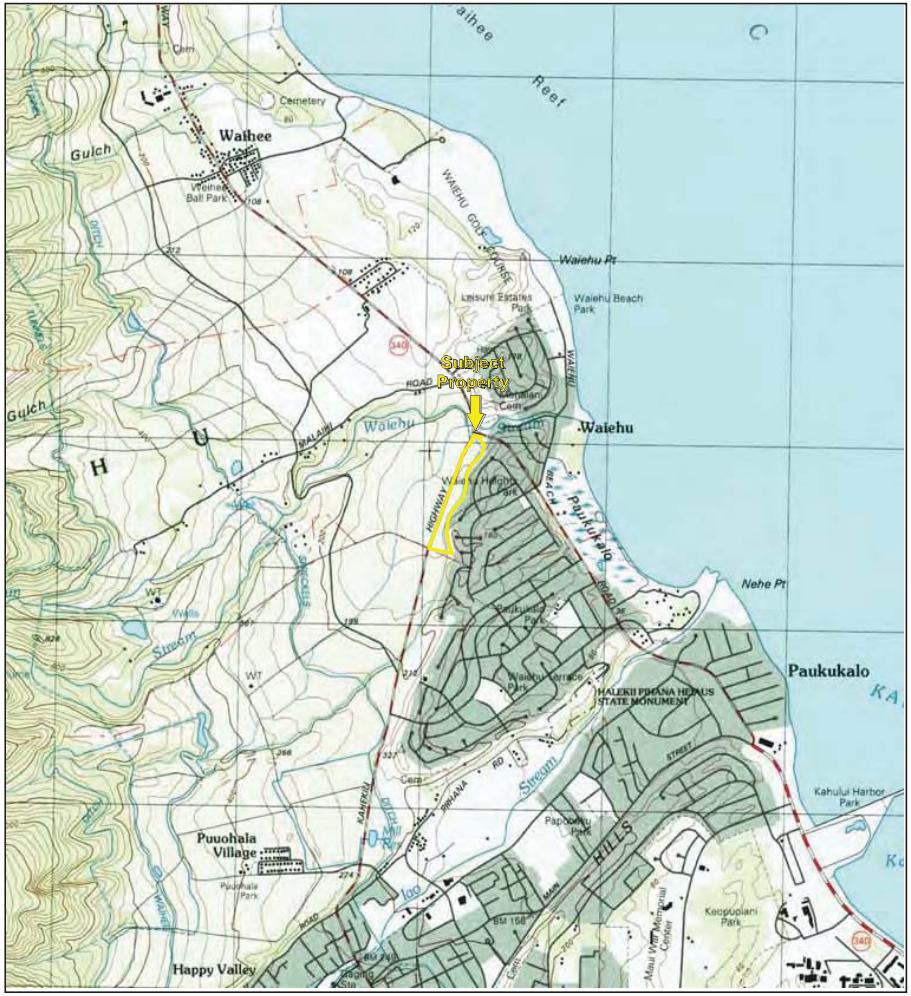
APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

6084367 - 4

Topographic Map Year: 1997



TP, Wailuku, 1997, 7.5-minute

0 Miles 0.25 0.5 1 1.5

N

Key: Subject Property

APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

6084367 - 4

Topographic Map Year: 2013

TP, Wailuku, 2013, 7.5-minute

0 Miles 0.25 0.5 1 1.5

N

Key: Subject Property

APPENDIX B: Topographic Maps

Project No. 20-283903.1

PARTNER

6084367 - 4

APPENDIX C: REGULATORY DATABASE REPORT

PARTNER

SE Corner of Kahekili Hwy & Waiehu Beach Rd.
SE Corner of Kahekili Hwy & Waiehu Beach Rd.
Wailuku, HI 96793

Inquiry Number: 6084367.2s
June 05, 2020

The EDR Radius Map™ Report with GeoCheck®

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

FORM-LBC-ASH

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

SE CORNER OF KAHEKILI HWY & WAIEHU BEACH RD.
WAILUKU, HI 96793

COORDINATES

Latitude (North):	20.9144270 - 20˚ 54' 51.93''
Longitude (West):	156.4986270 - 156˚ 29' 55.05''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	760178.7
UTM Y (Meters):	2314568.8
Elevation:	98 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5941607 WAILUKU, HI
Version Date:	2013

MAPPED SITES SUMMARY

Target Property Address:
SE CORNER OF KAHEKILI HWY & WAIEHU BEACH RD.
WAILUKU, HI 96793

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing
SEMS..... Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-VSQG..... RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROLS..... Institutional Controls Sites List

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent CERCLIS

SHWS..... Sites List

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Permitted Landfills in the State of Hawaii

State and tribal leaking storage tank lists

LUST..... Leaking Underground Storage Tank Database
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing
UST..... Underground Storage Tank Database
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS..... Engineering Control Sites
INST CONTROL..... Sites with Institutional Controls

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Voluntary Response Program Sites

State and tribal Brownfields sites

BROWNFIELDS..... Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
IHS OPEN DUMPS..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... Delisted National Clandestine Laboratory Register

CDL..... Clandestine Drug Lab Listing
US CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
SPILLS..... Release Notifications
SPILLS 90..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR..... RCRA - Non Generators / No Longer Regulated
FUDS..... Formerly Used Defense Sites
DOD..... Department of Defense Sites
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR..... Financial Assurance Information
EPA WATCH LIST..... EPA WATCH LIST
2020 COR ACTION..... 2020 Corrective Action Program List
TSCA..... Toxic Substances Control Act
TRIS..... Toxic Chemical Release Inventory System
SSTS..... Section 7 Tracking Systems
ROD..... Records Of Decision
RMP..... Risk Management Plans
RAATS..... RCRA Administrative Action Tracking System
PRP..... Potentially Responsible Parties
PADS..... PCB Activity Database System
ICIS..... Integrated Compliance Information System
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS..... Material Licensing Tracking System
COAL ASH DOE..... Steam-Electric Plant Operation Data
COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER..... PCB Transformer Registration Database
RADINFO..... Radiation Information Database
HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS..... Incident and Accident Data
CONSENT..... Superfund (CERCLA) Consent Decrees
INDIAN RESERV..... Indian Reservations
FUSRAP..... Formerly Utilized Sites Remedial Action Program
UMTRA..... Uranium Mill Tailings Sites
LEAD SMELTERS..... Lead Smelter Sites
US AIRS..... Aerometric Information Retrieval System Facility Subsystem
US MINES..... Mines Master Index File
ABANDONED MINES..... Abandoned Mines
FINDS..... Facility Index System/Facility Registry System
DOCKET HWC..... Hazardous Waste Compliance Docket Listing
ECHO..... Enforcement & Compliance History Information
UXO..... Unexploded Ordnance Sites
FUELS PROGRAM..... EPA Fuels Program Registered Listing
AIRS..... List of Permitted Facilities
DRYCLEANERS..... Permitted Drycleaner Facility Listing

Financial Assurance..... Financial Assurance Information Listing
LEAD..... LEAD
UIC..... Underground Injection Wells Listing
MINES MRDS..... Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP..... EDR Proprietary Manufactured Gas Plants
EDR Hist Auto..... EDR Exclusive Historical Auto Stations
EDR Hist Cleaner..... EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS..... Recovered Government Archive State Hazardous Waste Facilities List
RGA LF..... Recovered Government Archive Solid Waste Facilities List
RGA LUST..... Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

There were no unmapped sites in this report.

OVERVIEW MAP - 6084367.2S

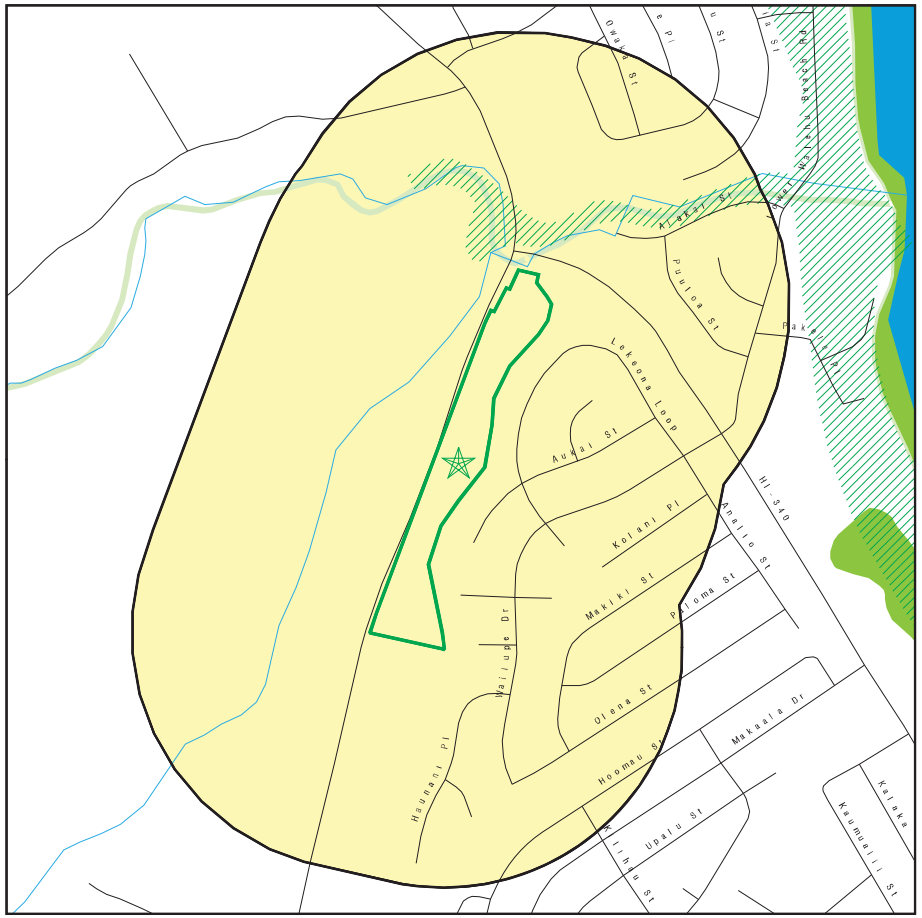
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SE Corner of Kahekili Hwy & Waiehu Beach Rd. ADDRESS: SE Corner of Kahekili Hwy & Waiehu Beach Rd. Walluku HI 96793 LAT/LONG: 20.914427 / 156.498627	CLIENT: Partner Engineering and Science, Inc. CONTACT: Cindy Sallee INQUIRY #: 6084367.2s DATE: June 05, 2020 5:17 pm

Copyright © 2020 EDR, Inc. © 2015 TomTom Rel. 2015.

DETAIL MAP - 6084367.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SE Corner of Kahekili Hwy & Waiehu Beach Rd. ADDRESS: SE Corner of Kahekili Hwy & Waiehu Beach Rd. Walluku HI 96793 LAT/LONG: 20.914427 / 156.498627	CLIENT: Partner Engineering and Science, Inc. CONTACT: Cindy Sallee INQUIRY #: 6084367.2s DATE: June 05, 2020 5:17 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
LEAD	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
MINES MRDS	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)

NO SITES FOUND

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites
A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: N/A
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 04/03/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System
SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/27/2020
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/27/2020
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 11/04/2019
Date Data Arrived at EDR: 11/13/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 76

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/14/2020
Next Scheduled EDR Contact: 08/24/2020
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 05/15/2020
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/15/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 05/15/2020
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/15/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/16/2019
Date Data Arrived at EDR: 12/19/2019
Date Made Active in Reports: 03/06/2020
Number of Days to Update: 78
Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/24/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

SHWS: Sites List
Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/26/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Permitted Landfills in the State of Hawaii
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/09/2020
Date Data Arrived at EDR: 03/13/2020
Date Made Active in Reports: 05/29/2020
Number of Days to Update: 77
Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 03/05/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Varies

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 02/25/2020
Date Data Arrived at EDR: 02/26/2020
Date Made Active in Reports: 05/01/2020
Number of Days to Update: 65
Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 05/29/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/04/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/27/2020
Number of Days to Update: 85
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/01/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/10/2019
Date Data Arrived at EDR: 12/05/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 67
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/11/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/01/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/02/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/03/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/14/2020
Number of Days to Update: 72
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/15/2019
Date Data Arrived at EDR: 12/17/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 55
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 08/27/2019
Date Data Arrived at EDR: 08/28/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 75

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 03/19/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 02/25/2020
Date Data Arrived at EDR: 02/26/2020
Date Made Active in Reports: 05/01/2020
Number of Days to Update: 65

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 05/29/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/11/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/01/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/10/2019
Date Data Arrived at EDR: 12/05/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 67

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 10/01/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/02/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 10/11/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 68

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/03/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/14/2020
Number of Days to Update: 72

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/04/2019
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 02/27/2020
Number of Days to Update: 85

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 05/20/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites
A listing of sites with engineering controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 05/26/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/26/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/18/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/26/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/26/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/02/2019
Date Data Arrived at EDR: 12/16/2019
Date Made Active in Reports: 03/06/2020
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/02/2020
Next Scheduled EDR Contact: 06/29/2020
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 04/16/2020
Next Scheduled EDR Contact: 08/10/2020
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/09/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/01/2020
Next Scheduled EDR Contact: 08/10/2020
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 06/11/2019
Date Data Arrived at EDR: 06/13/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 82

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 10/22/2010
Number of Days to Update: 42

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 06/11/2019
Date Data Arrived at EDR: 06/13/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 82

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Quarterly

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/05/2019
Date Data Arrived at EDR: 12/06/2019
Date Made Active in Reports: 02/14/2020
Number of Days to Update: 70

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/24/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 11/18/2019
Date Data Arrived at EDR: 11/19/2019
Date Made Active in Reports: 01/21/2020
Number of Days to Update: 63

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/14/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/23/2020
Date Data Arrived at EDR: 03/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/28/2020
Date Data Arrived at EDR: 02/19/2020
Date Made Active in Reports: 05/14/2020
Number of Days to Update: 85

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/10/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/06/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/15/2020
Next Scheduled EDR Contact: 08/24/2020
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 12/16/2019
Date Data Arrived at EDR: 12/19/2019
Date Made Active in Reports: 02/27/2020
Number of Days to Update: 70

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/24/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/04/2020
Next Scheduled EDR Contact: 08/17/2020
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/08/2020
Next Scheduled EDR Contact: 08/17/2020
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/20/2020
Next Scheduled EDR Contact: 06/29/2020
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 02/05/2020
Date Made Active in Reports: 04/24/2020
Number of Days to Update: 79

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/21/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 10/23/2019
Date Made Active in Reports: 01/15/2020
Number of Days to Update: 84

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/21/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 09/14/2020
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/05/2019
Date Data Arrived at EDR: 11/20/2019
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 149

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/15/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 01/30/2020
Date Data Arrived at EDR: 02/06/2020
Date Made Active in Reports: 02/14/2020
Number of Days to Update: 8

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 08/17/2020
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 10/09/2019
Date Data Arrived at EDR: 10/11/2019
Date Made Active in Reports: 12/20/2019
Number of Days to Update: 70

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/10/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 03/26/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/25/2019
Date Data Arrived at EDR: 10/25/2019
Date Made Active in Reports: 01/15/2020
Number of Days to Update: 82

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 04/10/2020
Next Scheduled EDR Contact: 08/03/2020
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 12/04/2019
Date Made Active in Reports: 01/15/2020
Number of Days to Update: 42

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 03/06/2020
Next Scheduled EDR Contact: 06/15/2020
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/01/2020
Next Scheduled EDR Contact: 09/14/2020
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/08/2020
Next Scheduled EDR Contact: 08/17/2020
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 04/28/2020
Next Scheduled EDR Contact: 08/10/2020
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 01/17/2020
Date Made Active in Reports: 03/06/2020
Number of Days to Update: 49
Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/26/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Varies

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218
Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 03/25/2020
Next Scheduled EDR Contact: 07/06/2020
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546
Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/10/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program
DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 08/08/2017
Date Data Arrived at EDR: 09/11/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 3
Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 04/29/2020
Next Scheduled EDR Contact: 08/17/2020
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74
Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/27/2020
Date Data Arrived at EDR: 05/06/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 22
Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36
Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data
Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 03/31/2020
Date Data Arrived at EDR: 04/01/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 50
Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 05/27/2020
Next Scheduled EDR Contact: 09/14/2020
Data Release Frequency: Quarterly

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/11/2020
Date Data Arrived at EDR: 02/25/2020
Date Made Active in Reports: 05/21/2020
Number of Days to Update: 86
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/21/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 02/28/2020
Date Made Active in Reports: 05/22/2020
Number of Days to Update: 84
Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97
Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/21/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines
An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/05/2020
Date Data Arrived at EDR: 03/06/2020
Date Made Active in Reports: 05/29/2020
Number of Days to Update: 84
Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 09/21/2020
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/03/2020
Date Data Arrived at EDR: 03/03/2020
Date Made Active in Reports: 05/28/2020
Number of Days to Update: 86
Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/02/2020
Next Scheduled EDR Contact: 09/14/2020
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/05/2020
Date Data Arrived at EDR: 01/07/2020
Date Made Active in Reports: 03/06/2020
Number of Days to Update: 59
Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 04/07/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 07/26/2018
Date Made Active in Reports: 10/05/2018
Number of Days to Update: 71
Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 01/17/2019
Date Made Active in Reports: 04/01/2019
Number of Days to Update: 74
Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 04/03/2020
Next Scheduled EDR Contact: 07/27/2020
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/18/2020
Date Data Arrived at EDR: 02/19/2020
Date Made Active in Reports: 05/14/2020
Number of Days to Update: 85
Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/19/2020
Next Scheduled EDR Contact: 08/31/2020
Data Release Frequency: Quarterly

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 12/19/2019
Date Data Arrived at EDR: 12/23/2019
Date Made Active in Reports: 03/02/2020
Number of Days to Update: 70
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 03/20/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 12/19/2019
Date Data Arrived at EDR: 12/23/2019
Date Made Active in Reports: 03/04/2020
Number of Days to Update: 72
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 03/20/2020
Next Scheduled EDR Contact: 07/13/2020
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/11/2020
Date Data Arrived at EDR: 03/12/2020
Date Made Active in Reports: 05/22/2020
Number of Days to Update: 71
Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 09/21/2020
Data Release Frequency: Varies

LEAD: Lead Inspection Listing
Lead inspections

Date of Government Version: 03/05/2020
Date Data Arrived at EDR: 03/06/2020
Date Made Active in Reports: 05/15/2020
Number of Days to Update: 70
Source: Department of Health
Telephone: 808-586-5800
Last EDR Contact: 06/03/2020
Next Scheduled EDR Contact: 09/21/2020
Data Release Frequency: Varies

UIC: Underground Injection Wells Listing
A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56
Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 05/18/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 03/26/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Varies

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/26/2020
Next Scheduled EDR Contact: 07/20/2020
Data Release Frequency: Semi-Annually

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 03/09/2020
Next Scheduled EDR Contact: 06/22/2020
Data Release Frequency: Semi-Annually

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 05/21/2020
Next Scheduled EDR Contact: 09/07/2020
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List
The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SE CORNER OF KAHEKILI HWY & WAIEHU BEACH RD.
SE CORNER OF KAHEKILI HWY & WAIEHU BEACH RD.
WAILUKU, HI 96793

TARGET PROPERTY COORDINATES

Latitude (North):	20.914427 - 20˚ 54' 51.94''
Longitude (West):	156.498627 - 156˚ 29' 55.06''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	760178.7
UTM Y (Meters):	2314568.8
Elevation:	98 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5941607 WAILUKU, HI
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

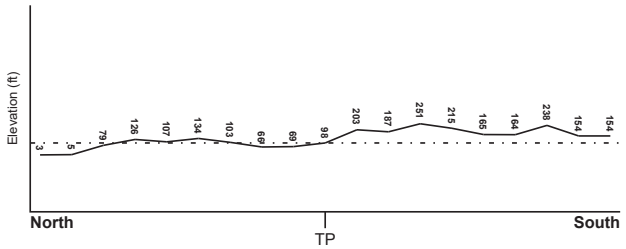
TOPOGRAPHIC INFORMATION

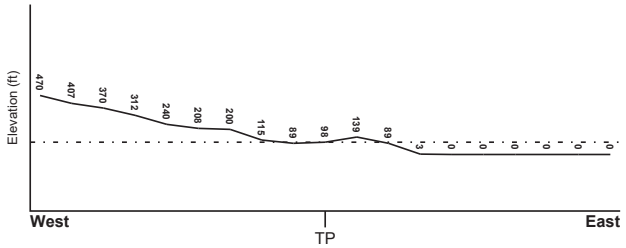
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 98 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
1500030383E	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
1500030381E	FEMA FIRM Flood data
1500030384E	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

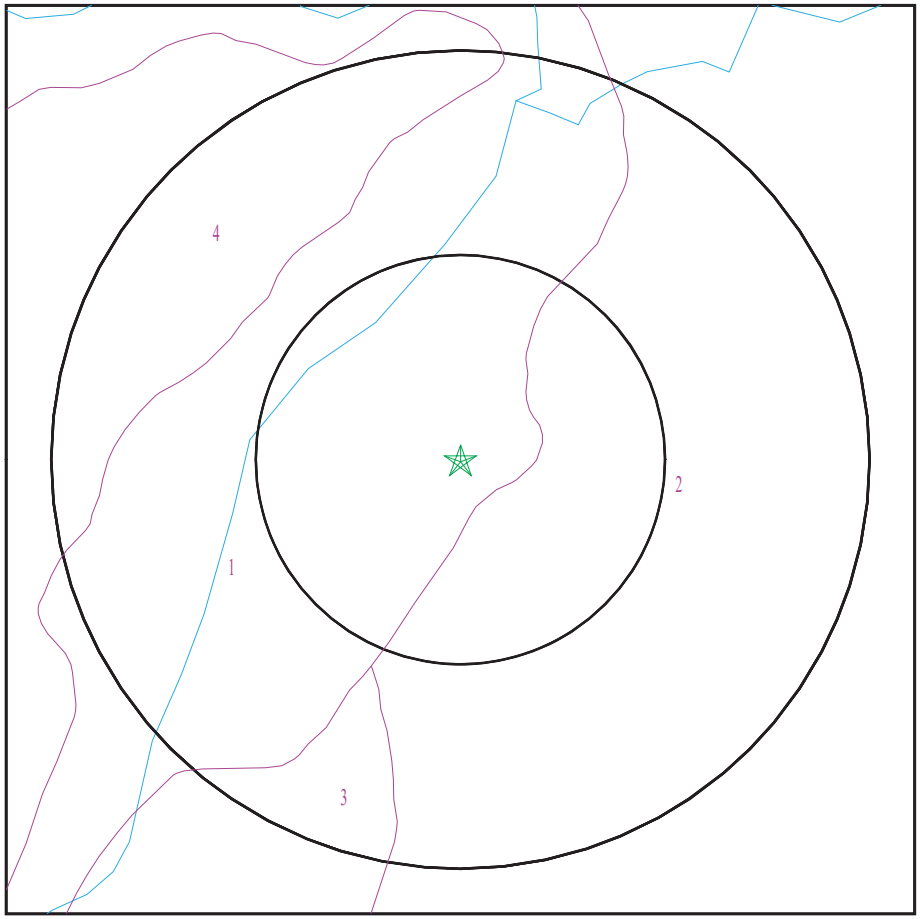
Era: -
System: -
Series: -
Code: N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 6084367.2s



★ Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME: SE Corner of Kahekili Hwy & Waiehu Beach Rd. ADDRESS: SE Corner of Kahekili Hwy & Waiehu Beach Rd. Wailuku HI 96793 LAT/LONG: 20.914427 / 156.498627	CLIENT: Partner Engineering and Science, Inc. CONTACT: Cindy Sallee INQUIRY #: 6084367.2s DATE: June 05, 2020 5:17 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Iao

Soil Surface Texture: silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	14 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	ML-K (proposed)	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

Soil Map ID: 2

Soil Component Name: Puuone

Soil Surface Texture: sand

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches	sand	Granular materials (35 pct. or less passing No. 200), Fine Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14.11 Min: 4.23	Max: 8.5 Min: 8
2	20 inches	40 inches	cemented material	Granular materials (35 pct. or less passing No. 200), Fine Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14.11 Min: 4.23	Max: 8.5 Min: 8

Soil Map ID: 3

Soil Component Name: Iao

Soil Surface Texture: cobbly silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	cobbly silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
2	14 inches	48 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6
3	48 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14.11 Min: 1.41	Max: 7.3 Min: 6.6

Soil Map ID: 4

Soil Component Name: Wailuku

Soil Surface Texture: silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4.23 Min: 0.42	Max: 6.5 Min: 5.6
2	11 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4.23 Min: 0.42	Max: 6.5 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A3	USGS40000269211	1/4 - 1/2 Mile NNW
B6	USGS40000269214	1/2 - 1 Mile NNE
C8	USGS40000269216	1/2 - 1 Mile North
D10	USGS40000269219	1/2 - 1 Mile North
F13	USGS40000269206	1/2 - 1 Mile West
F14	USGS40000269204	1/2 - 1 Mile West
F18	USGS40000269182	1/2 - 1 Mile West
E20	USGS40000269190	1/2 - 1 Mile SW
E21	USGS40000269188	1/2 - 1 Mile SW
G22	USGS40000269194	1/2 - 1 Mile ESE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
E19	HI0000212	1/2 - 1 Mile SW

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	HI1100000003619	0 - 1/8 Mile South
A2	HI1100000003685	1/4 - 1/2 Mile NNW
4	HI1100000003686	1/2 - 1 Mile North
B5	HI1100000003682	1/2 - 1 Mile NNE
7	HI1100000003684	1/2 - 1 Mile West
C9	HI1100000003687	1/2 - 1 Mile North
D11	HI1100000003683	1/2 - 1 Mile North
E12	HI1100000003621	1/2 - 1 Mile SW
F15	HI1100000003623	1/2 - 1 Mile West
F16	HI1100000003624	1/2 - 1 Mile West
E17	HI1100000003620	1/2 - 1 Mile SW
G23	HI1100000003617	1/2 - 1 Mile ESE

PHYSICAL SETTING SOURCE MAP - 6084367.2s

County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location

0 1/4 1/2 1 Miles

SITE NAME: SE Corner of Kahekili Hwy & Waiehu Beach Rd. ADDRESS: SE Corner of Kahekili Hwy & Waiehu Beach Rd. Wailuku HI 96793 LAT/LONG: 20.914427 / 156.498627	CLIENT: Partner Engineering and Science, Inc. CONTACT: Cindy Sallee INQUIRY #: 6084367.2s DATE: June 05, 2020 5:17 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
1 **South** **0 - 1/8 Mile** **Higher**	**HI WELLS**	**HI100000003619**

Well ID:	6-5429-003	Well Name:	MEO BEST Ke Kahua
Well Owner:	John Min (Maui Economic Opportunity)		
Land Owner:	Not Reported	Pump Rate (g/m):	59
Year Drilled:	2011	Original Well Name:	Not Reported
Driller:	Not Reported	Well Construction Type:	Rotary
Casing Diameter (in):	12	Ground Elevation (ft):	91
Well Depth (ft):	112	Solid Casing Depth:	97
Perforated Casing Depth:	112		
Major Well Use:	Irrigation (non-domestic, non-agriculture)		
Inital Water Level (ft):	21.9	Water Level After Drilling:	Not Reported
Water Level After Install:	Not Reported	Chloride Content (mg/L):	20
Date Tested:	12/20/2011	Test Pump Rate (g/m):	76
Test Drawdown Rate (ft):	12.4	Test Chloride Content (MG/L):	20
Test Water Temp:	71	Temp Unit:	F
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Draft Year:	Not Reported	Hole Bottom Elevation:	-12
Solid Casing Bottom Elevation:	-6	Year Installed:	2011
Pump Capacity (MM gal/day):	0.085	Pump Intake Depth:	93
Latest Head:	Not Reported	Latest WCR1 Report:	1/26/2012
Latest WCR2 Report:	1/26/2012	Transmissivity:	Not Reported
Min to pump 5 volumes:	Not Reported		

A2 **NNW** **1/4 - 1/2 Mile** **Lower**	**HI WELLS**	**HI100000003685**

Well ID:	6-5530-002	Well Name:	Waiehu TH
Well Owner:	Malaihi Condo	Land Owner:	Malaihi Condo
Pump Rate (g/m):	Not Reported	Year Drilled:	1933
Original Well Name:	Not Reported	Driller:	J Heizer
Well Construction Type:	Rotary	Casing Diameter (in):	1
Ground Elevation (ft):	80	Well Depth (ft):	177
Solid Casing Depth:	Not Reported	Perforated Casing Depth:	Not Reported
Major Well Use:	Abandoned-Lost	Inital Water Level (ft):	65
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	0	Date Tested:	Not Reported
Test Pump Rate (g/m):	Not Reported	Test Drawdown Rate (ft):	Not Reported
Test Chloride Content (MG/L):	Not Reported	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-97	Solid Casing Bottom Elevation:	Not Reported
Year Installed:	Not Reported	Pump Capacity (MM gal/day):	Not Reported
Pump Intake Depth:	Not Reported	Latest Head:	Not Reported
Latest WCR1 Report:	1/1/1933	Latest WCR2 Report:	Not Reported
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

Map ID Direction Distance Elevation	Database	EDR ID Number
A3 **NNW** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS40000269211**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5530-02 WAIEHU TH103		
Type:	Well: Test hole not completed as a well		
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19331201
Well Depth:	177	Well Depth Units:	ft
Well Hole Depth:	177	Well Hole Depth Units:	ft

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4 **North** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI1100000003686**

Well ID:	6-5530-003	Well Name:	Waiehu Golf Course - 15th Tee
Well Owner:	Department of Parks and Recreation, Central Maui, MDPR		
Land Owner:	Not Reported	Pump Rate (g/m):	Not Reported
Year Drillled:	1995	Original Well Name:	Waiehu Golf Course 1
Driller:	David Pico Cesspool Digging		
Well Construction Type:	Rotary	Casing Diameter (in):	Not Reported
Ground Elevation (ft):	Not Reported	Well Depth (ft):	210
Solid Casing Depth:	Not Reported	Perforated Casing Depth:	Not Reported
Major Well Use:	Unused	Inital Water Level (ft):	Not Reported
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	0	Date Tested:	Not Reported
Test Pump Rate (g/m):	Not Reported	Test Drawdown Rate (ft):	Not Reported
Test Chloride Content (MG/L):	Not Reported	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	Not Reported	Solid Casing Bottom Elevation:	Not Reported
Year Installed:	Not Reported	Pump Capacity (MM gal/day):	Not Reported
Pump Intake Depth:	Not Reported	Latest Head:	Not Reported
Latest WCR1 Report:	7/1/1995	Latest WCR2 Report:	Not Reported
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

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B5 **NNE** **1/2 - 1 Mile** **Lower**	**HI WELLS**	**HI1100000003682**

Well ID:	6-5529-001	Well Name:	Waiehu TH
Well Owner:	Pacific Islands Water Science Center, USGS, U.S. Geological Survey		
Land Owner:	Not Reported	Pump Rate (g/m):	0
Year Drillled:	1935	Original Well Name:	Not Reported
Driller:	J Heizer	Well Construction Type:	Rotary
Casing Diameter (in):	1	Ground Elevation (ft):	14
Well Depth (ft):	22	Solid Casing Depth:	Not Reported
Perforated Casing Depth:	Not Reported	Major Well Use:	Abandoned-Lost
Inital Water Level (ft):	2	Water Level After Drilling:	Not Reported

Water Level After Install:	Not Reported	Chloride Content (mg/L):	0
Date Tested:	Not Reported	Test Pump Rate (g/m):	Not Reported
Test Drawdown Rate (ft):	Not Reported	Test Chloride Content (MG/L):	Not Reported
Test Water Temp:	Not Reported	Temp Unit:	Not Reported
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Draft Year:	Not Reported	Hole Bottom Elevation:	-8
Solid Casing Bottom Elevation:	Not Reported	Year Installed:	Not Reported
Pump Capacity (MM gal/day):	Not Reported	Pump Intake Depth:	Not Reported
Latest Head:	Not Reported	Latest WCR1 Report:	1/1/1935
Latest WCR2 Report:	Not Reported	Transmissivity:	Not Reported
Min to pump 5 volumes:	Not Reported		

B6 **NNE** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000269214**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5529-01 WAIEHU TH104		
Type:	Well: Test hole not completed as a well		
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19351107
Well Depth:	22	Well Depth Units:	ft
Well Hole Depth:	22	Well Hole Depth Units:	ft

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7 **West** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI1100000003684**

Well ID:	6-5530-001	Well Name:	Waiehu Tunnel
Well Owner:	Wailuku Sugar	Land Owner:	Not Reported
Pump Rate (g/m):	0	Year Drillled:	1942
Original Well Name:	Not Reported	Driller:	Not Reported
Well Construction Type:	Tunnel	Casing Diameter (in):	Not Reported
Ground Elevation (ft):	300	Well Depth (ft):	0
Solid Casing Depth:	Not Reported	Perforated Casing Depth:	Not Reported
Major Well Use:	Observation	Inital Water Level (ft):	300
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	0	Date Tested:	Not Reported
Test Pump Rate (g/m):	Not Reported	Test Drawdown Rate (ft):	Not Reported
Test Chloride Content (MG/L):	Not Reported	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	Not Reported	Solid Casing Bottom Elevation:	Not Reported
Year Installed:	Not Reported	Pump Capacity (MM gal/day):	Not Reported
Pump Intake Depth:	Not Reported	Latest Head:	Not Reported
Latest WCR1 Report:	Not Reported	Latest WCR2 Report:	Not Reported
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
C8 **North** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000269216**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5530-02 Test Hole T-103, Waihee, Maui, HI		
Type:	Well: Test hole not completed as a well		
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19331218
Well Depth:	Not Reported	Well Depth Units:	Not Reported
Well Hole Depth:	177	Well Hole Depth Units:	ft

	Database	EDR ID Number
C9 **North** **1/2 - 1 Mile** **Lower**	**HI WELLS**	**HI100000003687**

Well ID:	6-5530-004	Well Name:	Waiehu Golf Course - 13th Fairway
Well Owner:	Department of Parks and Recreation, Central Maui, MDPR		
Land Owner:	Not Reported	Pump Rate (g/m):	300
Year Drillled:	1995	Original Well Name:	Waiehu Golf Course 2
Driller:	David Pico Cesspool Digging		
Well Construction Type:	Rotary	Casing Diameter (in):	12
Ground Elevation (ft):	77	Well Depth (ft):	150
Solid Casing Depth:	80	Perforated Casing Depth:	140
Major Well Use:	Golf Course Irrigation	Inital Water Level (ft):	8.43
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	80	Date Tested:	9/20/1995
Test Pump Rate (g/m):	320	Test Drawdown Rate (ft):	22.9
Test Chloride Content (MG/L):	170	Test Water Temp:	23.3
Temp Unit:	C	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-73	Solid Casing Bottom Elevation:	-3
Year Installed:	1997	Pump Capacity (MM gal/day):	0.432
Pump Intake Depth:	119	Latest Head:	Not Reported
Latest WCR1 Report:	9/1/1995	Latest WCR2 Report:	6/9/2014
Transmissivity:	4601	Min to pump 5 volumes:	Not Reported

	Database	EDR ID Number
D10 **North** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000269219**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5529-02 W451	Type:	Well
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19670706
Well Depth:	76	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
D11 **North** **1/2 - 1 Mile** **Lower**	**HI WELLS**	**HI100000003683**

Well ID:	6-5529-002	Well Name:	Waiehu Golf Course - Pond
Well Owner:	Department of Parks and Recreation, Central Maui, MDPR		
Land Owner:	Department of Parks and Recreation, Central Maui, MDPR		
Pump Rate (g/m):	390	Year Drillled:	1967
Original Well Name:	Waiehu Golf Course	Driller:	Ocean View Drilling Co., Ltd.
Well Construction Type:	Rotary	Casing Diameter (in):	8
Ground Elevation (ft):	10	Well Depth (ft):	76
Solid Casing Depth:	40	Perforated Casing Depth:	Not Reported
Major Well Use:	Golf Course Irrigation	Inital Water Level (ft):	3.6
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	32	Date Tested:	Not Reported
Test Pump Rate (g/m):	190	Test Drawdown Rate (ft):	0.3
Test Chloride Content (MG/L):	Not Reported	Test Water Temp:	23.3
Temp Unit:	C	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-66	Solid Casing Bottom Elevation:	-30
Year Installed:	Not Reported	Pump Capacity (MM gal/day):	0.561
Pump Intake Depth:	Not Reported	Latest Head:	Not Reported
Latest WCR1 Report:	1/1/1967	Latest WCR2 Report:	Not Reported
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

	Database	EDR ID Number
E12 **SW** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI100000003621**

Well ID:	6-5430-002	Well Name:	Waiehu Heights 2
Well Owner:	Maui Department of Water Supply, MDWS		
Land Owner:	County of Maui	Pump Rate (g/m):	1250
Year Drillled:	1975	Original Well Name:	514
Driller:	Water Resources International, Inc.		
Well Construction Type:	Rotary	Casing Diameter (in):	14
Ground Elevation (ft):	337	Well Depth (ft):	543
Solid Casing Depth:	337	Perforated Casing Depth:	367
Major Well Use:	County	Inital Water Level (ft):	18
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	20	Date Tested:	5/29/1975
Test Pump Rate (g/m):	1300	Test Drawdown Rate (ft):	21
Test Chloride Content (MG/L):	20	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-206	Solid Casing Bottom Elevation:	0
Year Installed:	1998	Pump Capacity (MM gal/day):	1.8
Pump Intake Depth:	360	Latest Head:	Not Reported
Latest WCR1 Report:	5/18/1975	Latest WCR2 Report:	10/26/2011
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

Map ID Direction Distance Elevation	Database	EDR ID Number
F13 **West** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269206**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5530-03 WAIEHU TH-D		
Type:	Well: Test hole not completed as a well		
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19750826
Well Depth:	490	Well Depth Units:	ft
Well Hole Depth:	490	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	1	Level reading date:	1975-10-07
Feet below surface:	365.53	Feet to sea level:	Not Reported
Note:	Not Reported		

F14 **West** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269204**	

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5430-04 TH-D Waiehu, Maui, HI		
Type:	Well: Test hole not completed as a well		
Description:	Not Reported	HUC:	20020000
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19750801
Well Depth:	490	Well Depth Units:	ft
Well Hole Depth:	490	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	145	Level reading date:	2000-01-19
Feet below surface:	Not Reported	Feet to sea level:	9.85
Note:	Not Reported		

Level reading date:	1999-03-29	Feet below surface:	Not Reported
Feet to sea level:	10.67	Note:	Not Reported
Level reading date:	1999-03-05	Feet below surface:	Not Reported
Feet to sea level:	11.18	Note:	Not Reported
Level reading date:	1999-02-11	Feet below surface:	Not Reported
Feet to sea level:	11.24	Note:	Not Reported
Level reading date:	1999-01-04	Feet below surface:	Not Reported
Feet to sea level:	11.05	Note:	Not Reported
Level reading date:	1998-12-04	Feet below surface:	Not Reported
Feet to sea level:	10.62	Note:	Not Reported
Level reading date:	1998-09-30	Feet below surface:	Not Reported
Feet to sea level:	10.23	Note:	Not Reported

Level reading date:	1998-08-24	Feet below surface:	Not Reported
Feet to sea level:	9.95	Note:	Not Reported
Level reading date:	1998-07-01	Feet below surface:	Not Reported
Feet to sea level:	10.44	Note:	Not Reported
Level reading date:	1998-05-26	Feet below surface:	Not Reported
Feet to sea level:	10.39	Note:	Not Reported
Level reading date:	1998-04-02	Feet below surface:	Not Reported
Feet to sea level:	10.64	Note:	Not Reported
Level reading date:	1998-02-23	Feet below surface:	Not Reported
Feet to sea level:	10.58	Note:	Not Reported
Level reading date:	1998-01-06	Feet below surface:	Not Reported
Feet to sea level:	11.09	Note:	Not Reported
Level reading date:	1997-11-25	Feet below surface:	Not Reported
Feet to sea level:	10.68	Note:	Not Reported
Level reading date:	1997-10-02	Feet below surface:	Not Reported
Feet to sea level:	9.86	Note:	Not Reported
Level reading date:	1997-08-25	Feet below surface:	Not Reported
Feet to sea level:	9.36	Note:	Not Reported
Level reading date:	1997-08-06	Feet below surface:	Not Reported
Feet to sea level:	9.08	Note:	Not Reported
Level reading date:	1997-07-02	Feet below surface:	Not Reported
Feet to sea level:	9.28	Note:	Not Reported
Level reading date:	1997-05-27	Feet below surface:	Not Reported
Feet to sea level:	9.82	Note:	Not Reported
Level reading date:	1997-05-08	Feet below surface:	Not Reported
Feet to sea level:	9.88	Note:	Not Reported
Level reading date:	1997-04-02	Feet below surface:	Not Reported
Feet to sea level:	10.42	Note:	Not Reported
Level reading date:	1997-02-24	Feet below surface:	Not Reported
Feet to sea level:	10.41	Note:	Not Reported
Level reading date:	1997-01-06	Feet below surface:	Not Reported
Feet to sea level:	10.83	Note:	Not Reported
Level reading date:	1996-11-25	Feet below surface:	Not Reported
Feet to sea level:	10.18	Note:	Not Reported
Level reading date:	1996-10-02	Feet below surface:	Not Reported
Feet to sea level:	9.02	Note:	Not Reported
Level reading date:	1996-09-12	Feet below surface:	Not Reported
Feet to sea level:	9.20	Note:	Not Reported
Level reading date:	1996-05-29	Feet below surface:	Not Reported
Feet to sea level:	10.32	Note:	Not Reported
Level reading date:	1996-04-30	Feet below surface:	Not Reported
Feet to sea level:	10.66	Note:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	1996-04-02	Feet below surface:	Not Reported
Feet to sea level:	10.91	Note:	Not Reported
Level reading date:	1996-01-03	Feet below surface:	Not Reported
Feet to sea level:	10.77	Note:	Not Reported
Level reading date:	1995-11-21	Feet below surface:	Not Reported
Feet to sea level:	10.00	Note:	Not Reported
Level reading date:	1995-10-05	Feet below surface:	Not Reported
Feet to sea level:	9.87	Note:	Not Reported
Level reading date:	1995-08-31	Feet below surface:	Not Reported
Feet to sea level:	10.15	Note:	Not Reported
Level reading date:	1995-08-02	Feet below surface:	Not Reported
Feet to sea level:	10.55	Note:	Not Reported
Level reading date:	1995-07-06	Feet below surface:	Not Reported
Feet to sea level:	11.00	Note:	Not Reported
Level reading date:	1995-06-06	Feet below surface:	Not Reported
Feet to sea level:	11.60	Note:	Not Reported
Level reading date:	1995-05-04	Feet below surface:	Not Reported
Feet to sea level:	12.31	Note:	Not Reported
Level reading date:	1995-02-27	Feet below surface:	Not Reported
Feet to sea level:	12.76	Note:	Not Reported
Level reading date:	1995-01-11	Feet below surface:	Not Reported
Feet to sea level:	11.25	Note:	Not Reported
Level reading date:	1994-09-20	Feet below surface:	Not Reported
Feet to sea level:	11.50	Note:	Not Reported
Level reading date:	1994-08-04	Feet below surface:	Not Reported
Feet to sea level:	11.44	Note:	Not Reported
Level reading date:	1994-06-24	Feet below surface:	Not Reported
Feet to sea level:	11.54	Note:	Not Reported
Level reading date:	1994-06-15	Feet below surface:	Not Reported
Feet to sea level:	11.69	Note:	Not Reported
Level reading date:	1994-03-21	Feet below surface:	Not Reported
Feet to sea level:	12.89	Note:	Not Reported
Level reading date:	1994-03-17	Feet below surface:	Not Reported
Feet to sea level:	12.96	Note:	Not Reported
Level reading date:	1994-02-22	Feet below surface:	Not Reported
Feet to sea level:	13.37	Note:	Not Reported
Level reading date:	1994-01-19	Feet below surface:	Not Reported
Feet to sea level:	12.57	Note:	Not Reported
Level reading date:	1993-12-02	Feet below surface:	Not Reported
Feet to sea level:	12.39	Note:	Not Reported
Level reading date:	1993-11-18	Feet below surface:	Not Reported
Feet to sea level:	12.30	Note:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	1993-10-01	Feet below surface:	Not Reported
Feet to sea level:	11.82	Note:	Not Reported
Level reading date:	1993-08-17	Feet below surface:	Not Reported
Feet to sea level:	11.86	Note:	Not Reported
Level reading date:	1993-06-18	Feet below surface:	Not Reported
Feet to sea level:	12.18	Note:	Not Reported
Level reading date:	1993-05-18	Feet below surface:	Not Reported
Feet to sea level:	12.56	Note:	Not Reported
Level reading date:	1993-04-29	Feet below surface:	Not Reported
Feet to sea level:	12.58	Note:	Not Reported
Level reading date:	1993-03-29	Feet below surface:	Not Reported
Feet to sea level:	12.81	Note:	Not Reported
Level reading date:	1993-02-18	Feet below surface:	Not Reported
Feet to sea level:	13.36	Note:	Not Reported
Level reading date:	1993-02-17	Feet below surface:	Not Reported
Feet to sea level:	13.36	Note:	Not Reported
Level reading date:	1993-02-02	Feet below surface:	Not Reported
Feet to sea level:	13.65	Note:	Not Reported
Level reading date:	1993-01-26	Feet below surface:	Not Reported
Feet to sea level:	13.52	Note:	Not Reported
Level reading date:	1992-12-21	Feet below surface:	Not Reported
Feet to sea level:	13.11	Note:	Not Reported
Level reading date:	1992-11-28	Feet below surface:	Not Reported
Feet to sea level:	13.05	Note:	Not Reported
Level reading date:	1992-11-05	Feet below surface:	Not Reported
Feet to sea level:	12.90	Note:	Not Reported
Level reading date:	1992-09-16	Feet below surface:	Not Reported
Feet to sea level:	12.30	Note:	Not Reported
Level reading date:	1992-09-08	Feet below surface:	Not Reported
Feet to sea level:	12.29	Note:	Not Reported
Level reading date:	1992-07-22	Feet below surface:	Not Reported
Feet to sea level:	12.44	Note:	Not Reported
Level reading date:	1992-06-03	Feet below surface:	Not Reported
Feet to sea level:	13.39	Note:	Not Reported
Level reading date:	1992-04-24	Feet below surface:	Not Reported
Feet to sea level:	13.43	Note:	Not Reported
Level reading date:	1992-03-12	Feet below surface:	Not Reported
Feet to sea level:	13.32	Note:	Not Reported
Level reading date:	1992-01-22	Feet below surface:	Not Reported
Feet to sea level:	14.40	Note:	Not Reported
Level reading date:	1991-12-05	Feet below surface:	Not Reported
Feet to sea level:	14.09	Note:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	1991-11-13	Feet below surface:	Not Reported
Feet to sea level:	13.83	Note:	Not Reported
Level reading date:	1991-10-17	Feet below surface:	Not Reported
Feet to sea level:	13.58	Note:	Not Reported
Level reading date:	1991-10-01	Feet below surface:	Not Reported
Feet to sea level:	13.38	Note:	Not Reported
Level reading date:	1991-09-04	Feet below surface:	Not Reported
Feet to sea level:	12.06	Note:	Not Reported
Level reading date:	1991-06-27	Feet below surface:	Not Reported
Feet to sea level:	12.61	Note:	Not Reported
Level reading date:	1991-05-23	Feet below surface:	Not Reported
Feet to sea level:	13.71	Note:	Not Reported
Level reading date:	1991-03-04	Feet below surface:	Not Reported
Feet to sea level:	15.08	Note:	Not Reported
Level reading date:	1991-01-23	Feet below surface:	Not Reported
Feet to sea level:	14.96	Note:	Not Reported
Level reading date:	1990-12-27	Feet below surface:	Not Reported
Feet to sea level:	14.96	Note:	Not Reported
Level reading date:	1990-12-11	Feet below surface:	Not Reported
Feet to sea level:	14.31	Note:	Not Reported
Level reading date:	1990-11-28	Feet below surface:	Not Reported
Feet to sea level:	14.14	Note:	Not Reported
Level reading date:	1990-10-24	Feet below surface:	Not Reported
Feet to sea level:	13.64	Note:	Not Reported
Level reading date:	1990-09-26	Feet below surface:	Not Reported
Feet to sea level:	14.13	Note:	Not Reported
Level reading date:	1990-08-23	Feet below surface:	Not Reported
Feet to sea level:	13.83	Note:	Not Reported
Level reading date:	1990-07-23	Feet below surface:	Not Reported
Feet to sea level:	14.05	Note:	Not Reported
Level reading date:	1990-06-06	Feet below surface:	Not Reported
Feet to sea level:	15.15	Note:	Not Reported
Level reading date:	1990-05-31	Feet below surface:	Not Reported
Feet to sea level:	15.21	Note:	Not Reported
Level reading date:	1990-05-29	Feet below surface:	Not Reported
Feet to sea level:	15.23	Note:	Not Reported
Level reading date:	1990-04-17	Feet below surface:	Not Reported
Feet to sea level:	16.45	Note:	Not Reported
Level reading date:	1990-03-07	Feet below surface:	Not Reported
Feet to sea level:	17.16	Note:	Not Reported
Level reading date:	1990-01-18	Feet below surface:	Not Reported
Feet to sea level:	17.77	Note:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	1989-12-06	Feet below surface:	Not Reported
Feet to sea level:	17.96	Note:	Not Reported
Level reading date:	1989-11-27	Feet below surface:	Not Reported
Feet to sea level:	17.86	Note:	Not Reported
Level reading date:	1989-10-24	Feet below surface:	Not Reported
Feet to sea level:	17.92	Note:	Not Reported
Level reading date:	1989-09-13	Feet below surface:	Not Reported
Feet to sea level:	16.98	Note:	Not Reported
Level reading date:	1989-08-11	Feet below surface:	Not Reported
Feet to sea level:	16.65	Note:	Not Reported
Level reading date:	1989-07-18	Feet below surface:	Not Reported
Feet to sea level:	16.61	Note:	Not Reported
Level reading date:	1989-06-01	Feet below surface:	Not Reported
Feet to sea level:	16.42	Note:	Not Reported
Level reading date:	1989-05-23	Feet below surface:	Not Reported
Feet to sea level:	16.35	Note:	Not Reported
Level reading date:	1989-05-01	Feet below surface:	Not Reported
Feet to sea level:	16.43	Note:	Not Reported
Level reading date:	1989-03-01	Feet below surface:	Not Reported
Feet to sea level:	15.96	Note:	Not Reported
Level reading date:	1989-01-17	Feet below surface:	Not Reported
Feet to sea level:	16.05	Note:	Not Reported
Level reading date:	1988-12-01	Feet below surface:	Not Reported
Feet to sea level:	15.96	Note:	Not Reported
Level reading date:	1988-11-02	Feet below surface:	Not Reported
Feet to sea level:	15.95	Note:	Not Reported
Level reading date:	1988-10-11	Feet below surface:	Not Reported
Feet to sea level:	15.87	Note:	Not Reported
Level reading date:	1988-09-13	Feet below surface:	Not Reported
Feet to sea level:	16.08	Note:	Not Reported
Level reading date:	1988-07-20	Feet below surface:	Not Reported
Feet to sea level:	16.39	Note:	Not Reported
Level reading date:	1988-06-17	Feet below surface:	Not Reported
Feet to sea level:	16.60	Note:	Not Reported
Level reading date:	1988-06-03	Feet below surface:	Not Reported
Feet to sea level:	16.69	Note:	Not Reported
Level reading date:	1988-05-19	Feet below surface:	Not Reported
Feet to sea level:	16.80	Note:	Not Reported
Level reading date:	1988-04-13	Feet below surface:	Not Reported
Feet to sea level:	16.94	Note:	Not Reported
Level reading date:	1988-02-23	Feet below surface:	Not Reported
Feet to sea level:	17.02	Note:	Not Reported

Level reading date:	1988-01-11	Feet below surface:	Not Reported
Feet to sea level:	16.52	Note:	Not Reported
Level reading date:	1987-12-02	Feet below surface:	Not Reported
Feet to sea level:	15.76	Note:	Not Reported
Level reading date:	1987-11-23	Feet below surface:	Not Reported
Feet to sea level:	15.71	Note:	Not Reported
Level reading date:	1987-10-15	Feet below surface:	Not Reported
Feet to sea level:	15.08	Note:	Not Reported
Level reading date:	1987-08-10	Feet below surface:	Not Reported
Feet to sea level:	14.52	Note:	Not Reported
Level reading date:	1987-08-03	Feet below surface:	Not Reported
Feet to sea level:	14.75	Note:	Not Reported
Level reading date:	1987-07-14	Feet below surface:	Not Reported
Feet to sea level:	14.82	Note:	Not Reported
Level reading date:	1987-05-20	Feet below surface:	Not Reported
Feet to sea level:	14.88	Note:	Not Reported
Level reading date:	1987-04-13	Feet below surface:	Not Reported
Feet to sea level:	14.38	Note:	Not Reported
Level reading date:	1987-03-11	Feet below surface:	Not Reported
Feet to sea level:	14.85	Note:	Not Reported
Level reading date:	1987-02-11	Feet below surface:	Not Reported
Feet to sea level:	14.87	Note:	Not Reported
Level reading date:	1987-01-21	Feet below surface:	Not Reported
Feet to sea level:	15.20	Note:	Not Reported
Level reading date:	1987-01-13	Feet below surface:	Not Reported
Feet to sea level:	15.06	Note:	Not Reported
Level reading date:	1986-12-11	Feet below surface:	Not Reported
Feet to sea level:	14.86	Note:	Not Reported
Level reading date:	1986-11-21	Feet below surface:	Not Reported
Feet to sea level:	14.46	Note:	Not Reported
Level reading date:	1986-10-01	Feet below surface:	Not Reported
Feet to sea level:	14.04	Note:	Not Reported
Level reading date:	1986-08-22	Feet below surface:	Not Reported
Feet to sea level:	13.64	Note:	Not Reported
Level reading date:	1986-07-23	Feet below surface:	Not Reported
Feet to sea level:	13.41	Note:	Not Reported
Level reading date:	1986-07-09	Feet below surface:	Not Reported
Feet to sea level:	13.34	Note:	Not Reported
Level reading date:	1986-06-24	Feet below surface:	Not Reported
Feet to sea level:	13.39	Note:	Not Reported
Level reading date:	1986-06-17	Feet below surface:	Not Reported
Feet to sea level:	13.39	Note:	Not Reported

Level reading date:	1986-05-21	Feet below surface:	Not Reported
Feet to sea level:	13.40	Note:	Not Reported
Level reading date:	1986-05-16	Feet below surface:	Not Reported
Feet to sea level:	13.46	Note:	Not Reported
Level reading date:	1986-04-22	Feet below surface:	Not Reported
Feet to sea level:	13.60	Note:	Not Reported
Level reading date:	1986-02-28	Feet below surface:	Not Reported
Feet to sea level:	14.00	Note:	Not Reported
Level reading date:	1986-01-16	Feet below surface:	Not Reported
Feet to sea level:	13.99	Note:	Not Reported
Level reading date:	1985-11-29	Feet below surface:	Not Reported
Feet to sea level:	13.72	Note:	Not Reported
Level reading date:	1985-10-11	Feet below surface:	Not Reported
Feet to sea level:	13.05	Note:	Not Reported
Level reading date:	1985-09-16	Feet below surface:	Not Reported
Feet to sea level:	13.16	Note:	Not Reported
Level reading date:	1985-08-22	Feet below surface:	Not Reported
Feet to sea level:	13.14	Note:	Not Reported
Level reading date:	1985-07-26	Feet below surface:	Not Reported
Feet to sea level:	13.57	Note:	Not Reported
Level reading date:	1983-08-26	Feet below surface:	Not Reported
Feet to sea level:	16.50	Note:	Not Reported
Level reading date:	1983-08-26	Feet below surface:	Not Reported
Feet to sea level:	16.41	Note:	Not Reported

F15
West
1/2 - 1 Mile
Higher

HI WELLS **HI1100000003623**

Well ID:	6-5430-004	Well Name:	Waiehu TH-D
Well Owner:	State of Hawaii, DLNR Land Division Oahu, DLNR-LD		
Land Owner:	Not Reported	Pump Rate (g/m):	0
Year Drillled:	1975	Original Well Name:	Not Reported
Driller:	Continental Drilling Hawaii, Inc		
Well Construction Type:	Rotary	Casing Diameter (in):	1
Ground Elevation (ft):	382	Well Depth (ft):	490
Solid Casing Depth:	488	Perforated Casing Depth:	Not Reported
Major Well Use:	Observation	Inital Water Level (ft):	0
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	0	Date Tested:	Not Reported
Test Pump Rate (g/m):	Not Reported	Test Drawdown Rate (ft):	Not Reported
Test Chloride Content (MG/L):	Not Reported	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-108	Solid Casing Bottom Elevation:	-106
Year Installed:	Not Reported	Pump Capacity (MM gal/day):	Not Reported
Pump Intake Depth:	Not Reported	Latest Head:	Not Reported
Latest WCR1 Report:	10/2/1975	Latest WCR2 Report:	Not Reported
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

F16
West
1/2 - 1 Mile
Higher | **HI WELLS** | **HI1100000003624**

Well ID:	6-5430-005	Well Name:	Waiehu Deep Monitor
Well Owner:	Commission on Water Resource Management, CWRM		
Land Owner:	Higashino-Minney LLC	Pump Rate (g/m):	0
Year Drillled:	1982	Original Well Name:	Not Reported
Driller:	Water Resources International, Inc.		
Well Construction Type:	Rotary	Casing Diameter (in):	10
Ground Elevation (ft):	380	Well Depth (ft):	1400
Solid Casing Depth:	400	Perforated Casing Depth:	Not Reported
Major Well Use:	Deep (through Transition zone)		
Inital Water Level (ft):	Not Reported	Water Level After Drilling:	Not Reported
Water Level After Install:	Not Reported	Chloride Content (mg/L):	0
Date Tested:	Not Reported	Test Pump Rate (g/m):	Not Reported
Test Drawdown Rate (ft):	Not Reported	Test Chloride Content (MG/L):	Not Reported
Test Water Temp:	Not Reported	Temp Unit:	Not Reported
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Draft Year:	Not Reported	Hole Bottom Elevation:	-1020
Solid Casing Bottom Elevation:	-20	Year Installed:	Not Reported
Pump Capacity (MM gal/day):	Not Reported	Pump Intake Depth:	Not Reported
Latest Head:	Not Reported	Latest WCR1 Report:	1/1/1982
Latest WCR2 Report:	Not Reported	Transmissivity:	Not Reported
Min to pump 5 volumes:	Not Reported		

E17
SW
1/2 - 1 Mile
Higher | **HI WELLS** | **HI1100000003620**

Well ID:	6-5430-001	Well Name:	Waiehu Heights 1
Well Owner:	Maui Department of Water Supply, MDWS		
Land Owner:	County of Maui	Pump Rate (g/m):	700
Year Drillled:	1975	Original Well Name:	514
Driller:	Water Resources International, Inc.		
Well Construction Type:	Rotary	Casing Diameter (in):	14
Ground Elevation (ft):	337	Well Depth (ft):	675
Solid Casing Depth:	337	Perforated Casing Depth:	367
Major Well Use:	County	Inital Water Level (ft):	18
Water Level After Drilling:	Not Reported	Water Level After Install:	Not Reported
Chloride Content (mg/L):	52	Date Tested:	4/21/1975
Test Pump Rate (g/m):	1300	Test Drawdown Rate (ft):	6.5
Test Chloride Content (MG/L):	51	Test Water Temp:	Not Reported
Temp Unit:	Not Reported	Max Chloride Level:	Not Reported
Minimum Chloride Level:	Not Reported	Draft Year:	Not Reported
Hole Bottom Elevation:	-338	Solid Casing Bottom Elevation:	0
Year Installed:	2007	Pump Capacity (MM gal/day):	1.008
Pump Intake Depth:	359	Latest Head:	Not Reported
Latest WCR1 Report:	5/1/1975	Latest WCR2 Report:	10/16/2007
Transmissivity:	Not Reported	Min to pump 5 volumes:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

F18
West
1/2 - 1 Mile
Higher | **FED USGS** | **USGS40000269182**

Organization ID:	USGS-HI	Organization Name:	USGS Hawaii Water Science Center
Monitor Location:	6-5430-05 Waiehu Deep Monitor Well, Maui, HI		
Type:	Well	Description:	Not Reported
HUC:	20020000	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	Hawaii volcanic-rock aquifers
Formation Type:	Wailuku Volcanic Series, Lava Flows		
Aquifer Type:	Unconfined single aquifer	Construction Date:	19820101
Well Depth:	1400	Well Depth Units:	ft
Well Hole Depth:	1400	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	82	Level reading date:	2002-08-22
Feet below surface:	Not Reported	Feet to sea level:	8.45
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-08-22	Feet below surface:	Not Reported
Feet to sea level:	8.44		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-07-03	Feet below surface:	Not Reported
Feet to sea level:	9.59		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-07-03	Feet below surface:	Not Reported
Feet to sea level:	9.51		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-05-14	Feet below surface:	Not Reported
Feet to sea level:	10.68		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-04-01	Feet below surface:	Not Reported
Feet to sea level:	10.26		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-04-01	Feet below surface:	Not Reported
Feet to sea level:	10.33		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-02-21	Feet below surface:	Not Reported
Feet to sea level:	10.25		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-02-06	Feet below surface:	Not Reported
Feet to sea level:	10.33		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-01-03	Feet below surface:	Not Reported
Feet to sea level:	9.72		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2002-01-03	Feet below surface:	Not Reported
Feet to sea level:	9.86		
Note:	Other conditions existed that would affect the measured water level.		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	2001-12-04	Feet below surface:	Not Reported
Feet to sea level:	8.82		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-10-01	Feet below surface:	Not Reported
Feet to sea level:	8.27		
Note:	Other conditions existed that would affect the measured water level.		
Level reading date:	2001-10-01	Feet below surface:	Not Reported
Feet to sea level:	8.25	Note:	Not Reported
Level reading date:	2001-08-22	Feet below surface:	Not Reported
Feet to sea level:	8.08	Note:	Not Reported
Level reading date:	2001-08-22	Feet below surface:	Not Reported
Feet to sea level:	8.06	Note:	Not Reported
Level reading date:	2001-07-02	Feet below surface:	Not Reported
Feet to sea level:	8.59	Note:	Not Reported
Level reading date:	2001-07-02	Feet below surface:	Not Reported
Feet to sea level:	8.54	Note:	Not Reported
Level reading date:	2001-05-17	Feet below surface:	Not Reported
Feet to sea level:	8.93	Note:	Not Reported
Level reading date:	2001-04-04	Feet below surface:	Not Reported
Feet to sea level:	9.19	Note:	Not Reported
Level reading date:	2001-04-04	Feet below surface:	Not Reported
Feet to sea level:	9.08	Note:	Not Reported
Level reading date:	2001-03-08	Feet below surface:	Not Reported
Feet to sea level:	9.49	Note:	Not Reported
Level reading date:	2001-01-25	Feet below surface:	Not Reported
Feet to sea level:	9.75	Note:	Not Reported
Level reading date:	2001-01-25	Feet below surface:	Not Reported
Feet to sea level:	9.74	Note:	Not Reported
Level reading date:	2001-01-03	Feet below surface:	Not Reported
Feet to sea level:	10.02	Note:	Not Reported
Level reading date:	2001-01-03	Feet below surface:	Not Reported
Feet to sea level:	9.94	Note:	Not Reported
Level reading date:	2000-12-07	Feet below surface:	Not Reported
Feet to sea level:	9.80	Note:	Not Reported
Level reading date:	2000-10-02	Feet below surface:	Not Reported
Feet to sea level:	9.15	Note:	Not Reported
Level reading date:	2000-10-02	Feet below surface:	Not Reported
Feet to sea level:	9.12	Note:	Not Reported
Level reading date:	2000-08-23	Feet below surface:	Not Reported
Feet to sea level:	8.69	Note:	Not Reported
Level reading date:	2000-08-23	Feet below surface:	Not Reported
Feet to sea level:	8.70	Note:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Level reading date:	2000-07-05	Feet below surface:	Not Reported
Feet to sea level:	8.95	Note:	Not Reported
Level reading date:	2000-07-05	Feet below surface:	Not Reported
Feet to sea level:	8.96	Note:	Not Reported
Level reading date:	2000-05-16	Feet below surface:	Not Reported
Feet to sea level:	9.56	Note:	Not Reported
Level reading date:	2000-04-27	Feet below surface:	Not Reported
Feet to sea level:	9.65	Note:	Not Reported
Level reading date:	2000-04-27	Feet below surface:	Not Reported
Feet to sea level:	9.68	Note:	Not Reported
Level reading date:	2000-04-03	Feet below surface:	Not Reported
Feet to sea level:	9.72	Note:	Not Reported
Level reading date:	2000-02-16	Feet below surface:	Not Reported
Feet to sea level:	10.10	Note:	Not Reported
Level reading date:	2000-01-20	Feet below surface:	Not Reported
Feet to sea level:	9.88	Note:	Not Reported
Level reading date:	2000-01-18	Feet below surface:	Not Reported
Feet to sea level:	9.84	Note:	Not Reported
Level reading date:	2000-01-06	Feet below surface:	Not Reported
Feet to sea level:	9.32	Note:	Not Reported
Level reading date:	1999-12-09	Feet below surface:	Not Reported
Feet to sea level:	8.48	Note:	Not Reported
Level reading date:	1999-10-04	Feet below surface:	Not Reported
Feet to sea level:	7.70	Note:	Not Reported
Level reading date:	1999-08-24	Feet below surface:	Not Reported
Feet to sea level:	8.24	Note:	Not Reported
Level reading date:	1999-08-24	Feet below surface:	Not Reported
Feet to sea level:	8.24	Note:	Not Reported
Level reading date:	1999-07-06	Feet below surface:	Not Reported
Feet to sea level:	8.87	Note:	Not Reported
Level reading date:	1999-06-23	Feet below surface:	Not Reported
Feet to sea level:	9.19	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	9.66	Note:	Not Reported
Level reading date:	1999-05-19	Feet below surface:	Not Reported
Feet to sea level:	9.66	Note:	Not Reported
Level reading date:	1999-03-29	Feet below surface:	Not Reported
Feet to sea level:	10.74	Note:	Not Reported
Level reading date:	1989-06-01	Feet below surface:	Not Reported
Feet to sea level:	16.41	Note:	Not Reported
Level reading date:	1988-07-20	Feet below surface:	Not Reported
Feet to sea level:	16.42	Note:	Not Reported

Level reading date:	1987-12-02	Feet below surface:	Not Reported
Feet to sea level:	15.81	Note:	Not Reported
Level reading date:	1987-08-03	Feet below surface:	Not Reported
Feet to sea level:	14.77	Note:	Not Reported
Level reading date:	1987-03-11	Feet below surface:	Not Reported
Feet to sea level:	14.84	Note:	Not Reported
Level reading date:	1987-02-11	Feet below surface:	Not Reported
Feet to sea level:	14.91	Note:	Not Reported
Level reading date:	1986-12-11	Feet below surface:	Not Reported
Feet to sea level:	14.94	Note:	Not Reported
Level reading date:	1986-11-21	Feet below surface:	Not Reported
Feet to sea level:	14.48	Note:	Not Reported
Level reading date:	1986-10-01	Feet below surface:	Not Reported
Feet to sea level:	14.09	Note:	Not Reported
Level reading date:	1986-07-23	Feet below surface:	Not Reported
Feet to sea level:	13.41	Note:	Not Reported
Level reading date:	1986-05-21	Feet below surface:	Not Reported
Feet to sea level:	13.40	Note:	Not Reported
Level reading date:	1986-04-22	Feet below surface:	Not Reported
Feet to sea level:	13.59	Note:	Not Reported
Level reading date:	1985-10-11	Feet below surface:	Not Reported
Feet to sea level:	13.04	Note:	Not Reported
Level reading date:	1985-09-16	Feet below surface:	Not Reported
Feet to sea level:	13.16	Note:	Not Reported
Level reading date:	1985-05-15	Feet below surface:	Not Reported
Feet to sea level:	13.63	Note:	Not Reported
Level reading date:	1985-03-29	Feet below surface:	Not Reported
Feet to sea level:	14.12	Note:	Not Reported
Level reading date:	1985-02-11	Feet below surface:	Not Reported
Feet to sea level:	14.29	Note:	Not Reported
Level reading date:	1985-01-03	Feet below surface:	Not Reported
Feet to sea level:	14.25	Note:	Not Reported
Level reading date:	1984-11-01	Feet below surface:	Not Reported
Feet to sea level:	13.99	Note:	Not Reported
Level reading date:	1984-10-18	Feet below surface:	Not Reported
Feet to sea level:	14.12	Note:	Not Reported
Level reading date:	1984-08-14	Feet below surface:	Not Reported
Feet to sea level:	14.21	Note:	Not Reported
Level reading date:	1984-07-03	Feet below surface:	Not Reported
Feet to sea level:	14.59	Note:	Not Reported
Level reading date:	1984-05-22	Feet below surface:	Not Reported
Feet to sea level:	15.31	Note:	Not Reported

Level reading date:	1984-04-09	Feet below surface:	Not Reported
Feet to sea level:	15.35	Note:	Not Reported
Level reading date:	1984-03-01	Feet below surface:	Not Reported
Feet to sea level:	15.70	Note:	Not Reported
Level reading date:	1984-01-16	Feet below surface:	Not Reported
Feet to sea level:	16.08	Note:	Not Reported
Level reading date:	1983-12-06	Feet below surface:	Not Reported
Feet to sea level:	15.93	Note:	Not Reported
Level reading date:	1983-10-19	Feet below surface:	Not Reported
Feet to sea level:	15.92	Note:	Not Reported
Level reading date:	1983-08-26	Feet below surface:	Not Reported
Feet to sea level:	16.45	Note:	Not Reported
Level reading date:	1983-08-24	Feet below surface:	Not Reported
Feet to sea level:	16.52	Note:	Not Reported
Level reading date:	1983-08-05	Feet below surface:	Not Reported
Feet to sea level:	16.68	Note:	Not Reported
Level reading date:	1982-01-01	Feet below surface:	263.70
Feet to sea level:	Not Reported	Note:	Not Reported

E19
SW
1/2 - 1 Mile
Higher

FRDS PWS HI0000212

Epa region:	09	State:	HI
Pwsid:	HI0000212	Pwsname:	WAILUKU
Cityserved:	WAILUKU	Stateserved:	HI
Zipserved:	Not Reported	Fipscounty:	Not Reported
Status:	Active	Retpopsrvd:	68054
Pwssvcconn:	20016	Psource longname:	Surface_water
Pwstype:	CWS	Owner:	Local_Govt
Contact:	TAYLOR, DAVID	Contactorgname:	TAYLOR, DAVID
Contactphone:	808-270-7816		
Contactaddress1:	DEPT. OF WATER SUPPLY, COUNTY OF MAUI		
Contactaddress2:	200 SOUTH HIGH STREET	Contactcity:	WAILUKU
Contactstate:	HI	Contactzip:	96793-2155
Pwsactivitycode:	A		
Pwsid:	HI0000212	Facid:	1080
Facname:	IAO DITCH WTP	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	particulate removal
Trtprocess:	filtration, ultrafiltration		
Factypecode:	TP		
Pwsid:	HI0000212	Facid:	1080
Facname:	IAO DITCH WTP	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	disinfection
Trtprocess:	chlorination (frds-1.5)	Factypecode:	TP
Pwsid:	HI0000212	Facid:	1084
Facname:	KANOA WELL 2	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	disinfection
Trtprocess:	chlorination (frds-1.5)	Factypecode:	TP

Pwsid:	HI0000212	Facid:	123
Facname:	WAIHEE WELLS 1,2,3 CHLORINATOR		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	organics removal	Trtprocess:	gaseous chlorination, pre
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	125
Facname:	NORTH WAIHEE WELL & KANOA WELL CHLORINAT		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	disinfection	Trtprocess:	hypochlorination, post
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	126
Facname:	NORTH WAIHEE WELL #2	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	disinfection
Trtprocess:	hypochlorination, post	Factypecode:	TP

Pwsid:	HI0000212	Facid:	127
Facname:	MOKUHAU WELLS 1, 3 CHLORINATOR		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	organics removal	Trtprocess:	gaseous chlorination, pre
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	128
Facname:	MOKUHAU WELL 1, 2	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	organics removal
Trtprocess:	gaseous chlorination, pre	Factypecode:	TP

Pwsid:	HI0000212	Facid:	129
Facname:	IAO TUNNEL UV	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	particulate removal
Trtprocess:	filtration, ultrafiltration		
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	129
Facname:	IAO TUNNEL UV	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	disinfection
Trtprocess:	chlorination (frds-1.5)	Factypecode:	TP

Pwsid:	HI0000212	Facid:	130
Facname:	KEPANIWAI WELL CHLORINATOR		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	organics removal	Trtprocess:	gaseous chlorination, pre
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	131
Facname:	WAIEHU HEIGHTS WELLS 1, 2 CHLORINATOR		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	disinfection	Trtprocess:	hypochlorination, post
Factypecode:	TP		

Pwsid:	HI0000212	Facid:	132
Facname:	WAIEHU HEIGHTS 2	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	disinfection
Trtprocess:	hypochlorination, post	Factypecode:	TP

Pwsid:	HI0000212	Facid:	133
Facname:	WAIHEE 1	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	organics removal
Trtprocess:	gaseous chlorination, pre	Factypecode:	TP

Pwsid:	HI0000212	Facid:	134

Facname:	WAIHEE 2	Factype:	Treatment_plant
Facactivitycode:	A	Trtobjective:	organics removal
Trtprocess:	gaseous chlorination, pre	Factypecode:	TP

Pwsid:	HI0000212	Facid:	937
Facname:	WAILUKU AG. SHAFT 33 CHLORINATOR		
Factype:	Treatment_plant	Facactivitycode:	A
Trtobjective:	disinfection	Trtprocess:	chlorination (frds-1.5)
Factypecode:	TP		

PWS ID:	HI0000212	PWS name:	DWS WAILUKU
Address:	Not Reported	Care of:	Not Reported
City:	WAILUKU, MAUI	State:	HI
Zip:	96793	Owner:	DWS WAILUKU
Source code:	Surface water	Population:	41691

PWS ID:	HI0000212	PWS type:	System Owner/Responsible Party
PWS name:	MR. DAVID CRADDOCK, DIRECTOR		
PWS address:	DEPARTMENT OF WATER SUPPLY		
PWS address:	P.O. BOX 1109	PWS city:	WAILUKU
PWS state:	HI	PWS zip:	96793
PWS ID:	HI0000212	PWS type:	Laboratory
PWS name:	MS. CARI CERIZO	PWS address:	DEPARTMENT OF WATER SUPPLY
PWS address:	614 PALAPALA DRIVE	PWS city:	KAHULUI, MAUI
PWS state:	HI	PWS zip:	96732
PWS name:	WAILUKU	PWS type code:	C
Retail population served:	52200	Contact:	ENG, JEFFREY
Contact address:	Department of Water Supply		
Contact address:	200 South High Street	Contact city:	WAILUKU
Contact state:	HI	Contact zip:	96793-2155
Contact telephone:	808-270-7816		

County:	MAUI	Source:	Surface water
Treatment Objective:	DISINFECTION	Process:	GASEOUS CHLORINATION, POST
Population:	41691		

PWS ID:	HI0000212	Activity status:	Active
Date system activated:	7706	Date system deactivated:	Not Reported
Retail population:	00041691	System name:	DWS WAILUKU
System address:	Not Reported	System city:	WAILUKU, MAUI
System state:	HI	System zip:	96793

County FIPS:	Not Reported	City served:	WAILUKU

County FIPS:	002	City served:	WAILUKU

Population served:	10,001 - 50,000 Persons	Treatment:	Treated

Latitude:	205329	Longitude:	1563055

Latitude:	205329	Longitude:	1563055

Latitude:	205330	Longitude:	1563054

Latitude:	205309	Longitude:	1563230

Latitude:	205312	Longitude:	1563214

Latitude:	204954	Longitude:	1565512

Latitude:	205444	Longitude:	1563104

Latitude:	205440	Longitude:	1563101
Latitude:	205440	Longitude:	1563102
Latitude:	205432	Longitude:	1563044
Latitude:	205430	Longitude:	1563044

State:	HI	Latitude degrees:	20
Latitude minutes:	53	Latitude seconds:	9.0000
Longitude degrees:	156	Longitude minutes:	32
Longitude seconds:	30.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	53	Latitude seconds:	12.0000
Longitude degrees:	156	Longitude minutes:	32
Longitude seconds:	14.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	53	Latitude seconds:	29.0000
Longitude degrees:	156	Longitude minutes:	30
Longitude seconds:	55.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	53	Latitude seconds:	30.0000
Longitude degrees:	156	Longitude minutes:	30
Longitude seconds:	54.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	54	Latitude seconds:	30.0000
Longitude degrees:	156	Longitude minutes:	30
Longitude seconds:	44.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	54	Latitude seconds:	32.0000
Longitude degrees:	156	Longitude minutes:	30
Longitude seconds:	44.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	54	Latitude seconds:	40.0000
Longitude degrees:	156	Longitude minutes:	31
Longitude seconds:	1.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	54	Latitude seconds:	40.0000
Longitude degrees:	156	Longitude minutes:	31
Longitude seconds:	2.0000		

State:	HI	Latitude degrees:	20
Latitude minutes:	54	Latitude seconds:	44.0000
Longitude degrees:	156	Longitude minutes:	31
Longitude seconds:	4.0000		

Violation id:	10101	Orig code:	S
State:	HI	Violation Year:	2000
Contamination code:	3100	Contamination Name:	Coliform (TCR)
Violation code:	22	Violation name:	MCL, Monthly (TCR)
Rule code:	110	Rule name:	TCR
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	10/01/2000
Cmp edt:	10/31/2000		

Violation id:	10201	Orig code:	S
State:	HI	Violation Year:	2000
Contamination code:	3100	Contamination Name:	Coliform (TCR)
Violation code:	21	Violation name:	MCL, Acute (TCR)
Rule code:	110	Rule name:	TCR
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	10/01/2000
Cmp edt:	10/31/2000		

Violation id:	10202	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	1024	Contamination Name:	CYANIDE
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	333	Rule name:	Other IOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10210	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2031	Contamination Name:	Dalapon
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10211	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2040	Contamination Name:	Picloram
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10212	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2041	Contamination Name:	Dinoseb
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10213	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2105	Contamination Name:	2,4-D
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10214	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2110	Contamination Name:	2,4,5-TP
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10215	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2326	Contamination Name:	Pentachlorophenol
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10216	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2035	Contamination Name:	Di(2-ethylhexyl) adipate
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10217	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2039	Contamination Name:	Di(2-ethylhexyl) phthalate
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10218	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2306	Contamination Name:	Benzo(a)pyrene
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10222	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2033	Contamination Name:	Endothall
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10224	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2032	Contamination Name:	Diquat
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10226	Orig code:	S
State:	HI	Violation Year:	2008
Contamination code:	2063	Contamination Name:	2,3,7,8-TCDD
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	320	Rule name:	SOC
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2008
Cmp edt:	12/31/2010		

Violation id:	10229	Orig code:	S
State:	HI	Violation Year:	2010
Contamination code:	1040	Contamination Name:	Nitrate
Violation code:	03	Violation name:	Monitoring, Regular
Rule code:	331	Rule name:	Nitrates
Violation measur:	Not Reported	Unit of measure:	Not Reported
State mcl:	Not Reported	Cmp bdt:	01/01/2010
Cmp edt:	12/31/2010		

Violation ID:	10101	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/16/2000
Enforcement Detail:	St Violation/Reminder Notice		
Enforcement Category:	Informal		

Violation ID:	10101	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/16/2000
Enforcement Detail:	St Public Notif requested	Enforcement Category:	Informal

Violation ID:	10101	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/19/2000
Enforcement Detail:	St Public Notif issued	Enforcement Category:	Informal

Violation ID:	10201	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/19/2000
Enforcement Detail:	St Public Notif issued	Enforcement Category:	Informal

Violation ID:	10201	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/16/2000
Enforcement Detail:	St Public Notif requested	Enforcement Category:	Informal

Violation ID:	10201	Orig Code:	S
Enforcemnt FY:	2001	Enforcement Action:	10/16/2000
Enforcement Detail:	St Violation/Reminder Notice		
Enforcement Category:	Informal		

Violation ID:	10202	Orig Code:	S
Enforcemnt FY:	2010	Enforcement Action:	06/27/2010
Enforcement Detail:	St Public Notif received	Enforcement Category:	Informal

Violation ID:	10202	Orig Code:	S
Enforcemnt FY:	2010	Enforcement Action:	05/07/2010
Enforcement Detail:	St Compliance achieved	Enforcement Category:	Resolving

Violation ID:	10202	Orig Code:	S
Enforcemnt FY:	2010	Enforcement Action:	04/28/2010
Enforcement Detail:	St Violation/Reminder Notice		
Enforcement Category:	Informal		

Violation ID:	10210	Orig Code:	S
Enforcemnt FY:	2011	Enforcement Action:	06/30/2011
Enforcement Detail:	St Public Notif received	Enforcement Category:	Informal

Violation ID:	10210	Orig Code:	S
Enforcemnt FY:	2012	Enforcement Action:	11/16/2011
Enforcement Detail:	St Compliance achieved	Enforcement Category:	Resolving

Violation ID:	10210	Orig Code:	S
Enforcemnt FY:	2011	Enforcement Action:	05/23/2011
Enforcement Detail:	St Violation/Reminder Notice		
Enforcement Category:	Informal		

Violation ID:	10211	Orig Code:	S

Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10211
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10211
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10212
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10212
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10212
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10213
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10213
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10213
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10214
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10214
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10214
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10215
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10215
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10215
Enforcemnt FY: 2011
Orig Code: S
Enforcement Action: 06/30/2011

Enforcement Detail: St Public Notif received
Enforcement Category: Informal

Violation ID: 10216
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10216
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10216
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10217
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10217
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10217
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10218
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10218
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10218
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10222
Enforcemnt FY: 2012
Enforcement Detail: St Compliance achieved
Orig Code: S
Enforcement Action: 11/16/2011
Enforcement Category: Resolving

Violation ID: 10222
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10222
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10224
Enforcemnt FY: 2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal
Orig Code: S
Enforcement Action: 05/23/2011

Violation ID: 10224
Enforcemnt FY: 2011
Enforcement Detail: St Public Notif received
Orig Code: S
Enforcement Action: 06/30/2011
Enforcement Category: Informal

Violation ID: 10224 Orig Code: S
Enforcemnt FY: 2012 Enforcement Action: 11/16/2011
Enforcement Detail: St Compliance achieved Enforcement Category: Resolving

Violation ID: 10226 Orig Code: S
Enforcemnt FY: 2012 Enforcement Action: 11/16/2011
Enforcement Detail: St Compliance achieved Enforcement Category: Resolving

Violation ID: 10226 Orig Code: S
Enforcemnt FY: 2011 Enforcement Action: 05/23/2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal

Violation ID: 10226 Orig Code: S
Enforcemnt FY: 2011 Enforcement Action: 06/30/2011
Enforcement Detail: St Public Notif received Enforcement Category: Informal

Violation ID: 10229 Orig Code: S
Enforcemnt FY: 2011 Enforcement Action: 06/30/2011
Enforcement Detail: St Public Notif received Enforcement Category: Informal

Violation ID: 10229 Orig Code: S
Enforcemnt FY: 2012 Enforcement Action: 11/14/2011
Enforcement Detail: St Compliance achieved Enforcement Category: Resolving

Violation ID: 10229 Orig Code: S
Enforcemnt FY: 2011 Enforcement Action: 06/09/2011
Enforcement Detail: St Violation/Reminder Notice
Enforcement Category: Informal

PWS name: WAILUKU Population served: 52200
PWS type code: C Violation ID: 10101
Contaminant: COLIFORM (TCR)
Violation type: Max Contaminant Level, Monthly (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/16/2000 0:00:00 Enforcement action: State Violation/Reminder Notice
Violation measurement: Not Reported

PWS name: WAILUKU Population served: 52200
PWS type code: C Violation ID: 10101
Contaminant: COLIFORM (TCR)
Violation type: Max Contaminant Level, Monthly (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/16/2000 0:00:00 Enforcement action: State Public Notif Requested
Violation measurement: Not Reported

PWS name: WAILUKU Population served: 52200
PWS type code: C Violation ID: 10101
Contaminant: COLIFORM (TCR)
Violation type: Max Contaminant Level, Monthly (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/19/2000 0:00:00 Enforcement action: State Public Notif Issued
Violation measurement: Not Reported

PWS name: WAILUKU Population served: 52200
PWS type code: C Violation ID: 10201
Contaminant: COLIFORM (TCR) Violation type: Max Contaminant Level, Acute (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/16/2000 0:00:00 Enforcement action: State Violation/Reminder Notice
Violation measurement: Not Reported

PWS name: WAILUKU Population served: 52200

PWS type code: C Violation ID: 10201
Contaminant: COLIFORM (TCR) Violation type: Max Contaminant Level, Acute (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/16/2000 0:00:00 Enforcement action: State Public Notif Requested
Violation measurement: Not Reported

PWS name: WAILUKU Population served: 52200
PWS type code: C Violation ID: 10201
Contaminant: COLIFORM (TCR) Violation type: Max Contaminant Level, Acute (TCR)
Compliance start date: 10/1/2000 0:00:00 Compliance end date: 10/31/2000 0:00:00
Enforcement date: 10/19/2000 0:00:00 Enforcement action: State Public Notif Issued
Violation measurement: Not Reported

E20
SW
1/2 - 1 Mile
Higher
FED USGS USGS40000269190

Organization ID: USGS-HI Organization Name: USGS Hawaii Water Science Center
Monitor Location: 6-5430-02 Waiehu Heights 2, Maui, HI
Type: Well Description: Not Reported
HUC: 20020000 Drainage Area: Not Reported
Drainage Area Units: Not Reported Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported Aquifer: Not Reported
Formation Type: Not Reported Aquifer Type: Not Reported
Construction Date: 19750425 Well Depth: 543
Well Depth Units: ft Well Hole Depth: 543
Well Hole Depth Units: ft

E21
SW
1/2 - 1 Mile
Higher
FED USGS USGS40000269188

Organization ID: USGS-HI Organization Name: USGS Hawaii Water Science Center
Monitor Location: 6-5430-01 Waiehu Heights 1, Maui, HI
Type: Well Description: Not Reported
HUC: 20020000 Drainage Area: Not Reported
Drainage Area Units: Not Reported Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported Aquifer: Not Reported
Formation Type: Not Reported Aquifer Type: Not Reported
Construction Date: 19750416 Well Depth: 675
Well Depth Units: ft Well Hole Depth: 675
Well Hole Depth Units: ft

Ground water levels,Number of Measurements: 1 Level reading date: 1975-06-24
Feet below surface: 319.64 Feet to sea level: Not Reported
Note: Not Reported

G22
ESE
1/2 - 1 Mile
Lower
FED USGS USGS40000269194

Organization ID: USGS-HI Organization Name: USGS Hawaii Water Science Center
Monitor Location: 6-5429-01 W18 Type: Well
Description: Not Reported HUC: 20020000

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19470101
Well Depth:	31	Well Depth Units:	ft
Well Hole Depth:	Not Reported	Well Hole Depth Units:	Not Reported

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G23
ESE
1/2 - 1 Mile
Lower

HI WELLS **HI1100000003617**

Well ID:	6-5429-001	Well Name:	De Lara
Well Owner:	Susan Kuwada	Land Owner:	Susan Kuwada
Pump Rate (g/m):	Not Reported	Year Drillled:	1947
Original Well Name:	Not Reported	Driller:	J. Ventura
Well Construction Type:	Not Reported	Casing Diameter (in):	8
Ground Elevation (ft):	Not Reported	Well Depth (ft):	31
Solid Casing Depth:	22	Perforated Casing Depth:	Not Reported
Major Well Use:	Irrigation (non-domestic, non-agriculture)		
Inital Water Level (ft):	Not Reported	Water Level After Drilling:	Not Reported
Water Level After Install:	Not Reported	Chloride Content (mg/L):	528
Date Tested:	Not Reported	Test Pump Rate (g/m):	Not Reported
Test Drawdown Rate (ft):	3	Test Chloride Content (MG/L):	Not Reported
Test Water Temp:	Not Reported	Temp Unit:	Not Reported
Max Chloride Level:	Not Reported	Minimum Chloride Level:	Not Reported
Draft Year:	Not Reported	Hole Bottom Elevation:	Not Reported
Solid Casing Bottom Elevation:	Not Reported	Year Installed:	Not Reported
Pump Capacity (MM gal/day):	Not Reported	Pump Intake Depth:	Not Reported
Latest Head:	Not Reported	Latest WCR1 Report:	1/1/1947
Latest WCR2 Report:	Not Reported	Transmissivity:	Not Reported
Min to pump 5 volumes:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for MAUI County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96793

Number of sites tested: 11

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.291 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii.

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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APPENDIX D: QUALIFICATIONS

PARTNER

PARTNER

Josh Barton
Project Assessor

Education
Bachelor of Science, Biology and Science Education, Southeastern Oklahoma State University

Registrations and Training
MBA multi-family Property Inspection Workshop
Asbestos Inspector

Highlights
8 years of experience performing engineering and environmental due diligence assessments
8 years of experience performing environmental assessments for agencies such as HUD, Fannie Mae, SBA
7 years completing Property Condition Assessments and HUD Project Capital Needs Assessments
2 years of completing construction progress monitoring assessments

Experience Summary
Mr. Barton currently holds the role of a Project Manager and Assessor and his responsibilities include thorough site assessment and technical report writing in line with the American Society of Testing and Materials (ASTM) standard and US Environmental Protection Agency's All Appropriate Inquiry (AAI) as well as customized client formats. In addition, Mr. Barton performs limited asbestos surveys, lead-based paint surveys and radon testing as required per scope of work. Mr. Barton also serves as a project manager for various scopes of work. He is responsible for ensuring consistency, quality, and on-time delivery of all projects. Mr. Barton works directly with clients to discuss and manage the specific needs and scopes of work necessary for each transaction.

Mr. Barton has completed over 750 projects located throughout Texas and Hawaii as well as 25 other states, Guam, and Puerto Rico. Mr. Barton works closely with state and local regulatory agencies to obtain environmentally significant documents regarding tank removal and subsurface investigations performed onsite. Mr. Barton has worked for large financial institutions as well as private investors and has also performed work for the Federal Deposit Insurance Corporation, HUD, Fannie Mae, Freddie Mac, and SBA. Mr. Barton has also completed Property Condition Assessments for seven years for various commercial, industrial, medical, and multi-family properties.

Mr. Barton has worked on numerous sites occupied by machine shops, auto repair facilities, printing facilities, manufacturing plants, distribution facilities, bio-diesel facilities, multi-family, high-rise office towers and hotels, dry cleaners, gas stations, historical military bases, casino/hotel resorts, and downtown metropolitan properties. Mr. Barton has completed numerous Naturally Occurring Radioactive Material (NORM) surveys for oil and gas exploration companies. His eight years of expertise in the research industry is a proven asset in identifying potential environmental hazards.

Project Experience
Mr. Barton has experience performing due diligence assessments for a variety of property types including multi-family residences, commercial office buildings, retail shopping centers, manufacturing plants, machine shops, auto repair facilities, agriculture properties, distribution facilities, historical properties, airports, dry cleaners, and gas stations. For each assessment he performs he reviews the condition of the building structure and systems and develops a thorough report.

Historical Fort McClellan Military Base, Anniston, Alabama. Mr. Barton performed a Phase I Environmental Assessment according to HUD guidelines at the former Fort McClellan Military Base.

Airport, Jacksonville, Florida. Mr. Barton performed a Phase I Environmental Assessment for an airport consisting of fuel storage tanks, hangars, and mechanical and service areas.

Oil and Gas exploration yard, Midland/Odessa, Texas. Mr. Barton has performed several NORM surveys and Phase I Environmental Assessments for oil and gas exploration properties that include fracking equipment, active wells, machine maintenance, and fuel storage.

Industrial Property, Mesquite, Texas. Mr. Barton performed a Phase I Environmental Assessment for 1,000,000 square foot manufacturing facility.

Gas Station ADA Survey, Seattle, Washington. Mr. Barton performed ADA surveys for multiple gas station properties in the Seattle area.

Multi-family, Las Vegas, Nevada. Mr. Barton performed a Phase I Environmental Assessment for three apartment complexes consisting of over 1,700 units and including radon testing at over 100 units.

Industrial, Kapolei, Hawaii. Mr. Barton has performed Environmental Assessments on several properties in the Campbell Industrial Park.

Office Building, Tamuning, Guam. Mr. Barton performed a Property Condition Assessment and Phase I Environmental Assessment for a telecommunications building.

Casino Resort, Gulfport, Mississippi. Mr. Barton performed a Phase I Environmental Assessment for a casino/hotel resort consisting of over 1,000 guest units in two hotel towers, casino, restaurants, and parking areas.

Multi-family, Ponce, Puerto Rico. Mr. Barton performed a HUD Physical Capital Needs Assessment for a seven story apartment complex.

Hotel Resort, Kapalua, Maui. Mr. Barton performed an indoor air quality assessment for a notable hotel property.

Hotel, Honolulu, Hawaii. Mr. Barton performed a Property Condition Assessment for a 496-room hotel property located in Waikiki.

Hotel Resort and Golf Course, Princeville, Kauai. Mr. Barton performed a Property Condition Assessment and Phase I Environmental Assessment for a 252-room hotel and 27-hole golf course situated on 324 acres.

Resort, Kona, Hawaii. Mr. Barton performed construction progress monitoring for the construction of a large resort property.

Contact

jbarton@partneresi.com

PARTNER

PARTNER

Jared Eudell
Project Scientist

Education

M.S., Systems Science; B.S., Environmental Studies; B.S., Marine Biology, Fairleigh Dickinson University

Registrations

Certified Recycling Professional, Rutgers University (expired)
Sustainable Resource Management Professional, Rutgers University (expired)
Wetlands Delineator, Rutgers University

Training

OSHA 40-Hour Hazardous Waste Operations & Emergency Responder (HAZWOPER)
AHERA Building Inspector

Highlights

5 years completing Phase I Environmental Site Assessments (ESAs) and related due diligence projects
5 years conducting subsurface activities including site remediation, Phase II, and geotechnical investigations
5 years providing regulatory compliance assistance for Underground Storage Tanks (USTs), stormwater, Spill Prevention Control and Countermeasures (SPCC), solid and hazardous waste, and recycling
1 year monitoring construction progress as part of fund control responsibilities
9 years performing watershed education, environmental advocacy, and government partnerships

Experience Summary

Mr. Eudell currently holds the title of Project Scientist with responsibilities including the practice of thorough site assessments and technical report writing in line with the American Society of Testing and Materials (ASTM) standards and US Environmental Protection Agency's All Appropriate Inquiry (AAI) requirements, as well as customized client formats. To date, Mr. Eudell has completed over 550 assessments.

Mr. Eudell also assists the Geotechnical and Subsurface Investigation disciplines with logistical and technical field services, conducts Construction Progress Monitoring (CPM) for fund control purposes, and consults on projects that require knowledge of SPCC Plans, environmental regulatory or permit compliance, and Geographic Information Systems (GIS).

Mr. Eudell formerly supported the Site Mitigation and Phase II Site Investigation teams with the monitoring and remediation of contaminated soil, groundwater and soil vapor from a variety of sites throughout the Mid-Atlantic region, including large colleges, hospitals and landfills. Mr. Eudell has extensive experience with low-flow purging techniques and managed the Quality Assurance and NJ Laboratory Accreditation program to maintain the operations. In addition to the field work and reporting, Mr. Eudell provided GIS and other analytical services to perform sensitive human and environmental receptor evaluations, groundwater flow and cross section diagrams and related analyses.

As part of the former Environmental Regulatory Compliance and Permitting group, Mr. Eudell was also responsible for providing consulting services to municipal, county, and state agencies, utility authorities, and other public and private clientele. These services spanned a wide array of regulatory programs and required comprehensive knowledge of NJPDES and stormwater permitting, underground storage tank

identification, maintenance and compliance requirements, air emission limits and reporting requirements, solid waste issues and recycling enhancement, and hazardous waste identification and training.

Mr. Eudell previously spent nine years as an environmental advocate and educator in northeast New Jersey, where, in cooperation with local, state, and federal governments and agencies helped local stakeholders, non-profit organizations, and academic and scientific institutions secure the preservation and restoration of wetlands, watersheds, and wildlife habitat.

Mr. Eudell has presented hundreds of presentations to schools, organizations, government bodies and the general public, and was a guest lecturer at Fairleigh Dickinson University for ten years.

Project Experience

Environmental Site Assessments, Multiple Property Types, Nationally. Mr. Eudell has performed hundreds of due diligence assessments (Phase I ESAs, Transaction Screens and Environmental Database Reviews) for a variety of property types including multi-family residences, commercial office buildings, retail shopping centers, dry-cleaners, colleges, manufacturing plants, machine shops, auto repair facilities, gasoline service stations and distribution facilities.

Subsurface Investigations, Multiple Property Types, San Diego. Mr. Eudell has conducted both geotechnical and environmental sampling for a variety of existing and proposed property types including multi-family residences, commercial buildings, retail shopping centers, hospitals, and potentially contaminated sites.

Construction Progress Monitoring, Multiple Property Types, San Diego. Mr. Eudell has monitored construction progress for both ground-up builds and renovations, including office buildings in Encinitas, multi-family residences in Oceanside and San Diego, and a mixed-use building in San Diego.

Site Mitigation, Multiple Sites*, NJ, NY and PA*. Mr. Eudell has assisted with over 50 remediation projects, including Preliminary Assessments, Receptor Evaluations, and ongoing soil, soil vapor and groundwater monitoring. For example, Mr. Eudell has assisted with identification and delineation of unauthorized releases from USTs, dry cleaners, and other on- and off-site sources at a restaurant in Clayton, NJ, a car dealership in Edison, NJ an amusement park in Freehold, NJ, a hospital in Wayne, NJ, colleges in Hoboken, NJ, and Jersey City, NJ, a dry cleaner in Whitehouse, PA and numerous industrial sites and landfills.

Regulatory Compliance/Risk Management, NJ Municipal Environmental Risk Management Fund, 370 Entities, NJ. Mr. Eudell helped coordinate environmental Loss Control/Loss Prevention Programs for over 370 municipal and utility authority members of the New Jersey Environmental Risk Management Fund (EJIF). Major responsibilities included conducting environmental audits of publically-owned properties to evaluate both applicability and compliance with various regulations (USTs, SPCC, stormwater, air emissions, solid waste/recycling, etc.), and providing assistance and resources during and after environmental emergencies.

USEPA Spill Prevention, Control and Countermeasure Plan (SPCC), Multiple Clients, Nationally. Mr. Eudell has worked with multiple health care systems (Meridian Health Village, Jackson, NJ and Trinitas Medical Center, Elizabeth, NJ) and dozens of municipalities and businesses to evaluate oil storage facilities and procedures, and implement plans to achieve at least minimal compliance with the SPCC Rule.

Solid Waste and Recycling, Multiple Clients, NJ. Mr. Eudell has worked with Union County, the Essex County Utilities Authority, and dozens of municipalities to enhance municipal solid waste (MSW) recycling rates by developing new programs and providing assistance to municipal recycling coordinators. Responsibilities have included: communicating with regulatory agencies and representing clients and their interests at meetings and seminars; preparing updates to Solid Waste Management Plans; auditing solid waste collection programs and generating budget analyses; permitting Class A (MSW), Class B (bulky debris), and Class C (compost) facilities; providing oversight and analysis for household hazardous waste collection events; auditing commercial buildings and multi-family dwellings to assess recycling compliance; reviewing ordinances and tonnage reports; and grant writing and implementation.

NJPDES/Municipal Stormwater Regulation Program, Multiple Clients, NJ. Mr. Eudell has provided stormwater planning, permitting, and compliance services, including the development and implementation of Stormwater Pollution Prevention Plans (SPPP) for such clients as Freehold Cartage, Inc. (Freehold, NJ), Linden Landfill (Linden, NJ) and Bayshore Recycling Corporation (Keasbey, NJ) as well as Monmouth County and the municipalities of Belmar, East Hanover, Emerson, North Plainfield, Ramsey, Secaucus. Services have included desk audits, stormwater mapping and pipe/discharge evaluations; stormwater discharge sampling; trainings/presentations to officials and public audiences; development of educational and outreach programs and materials; review of ordinances; and completion of annual reports.

Affiliations

Association of New Jersey Recycling Professionals (ANJR)
New Jersey WasteWise Business Network

Speaking

Seven Generations, "The Human Environment," Fairleigh Dickinson University, Hackensack, NJ (2005-2015). Discussed the contextual history of the environmental movement over the previous 2500 years; the interaction, influences and costs of modern life on our environmental and the connection between our choices and our future.

Regulatory Training, NJ Municipal Environmental Risk Management Fund Training Seminars, Multiple Venues, NJ (2006, 2007, 2009, 2010, 2011, 2012). Discussed the many Federal and State regulatory programs that affect the operations, equipment and personnel of municipal and utility authority entities. Problems, solutions and discussion were provided.

Developing and Implementing a New Monitoring Program, NJDEP Volunteer Monitoring Summit, Edison, NJ (2004). Detailed the basis and pitfalls of establishing a volunteer water monitoring program and the interconnectivity of the many pieces of the puzzle, including funding, materials, volunteers, logistics, data quality, etc.

Contact

jeudell@partneresi.com

Education
M.A. Environmental Studies, Brown University
B.S. Biology, University of California, Los Angeles, Emphasis in Ecology, Behavior and Evolution

Registrations
EPA Accredited Asbestos Inspector
National Registry of Environmental Professionals: Registered Environmental Property Assessor (REPA)

Training
California Underground Storage Tank Inspector

Highlights
15 years in environmental service industry
14 years performing Phase I Environmental Site Assessments (ESAs), Environmental Transaction Screens, radon screening, asbestos inspections, and lead-based paint inspection
13 years of experience with multi-family properties, commercial properties, retail shopping centers, municipal and private airports, oil well properties, oil refineries, gas stations, dry cleaners, aerospace manufacturers, dry cleaning plants, hotels, auto dealership and repair facilities, and various manufacturing operations throughout the US
8 years of project management experience in Environmental Assessments, Property Condition Assessments, Physical Needs Assessments, seismic evaluations, and ALTA Surveys, compliance reports
5 years of project management experience in ESAs and PCAs for properties located in Mexico, Canada, the Caribbean, Southeast Asia and South Pacific

Experience Summary
Ms. Churchill has served as an environmental scientist, project manager, senior author, or client manager for projects associated with thousands of real estate transactions. Ms. Churchill is familiar with the due diligence requirements of a varied number of reporting standards, including ASTM, EPA's All Appropriate Inquiry (AAI), Freddie Mac, Fannie Mae DUS, and U.S. Small Business Administration's (SBA) SOP 50 10. She also has experience with fulfilling numerous customized client scopes of work. Furthermore, Ms. Churchill has working experience in performing biological and noise assessments, and in preparing and reviewing environmental documentation in support of CEPA and NEPA.

While in graduate school, Ms. Churchill's Masters Thesis research focused on evaluating the potential of Japanese Knotweed (an invasive plant species) as an effective phytoremediator of heavy metal contaminated soils along a historically polluted river in Rhode Island. Phytoremediation refers to the natural ability of certain plants called hyperaccumulators to bioaccumulate contaminants in soil. Hyperaccumulators can be grown and harvested economically, leaving the soil with a greatly reduced level of toxic contamination. This cost-effective approach to remediation has gained increasing popularity in both academic and practical circles.

Ms. Churchill previously worked for the City of El Segundo, where she regularly collaborated with other local CUPAs to ensure compliance with State and Federal regulations. Ms. Churchill's responsibilities included implementing and enforcing elements of the CUPA program including the following: hazardous waste generator program; underground storage tank program; Hazardous Material Release Response Plan

(Business Plan) Program and the California Accidental Release Response Plan (CalARP) Programs. Ms. Churchill also worked on enforcing city specific environmental programs such as Stormwater Pollution Prevention and Industrial Wastewater Discharge. As the Principal Environmental Specialist for the City, Ms. Churchill worked with large industries such as Chevron, Northrop Grumman, Boeing and International Rectifier to ensure regulatory compliance pertaining to business operations and remedial activities.

Project Experience
International Airport Portfolio. Project Manager and Senior Reviewer for Phase I ESAs and PCAs of a confidential acquisition of airport facilities throughout the South Pacific and Southeast Asia. The project involved working with many foreign agencies and coordinating dual scope site visits at all facilities within a 2-week time frame.

West Coast Gas Station Portfolio. Project Manager for limited PCAs of an acquisition of gas station/car wash facilities throughout California, Oregon and Washington.

Mexico Industrial Site Portfolio. Project Manager and Senior Reviewer for Phase I ESAs of an acquisition of industrial/warehouse facilities throughout Northern Mexico. The project involved coordinating site inspections of multiple industrial facilities with private security in high risk danger areas.

Office Tower Portfolio, Los Angeles. Project Manager and Senior Reviewer for Phase I ESAs of a $1.34 Billion acquisition of Class A office buildings in Los Angeles.

Freddie Mac Multi-Scope Portfolio. Project Manager and Senior Reviewer for Phase I ESAs, PCAs and PMLs of an acquisition of multifamily apartment complexes throughout Southern California. The project involved coordinating three different scopes of specially qualified assessors to conduct site visits with radon and ACM sampling.

Contact
lchurchill@partneresi.com

PARTNER

PHASE II SUBSURFACE INVESTIGATION REPORT

Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui Island, Hawaii 96793

November 24, 2020
Partner Project Number: 20-283903.2

Prepared for:

Highridge Costa Development Company, LLC
330 West Victoria Street
Gardena, California 90248

Engineers who understand your business

PARTNER

November 24, 2020

Mohhanad Mohanna
Highridge Costa Development Company, LLC
330 West Victoria Street
Gardena, California 90248

Subject: Phase II Subsurface Investigation Report
Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui Island, Hawaii 96793
Partner Project Number: 20-283903.2

Partner Engineering and Science, Inc. (Partner) is pleased to provide the results of the assessment performed at the above-referenced property. The following report describes the field activities, methods, and findings of the Phase II Subsurface Investigation conducted at the above-referenced property.

This assessment was performed consistent with acceptable industry standards. The independent conclusions represent Partner's best professional judgment based upon existing conditions and the information and data available to us during the course of this assignment.

We appreciate the opportunity to provide these services. If you have any questions concerning this report, or if we can assist you in any other matter, please contact Lyly Churchill at 310-765-7271.

Sincerely,

Partner Engineering and Science, Inc.

Samantha J. Fujita
Regional Manager – Subsurface Investigation

Lyly Churchill
National Client Manager

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2. Soil Sample OCPs Laboratory Results
3. Comparison of Arsenic Laboratory Results and Regulatory Guidelines

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2. Sample Location Map

Appendix
A. Laboratory Analytical Report

1.0 INTRODUCTION

1.1 Purpose

The purpose of the investigation was to evaluate the potential impact of organochlorine pesticides (OCPs) and/or arsenic to soil as a consequence of a release or releases from the former on-site agricultural use. Highridge Costa Development Company, LLC provided project authorization of Partner Proposal Number P20-283903.2.

1.2 Limitations

This report presents a summary of work conducted by Partner. The work includes observations of site conditions encountered and the analytical results provided by an independent third-party laboratory of samples collected during the course of the project. The number and location of samples were selected to provide the required information. It cannot be assumed that the limited available data are representative of subsurface conditions in areas not sampled.

Conclusions and/or recommendations are based on the observations, laboratory analyses, and the governing regulations. Conclusions and/or recommendations beyond those stated and reported herein should not be inferred from this document.

Partner warrants that the environmental consulting services contained herein were accomplished in accordance with generally-accepted practices in the environmental engineering, geology, and hydrogeology fields that existed at the time and location of work. No other warranties are implied or expressed.

1.3 User Reliance

Partner was engaged by Highridge Costa Development Company, LLC (the Addressee), or their authorized representative, to perform this investigation. The engagement agreement specifically states the scope and purpose of the investigation, as well as the contractual obligations and limitations of both parties. This report and the information therein, are for the exclusive use of the Addressee. This report has no other purpose and may not be relied upon, or used, by any other person or entity without the written consent of Partner. Third parties that obtain this report, or the information therein, shall have no rights of recourse or recovery against Partner, its officers, employees, vendors, successors or assigns. Any such unauthorized user shall be responsible to protect, indemnify and hold Partner, the Addressee and their respective officers, employees, vendors, successors and assigns harmless from any and all claims, damages, losses, liabilities, expenses (including reasonable attorneys' fees) and costs attributable to such use. Unauthorized use of this report shall constitute acceptance of, and commitment to, these responsibilities, which shall be irrevocable and shall apply regardless of the cause of action or legal theory pled or asserted.

This report has been completed under specific Terms and Conditions relating to scope, relying parties, limitations of liability, indemnification, dispute resolution, and other factors relevant to any reliance on this report. Any parties relying on this report do so having accepted Partner's standard Terms and Conditions, a copy of which can be found at http://www.partneresi.com/terms-and-conditions.php.

2.0 SITE BACKGROUND

2.1 Site Description

The subject property consists of one parcel of land comprising 13.248 acres located on the southeast corner of the Kahekili Highway and Waiehu Beach Road intersection within a residential area of Maui Island, Maui County, Hawaii. The subject property is currently undeveloped land with water storage tanks, sheds, a water well pump, and planter boxes throughout the property.

The subject property is bound by residential properties and a cemetery to the north across Waiehu Beach Road, residential properties to the east, undeveloped land to the south, and undeveloped land to the west across Kahekili Highway. Refer to Figure 1 for a site vicinity map showing site features and surrounding properties.

2.2 Site History

Partner completed a *Phase I Environmental Site Assessment Report* (Phase I) for the subject property, dated July 2, 2020, on behalf of Highridge Costa Development Company, LLC. According to the reviewed historical sources, the subject property was previously agricultural by 1922 and developed with an orchard between 2010 and 2019.

The following recognized environmental condition (REC) was identified in the Phase I:

- The subject property was historically used for agricultural purposes. There is a potential that typical agricultural chemicals such as pesticides, herbicides, and fertilizers may have been used and stored on-site. Because residential development is proposed, the possible historical use of agricultural chemicals use is a REC.

3.0 FIELD ACTIVITIES

The Phase II Subsurface Investigation scope included collection of 14 multi-increment surficial soil samples (SS-1 through SS-14). Refer to Table 1 for a summary of the samples, sampling schedule and laboratory analyses for this investigation.

3.1 Preparatory Activities

Prior to the initiation of fieldwork, Partner completed the following activities.

3.1.1 Health and Safety Plan

Partner prepared a site-specific Health and Safety Plan, which was reviewed with on-site personnel involved in the project prior to the commencement of drilling activities.

3.2 Sample Locations

The subject property was divided into approximately 14 ¾-acre subareas (Decision Units) and a multi-increment agricultural soil sample was collected from each Decision Unit (SS-1 through SS-14).

Refer to Figure 2 for a map indicating sample locations.

3.3 Soil Sampling

Soil Sampling Methodology

Soil sampling was conducted on November 12, 2020. Agricultural soil sampling locations were prepared for sample collection by removing any surficial vegetation and the upper approximately 6 inches of soil with a trowel or shovel. At the desired sampling depth, soil was transferred with a trowel into a gallon-size plastic bag with a seal; labeled for identification; and stored in an iced cooler. Soil was collected from up to five locations in each Decision Unit and placed into the plastic bag. Sampling equipment was decontaminated between samples to prevent cross-contamination.

The sample locations were backfilled with surrounding soil upon completion of soil sampling. No significant amounts of derived wastes were generated during this investigation.

4.0 DATA ANALYSIS

4.1 Laboratory Analysis

Partner collected 14 soil samples on November 12, 2020, which were transported in an iced cooler under chain-of-custody protocol to ESN Northwest, Inc., in the City of Olympia, Washington, who subcontracted with Fremont Analytical in the City of Seattle, Washington for analysis. Each of the soil samples was prepared for analysis using the Hawai'i Department of Health (HDOH) multi-increment preparation and analyzed for OCPs via United States Environmental Protection Agency (EPA) Method 8081 and arsenic via EPA Method 6020B.

Laboratory analytical results are included in Appendix A and discussed below.

4.2 Regulatory Agency Comparison Criteria

Environmental Action Levels

For sites where releases of hazardous materials have occurred, the HDOH has developed conservative Environmental Action Levels (EALs) to aid in assessing the potential threats to human health and/or the environment due to contaminants in soil, soil gas, and/or groundwater. The EALs take into consideration potential impacts to human health, terrestrial/aquatic habitats, and/or drinking water resources. Under most circumstances, the presence of contamination below applicable EALs can be assumed to not pose a significant, chronic (i.e., long-term) adverse risk to the applicable receptor of concern. Conversely, sites that exceed EALs generally require further evaluation and/or remediation. Please note that the EALs were developed using default assumptions (e.g., standard exposure factors) and, consequently, are only meant for screening level assessments. The EALs should not be considered enforceable regulatory standards. Cleanup levels ultimately dependent on site-specific factors and are established by the regulatory agencies on a case-by-case basis.

4.3 Soil Sample Data Analysis

Various OCPs were detected in two of the analyzed soil samples (SS-7 and SS-11) above laboratory reporting limits (RLs). None of the detected OCPs exceeded the applicable Tier 1 EAL. In addition, none of the remaining soil samples contained OCPs above the laboratory RLs and the RLs did not exceed the Tier 1 EALs.

Arsenic was detected in each of the analyzed soil samples above the laboratory RL. None of the detected concentrations of arsenic exceeded the Tier 1 EAL and typical background concentrations for Hawai'i soil as based on the HDOH Hazard Evaluation and Emergency Response 2012 report *Hawaiian Islands Soil Metal Background Evaluation Report*.

Refer to Tables 2 and 3 for a summary of the soil sample OCPs and arsenic laboratory analysis results, respectively.

4.4 Discussion

There were no detections of OCPs or arsenic in soil above applicable Tier 1 EALs. There does not appear to be a release on site as a result of the former on-site agricultural use at this time.

5.0 SUMMARY AND CONCLUSIONS

Partner conducted a Phase II Subsurface Investigation at the subject property to evaluate the potential impact of OCPs and/or arsenic to soil as a consequence of a release or releases from the former on-site agricultural use. The scope of the Phase II Subsurface Investigation included 14 multi-increment soil samples. Fourteen soil samples were analyzed for OCPs and arsenic.

There were no detections of OCPs or arsenic in soil above applicable Tier 1 EALs. There does not appear to be a release on site as a result of the former on-site agricultural use. Partner recommends no further investigation with respect to the former on-site agricultural use at this time.

TABLES

PARTNER

Table 1: Summary of Investigation Scope
Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui Island, Hawaii 96793
Partner Project Number 20-283903.2
November 12, 2020

Boring Identification	Location	Terminal Depth (feet bgs)	Matrix Sampled	Sampling Depths* (feet bgs)	Target Analytes
SS-1	Decision Unit 1	0.5	Soil	0.5	OCPs, Arsenic
SS-2	Decision Unit 2	0.5	Soil	0.5	OCPs, Arsenic
SS-3	Decision Unit 3	0.5	Soil	0.5	OCPs, Arsenic
SS-4	Decision Unit 4	0.5	Soil	0.5	OCPs, Arsenic
SS-5	Decision Unit 5	0.5	Soil	0.5	OCPs, Arsenic
SS-6	Decision Unit 6	0.5	Soil	0.5	OCPs, Arsenic
SS-7	Decision Unit 7	0.5	Soil	0.5	OCPs, Arsenic
SS-8	Decision Unit 8	0.5	Soil	0.5	OCPs, Arsenic
SS-9	Decision Unit 9	0.5	Soil	0.5	OCPs, Arsenic
SS-10	Decision Unit 10	0.5	Soil	0.5	OCPs, Arsenic
SS-11	Decision Unit 11	0.5	Soil	0.5	OCPs, Arsenic
SS-12	Decision Unit 12	0.5	Soil	0.5	OCPs, Arsenic
SS-13	Decision Unit 13	0.5	Soil	0.5	OCPs, Arsenic
SS-14	Decision Unit 14	0.5	Soil	0.5	OCPs, Arsenic

Notes:

*All samples analyzed for organochlorine pesticides (OCPs) via United States Environmental Protection Agency (EPA) Method 8081 and arsenic via EPA Method 6020B

bgs = below ground surface

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Table 2: Soil Sample OCPs Laboratory Results
Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui Island, Hawaii 96793
Partner Project Number 20-283903.2
November 12, 2020

EPA Method	OCPs via 8081																	
Units	(mg/kg)																	
Sample Identification	beta-BHC	delta-BHC	Heptachlor epoxide	gamma-Chlordane	Endosulfan I	alpha-Chlordane	Dieldrin	4,4-DDE	Endrin	Endosulfan II	4,4-DDD	Endrin Aldehyde	Endosulfan Sulfate	4,4-DDT	Endrin Ketone	Methoxychlor	Other OCPs
SS-1	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	< 0.00983	ND
SS-2	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	< 0.00907	ND
SS-3	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	< 0.00996	ND
SS-4	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	ND
SS-5	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	< 0.00949	ND
SS-6	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	< 0.00975	ND
SS-7	< 0.0106	**0.0123**	< 0.0106	**0.0164**	**0.0154**	**0.0208**	**0.0239**	**0.0384**	**0.0445**	**0.0384**	**0.0593**	**0.0119**	**0.0369**	**0.1280**	**0.0570**	**0.0793**	ND
SS-8	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	ND
SS-9	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	< 0.00920	ND
SS-10	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	ND
SS-11	**0.0190**	**0.0227**	**0.0228**	**0.0383**	**0.0291**	**0.0461**	**0.0436**	**0.1100**	**0.0642**	**0.0630**	**0.1210**	**0.0335**	**0.0371**	**0.2180**	**0.0789**	**0.0710**	ND
SS-12	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	ND
SS-13	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	ND
SS-14	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	ND
Tier 1 EAL	**0.075**	**0.075**	**0.2**	**17**	**13**	**17**	**2.5**	**2**	**3.8**	**13**	**2.2**	**3.8**	**13**	**1.8**	**3.8**	**16**	**Varies**

Notes:
OCPs = organochlorine pesticides
EPA = United States Environmental Protection Agency
mg/kg = milligrams per kilogram
DDE = dichlorodiphenyldichloroethylene
DDD = dichlorodiphenyldichloroethane
DDT = dichlorodiphenyltrichloroethane
EAL = Environmental Action Level [Hawai'i Department of Health Environmental Management Division Hazard Evaluation and Emergency Response (HEER) Office - Fall 2017]
< = not detected above indicated laboratory Reporting Limit (RL)
ND = not detected above laboratory RLs
Values in **bold** exceed laboratory RLs

PARTNER

Table 3: Comparison of Arsenic Laboratory Results and Regulatory Guidelines
Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui Island, Hawaii 96793
Partner Project Number 20-283903.2
November 12, 2020

Sample	Total Arsenic Concentration (mg/kg)*
SS-1	4.37
SS-2	13.7
SS-3	14.8
SS-4	12.4
SS-5	13.1
SS-6	12.4
SS-7	11.7
SS-8	9.50
SS-9	12.6
SS-10	15.0
SS-11	9.65
SS-12	13.4
SS-13	10.3
SS-14	11.1
Tier 1 EAL	24

Notes:
mg/kg = milligrams per kilogram
*The background concentration of arsenic is below 50 mg/kg. From the Hawai'i Department of Health Hazard Evaluation and Emergency Response 2012 report *Hawaiian Islands Soil Metal Background Evaluation Report*
< = not detected above indicated laboratory Reporting Limit (RL)

EAL = Environmental Action Level [Hawai'i Department of Health Environmental Management Division Hazard Evaluation and Emergency Response (HEER) Office - Fall 2017])

PARTNER

FIGURES

PARTNER

PARTNER
2154 Torrance Boulevard, Suite 200
Torrance, California 90501
Project Number: 20-283903.2

N

Legend
Subject Property

Site Vicinity Map

Figure	Prepared By	Date
1	S. Fujita	November 2020

Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui, Hawaii 96793

PARTNER
2154 Torrance Boulevard, Suite 200
Torrance, California 90501
Project Number: 20-283903.2

N

Legend

Subject Property

Sample Location Map

Figure	Prepared By	Date
2	S. Fujita	November 2020

Southeast Corner of Kahekili Highway and Waiehu Beach Road
Maui, Hawaii 96793

APPENDIX A: LABORATORY ANALYTICAL REPORT

PARTNER

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

ESN Northwest
Lab
1210 Eastside Street SE, Suite 200
Olympia, WA 98501

RE: 283903.2
Work Order Number: 2011353

November 24, 2020

Attention Lab:

Fremont Analytical, Inc. received 14 sample(s) on 11/18/2020 for the analyses presented in the following report.

Organochlorine Pesticides by EPA Method 8081
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Date: *11/24/2020*

CLIENT: ESN Northwest
Project: 283903.2
Work Order: 2011353

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2011353-001	SS-1	11/12/2020 8:45 AM	11/18/2020 9:33 AM
2011353-002	SS-2	11/12/2020 8:55 AM	11/18/2020 9:33 AM
2011353-003	SS-3	11/12/2020 9:05 AM	11/18/2020 9:33 AM
2011353-004	SS-4	11/12/2020 9:15 AM	11/18/2020 9:33 AM
2011353-005	SS-5	11/12/2020 9:25 AM	11/18/2020 9:33 AM
2011353-006	SS-6	11/12/2020 9:35 AM	11/18/2020 9:33 AM
2011353-007	SS-7	11/12/2020 9:45 AM	11/18/2020 9:33 AM
2011353-008	SS-8	11/12/2020 9:55 AM	11/18/2020 9:33 AM
2011353-009	SS-9	11/12/2020 10:05 AM	11/18/2020 9:33 AM
2011353-010	SS-10	11/12/2020 10:15 AM	11/18/2020 9:33 AM
2011353-011	SS-11	11/12/2020 10:25 AM	11/18/2020 9:33 AM
2011353-012	SS-12	11/12/2020 10:35 AM	11/18/2020 9:33 AM
2011353-013	SS-13	11/12/2020 10:45 AM	11/18/2020 9:33 AM
2011353-014	SS-14	11/12/2020 10:55 AM	11/18/2020 9:33 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2011353**
Date: **11/24/2020**

CLIENT: ESN Northwest
Project: 283903.2

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms

WO#: **2011353**
Date Reported: **11/24/2020**

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-001
Client Sample ID: SS-1

Collection Date: 11/12/2020 8:45:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.492	0.0434		mg/Kg-dry	1	11/20/20 22:10:59
Alpha BHC	ND	0.00983	0.000699		mg/Kg-dry	1	11/20/20 22:10:59
Beta BHC	ND	0.00983	0.00102		mg/Kg-dry	1	11/20/20 22:10:59
Gamma BHC (Lindane)	ND	0.00983	0.000782		mg/Kg-dry	1	11/20/20 22:10:59
Delta BHC	ND	0.00983	0.000665		mg/Kg-dry	1	11/20/20 22:10:59
Heptachlor	ND	0.00983	0.000874		mg/Kg-dry	1	11/20/20 22:10:59
Aldrin	ND	0.00983	0.000867		mg/Kg-dry	1	11/20/20 22:10:59
Heptachlor epoxide	ND	0.00983	0.00105		mg/Kg-dry	1	11/20/20 22:10:59
gamma-Chlordane	ND	0.00983	0.000988		mg/Kg-dry	1	11/20/20 22:10:59
Endosulfan I	ND	0.00983	0.00112		mg/Kg-dry	1	11/20/20 22:10:59
alpha-Chlordane	ND	0.00983	0.00106		mg/Kg-dry	1	11/20/20 22:10:59
Dieldrin	ND	0.00983	0.000795		mg/Kg-dry	1	11/20/20 22:10:59
4,4´-DDE	ND	0.00983	0.000943		mg/Kg-dry	1	11/20/20 22:10:59
Endrin	ND	0.00983	0.000899		mg/Kg-dry	1	11/20/20 22:10:59
Endosulfan II	ND	0.00983	0.000998		mg/Kg-dry	1	11/20/20 22:10:59
4,4´-DDD	ND	0.00983	0.000785		mg/Kg-dry	1	11/20/20 22:10:59
Endrin aldehyde	ND	0.00983	0.00111		mg/Kg-dry	1	11/20/20 22:10:59
Endosulfan sulfate	ND	0.00983	0.00102		mg/Kg-dry	1	11/20/20 22:10:59
4,4´-DDT	ND	0.00983	0.000531		mg/Kg-dry	1	11/20/20 22:10:59
Endrin ketone	ND	0.00983	0.000833		mg/Kg-dry	1	11/20/20 22:10:59
Methoxychlor	ND	0.00983	0.000861		mg/Kg-dry	1	11/20/20 22:10:59
Surr: Decachlorobiphenyl	84.2	27 - 166			%Rec	1	11/20/20 22:10:59
Surr: Tetrachloro-m-xylene	74.7	28.1 - 171			%Rec	1	11/20/20 22:10:59
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	4.37	0.205	0.0644		mg/Kg-dry	1	11/20/20 21:04:12
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	6.36	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-002
Client Sample ID: SS-2

Collection Date: 11/12/2020 8:55:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.454	0.0400		mg/Kg-dry	1	11/20/20 22:20:32
Alpha BHC	ND	0.00907	0.000645		mg/Kg-dry	1	11/20/20 22:20:32
Beta BHC	ND	0.00907	0.000938		mg/Kg-dry	1	11/20/20 22:20:32
Gamma BHC (Lindane)	ND	0.00907	0.000721		mg/Kg-dry	1	11/20/20 22:20:32
Delta BHC	ND	0.00907	0.000614		mg/Kg-dry	1	11/20/20 22:20:32
Heptachlor	ND	0.00907	0.000806		mg/Kg-dry	1	11/20/20 22:20:32
Aldrin	ND	0.00907	0.000800		mg/Kg-dry	1	11/20/20 22:20:32
Heptachlor epoxide	ND	0.00907	0.000964		mg/Kg-dry	1	11/20/20 22:20:32
gamma-Chlordane	ND	0.00907	0.000911		mg/Kg-dry	1	11/20/20 22:20:32
Endosulfan I	ND	0.00907	0.00103		mg/Kg-dry	1	11/20/20 22:20:32
alpha-Chlordane	ND	0.00907	0.000975		mg/Kg-dry	1	11/20/20 22:20:32
Dieldrin	ND	0.00907	0.000734		mg/Kg-dry	1	11/20/20 22:20:32
4,4´-DDE	ND	0.00907	0.000870		mg/Kg-dry	1	11/20/20 22:20:32
Endrin	ND	0.00907	0.000830		mg/Kg-dry	1	11/20/20 22:20:32
Endosulfan II	ND	0.00907	0.000921		mg/Kg-dry	1	11/20/20 22:20:32
4,4´-DDD	ND	0.00907	0.000724		mg/Kg-dry	1	11/20/20 22:20:32
Endrin aldehyde	ND	0.00907	0.00102		mg/Kg-dry	1	11/20/20 22:20:32
Endosulfan sulfate	ND	0.00907	0.000942		mg/Kg-dry	1	11/20/20 22:20:32
4,4´-DDT	ND	0.00907	0.000490		mg/Kg-dry	1	11/20/20 22:20:32
Endrin ketone	ND	0.00907	0.000769		mg/Kg-dry	1	11/20/20 22:20:32
Methoxychlor	ND	0.00907	0.000794		mg/Kg-dry	1	11/20/20 22:20:32
Surr: Decachlorobiphenyl	69.1	27 - 166			%Rec	1	11/20/20 22:20:32
Surr: Tetrachloro-m-xylene	66.3	28.1 - 171			%Rec	1	11/20/20 22:20:32
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	13.7	0.198	0.0620		mg/Kg-dry	1	11/20/20 21:20:55
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	3.57	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-003
Client Sample ID: SS-3
Collection Date: 11/12/2020 9:05:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.498	0.0439		mg/Kg-dry	1	11/20/20 22:30:08
Alpha BHC	ND	0.00996	0.000708		mg/Kg-dry	1	11/20/20 22:30:08
Beta BHC	ND	0.00996	0.00103		mg/Kg-dry	1	11/20/20 22:30:08
Gamma BHC (Lindane)	ND	0.00996	0.000792		mg/Kg-dry	1	11/20/20 22:30:08
Delta BHC	ND	0.00996	0.000674		mg/Kg-dry	1	11/20/20 22:30:08
Heptachlor	ND	0.00996	0.000885		mg/Kg-dry	1	11/20/20 22:30:08
Aldrin	ND	0.00996	0.000878		mg/Kg-dry	1	11/20/20 22:30:08
Heptachlor epoxide	ND	0.00996	0.00106		mg/Kg-dry	1	11/20/20 22:30:08
gamma-Chlordane	ND	0.00996	0.00100		mg/Kg-dry	1	11/20/20 22:30:08
Endosulfan I	ND	0.00996	0.00114		mg/Kg-dry	1	11/20/20 22:30:08
alpha-Chlordane	ND	0.00996	0.00107		mg/Kg-dry	1	11/20/20 22:30:08
Dieldrin	ND	0.00996	0.000806		mg/Kg-dry	1	11/20/20 22:30:08
4,4´-DDE	ND	0.00996	0.000955		mg/Kg-dry	1	11/20/20 22:30:08
Endrin	ND	0.00996	0.000910		mg/Kg-dry	1	11/20/20 22:30:08
Endosulfan II	ND	0.00996	0.00101		mg/Kg-dry	1	11/20/20 22:30:08
4,4´-DDD	ND	0.00996	0.000795		mg/Kg-dry	1	11/20/20 22:30:08
Endrin aldehyde	ND	0.00996	0.00112		mg/Kg-dry	1	11/20/20 22:30:08
Endosulfan sulfate	ND	0.00996	0.00103		mg/Kg-dry	1	11/20/20 22:30:08
4,4´-DDT	ND	0.00996	0.000538		mg/Kg-dry	1	11/20/20 22:30:08
Endrin ketone	ND	0.00996	0.000844		mg/Kg-dry	1	11/20/20 22:30:08
Methoxychlor	ND	0.00996	0.000872		mg/Kg-dry	1	11/20/20 22:30:08
Surr: Decachlorobiphenyl	76.3	27 - 166			%Rec	1	11/20/20 22:30:08
Surr: Tetrachloro-m-xylene	73.6	28.1 - 171			%Rec	1	11/20/20 22:30:08
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	14.8	0.205	0.0641		mg/Kg-dry	1	11/20/20 21:26:28
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	6.68	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-004
Client Sample ID: SS-4
Collection Date: 11/12/2020 9:15:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.492	0.0434		mg/Kg-dry	1	11/20/20 22:39:50
Alpha BHC	ND	0.00985	0.000700		mg/Kg-dry	1	11/20/20 22:39:50
Beta BHC	ND	0.00985	0.00102		mg/Kg-dry	1	11/20/20 22:39:50
Gamma BHC (Lindane)	ND	0.00985	0.000783		mg/Kg-dry	1	11/20/20 22:39:50
Delta BHC	ND	0.00985	0.000666		mg/Kg-dry	1	11/20/20 22:39:50
Heptachlor	ND	0.00985	0.000875		mg/Kg-dry	1	11/20/20 22:39:50
Aldrin	ND	0.00985	0.000869		mg/Kg-dry	1	11/20/20 22:39:50
Heptachlor epoxide	ND	0.00985	0.00105		mg/Kg-dry	1	11/20/20 22:39:50
gamma-Chlordane	ND	0.00985	0.000989		mg/Kg-dry	1	11/20/20 22:39:50
Endosulfan I	ND	0.00985	0.00112		mg/Kg-dry	1	11/20/20 22:39:50
alpha-Chlordane	ND	0.00985	0.00106		mg/Kg-dry	1	11/20/20 22:39:50
Dieldrin	ND	0.00985	0.000796		mg/Kg-dry	1	11/20/20 22:39:50
4,4´-DDE	ND	0.00985	0.000944		mg/Kg-dry	1	11/20/20 22:39:50
Endrin	ND	0.00985	0.000900		mg/Kg-dry	1	11/20/20 22:39:50
Endosulfan II	ND	0.00985	0.00100		mg/Kg-dry	1	11/20/20 22:39:50
4,4´-DDD	ND	0.00985	0.000786		mg/Kg-dry	1	11/20/20 22:39:50
Endrin aldehyde	ND	0.00985	0.00111		mg/Kg-dry	1	11/20/20 22:39:50
Endosulfan sulfate	ND	0.00985	0.00102		mg/Kg-dry	1	11/20/20 22:39:50
4,4´-DDT	ND	0.00985	0.000532		mg/Kg-dry	1	11/20/20 22:39:50
Endrin ketone	ND	0.00985	0.000834		mg/Kg-dry	1	11/20/20 22:39:50
Methoxychlor	ND	0.00985	0.000862		mg/Kg-dry	1	11/20/20 22:39:50
Surr: Decachlorobiphenyl	70.8	27 - 166			%Rec	1	11/20/20 22:39:50
Surr: Tetrachloro-m-xylene	67.0	28.1 - 171			%Rec	1	11/20/20 22:39:50
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	12.4	0.212	0.0663		mg/Kg-dry	1	11/20/20 21:32:01
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	6.23	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-005
Client Sample ID: SS-5

Collection Date: 11/12/2020 9:25:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.474	0.0419		mg/Kg-dry	1	11/20/20 23:08:31
Alpha BHC	ND	0.00949	0.000675		mg/Kg-dry	1	11/20/20 23:08:31
Beta BHC	ND	0.00949	0.000981		mg/Kg-dry	1	11/20/20 23:08:31
Gamma BHC (Lindane)	ND	0.00949	0.000755		mg/Kg-dry	1	11/20/20 23:08:31
Delta BHC	ND	0.00949	0.000642		mg/Kg-dry	1	11/20/20 23:08:31
Heptachlor	ND	0.00949	0.000843		mg/Kg-dry	1	11/20/20 23:08:31
Aldrin	ND	0.00949	0.000837		mg/Kg-dry	1	11/20/20 23:08:31
Heptachlor epoxide	ND	0.00949	0.00101		mg/Kg-dry	1	11/20/20 23:08:31
gamma-Chlordane	ND	0.00949	0.000953		mg/Kg-dry	1	11/20/20 23:08:31
Endosulfan I	ND	0.00949	0.00108		mg/Kg-dry	1	11/20/20 23:08:31
alpha-Chlordane	ND	0.00949	0.00102		mg/Kg-dry	1	11/20/20 23:08:31
Dieldrin	ND	0.00949	0.000768		mg/Kg-dry	1	11/20/20 23:08:31
4,4´-DDE	ND	0.00949	0.000910		mg/Kg-dry	1	11/20/20 23:08:31
Endrin	ND	0.00949	0.000868		mg/Kg-dry	1	11/20/20 23:08:31
Endosulfan II	ND	0.00949	0.000963		mg/Kg-dry	1	11/20/20 23:08:31
4,4´-DDD	ND	0.00949	0.000757		mg/Kg-dry	1	11/20/20 23:08:31
Endrin aldehyde	ND	0.00949	0.00107		mg/Kg-dry	1	11/20/20 23:08:31
Endosulfan sulfate	ND	0.00949	0.000985		mg/Kg-dry	1	11/20/20 23:08:31
4,4´-DDT	ND	0.00949	0.000513		mg/Kg-dry	1	11/20/20 23:08:31
Endrin ketone	ND	0.00949	0.000804		mg/Kg-dry	1	11/20/20 23:08:31
Methoxychlor	ND	0.00949	0.000831		mg/Kg-dry	1	11/20/20 23:08:31
Surr: Decachlorobiphenyl	57.1	27 - 166			%Rec	1	11/20/20 23:08:31
Surr: Tetrachloro-m-xylene	60.1	28.1 - 171			%Rec	1	11/20/20 23:08:31
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	13.1	0.198	0.0621		mg/Kg-dry	1	11/20/20 21:37:34
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	5.83	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-006
Client Sample ID: SS-6

Collection Date: 11/12/2020 9:35:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	0.487	0.0430		mg/Kg-dry	1	11/20/20 23:18:06
Alpha BHC	ND	0.00975	0.000693		mg/Kg-dry	1	11/20/20 23:18:06
Beta BHC	ND	0.00975	0.00101		mg/Kg-dry	1	11/20/20 23:18:06
Gamma BHC (Lindane)	ND	0.00975	0.000775		mg/Kg-dry	1	11/20/20 23:18:06
Delta BHC	ND	0.00975	0.000660		mg/Kg-dry	1	11/20/20 23:18:06
Heptachlor	ND	0.00975	0.000866		mg/Kg-dry	1	11/20/20 23:18:06
Aldrin	ND	0.00975	0.000860		mg/Kg-dry	1	11/20/20 23:18:06
Heptachlor epoxide	ND	0.00975	0.00104		mg/Kg-dry	1	11/20/20 23:18:06
gamma-Chlordane	ND	0.00975	0.000979		mg/Kg-dry	1	11/20/20 23:18:06
Endosulfan I	ND	0.00975	0.00111		mg/Kg-dry	1	11/20/20 23:18:06
alpha-Chlordane	ND	0.00975	0.00105		mg/Kg-dry	1	11/20/20 23:18:06
Dieldrin	ND	0.00975	0.000788		mg/Kg-dry	1	11/20/20 23:18:06
4,4´-DDE	ND	0.00975	0.000935		mg/Kg-dry	1	11/20/20 23:18:06
Endrin	ND	0.00975	0.000891		mg/Kg-dry	1	11/20/20 23:18:06
Endosulfan II	ND	0.00975	0.000990		mg/Kg-dry	1	11/20/20 23:18:06
4,4´-DDD	ND	0.00975	0.000778		mg/Kg-dry	1	11/20/20 23:18:06
Endrin aldehyde	ND	0.00975	0.00110		mg/Kg-dry	1	11/20/20 23:18:06
Endosulfan sulfate	ND	0.00975	0.00101		mg/Kg-dry	1	11/20/20 23:18:06
4,4´-DDT	ND	0.00975	0.000527		mg/Kg-dry	1	11/20/20 23:18:06
Endrin ketone	ND	0.00975	0.000826		mg/Kg-dry	1	11/20/20 23:18:06
Methoxychlor	ND	0.00975	0.000853		mg/Kg-dry	1	11/20/20 23:18:06
Surr: Decachlorobiphenyl	78.0	27 - 166			%Rec	1	11/20/20 23:18:06
Surr: Tetrachloro-m-xylene	64.0	28.1 - 171			%Rec	1	11/20/20 23:18:06
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	12.4	0.198	0.0620		mg/Kg-dry	1	11/20/20 21:43:08
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	4.92	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-007
Client Sample ID: **SS-7**

Collection Date: 11/12/2020 9:45:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	5.31	0.468	D	mg/Kg-dry	10	11/23/20 18:30:34
Alpha BHC	ND	0.106	0.00755	D	mg/Kg-dry	10	11/23/20 18:30:34
Beta BHC	ND	0.106	0.0110	D	mg/Kg-dry	10	11/23/20 18:30:34
Gamma BHC (Lindane)	ND	0.106	0.00844	D	mg/Kg-dry	10	11/23/20 18:30:34
Delta BHC	ND	0.106	0.00719	D	mg/Kg-dry	10	11/23/20 18:30:34
Heptachlor	ND	0.106	0.00944	D	mg/Kg-dry	10	11/23/20 18:30:34
Aldrin	ND	0.106	0.00937	D	mg/Kg-dry	10	11/23/20 18:30:34
Heptachlor epoxide	ND	0.106	0.0113	D	mg/Kg-dry	10	11/23/20 18:30:34
gamma-Chlordane	ND	0.106	0.0107	D	mg/Kg-dry	10	11/23/20 18:30:34
Endosulfan I	ND	0.106	0.0121	D	mg/Kg-dry	10	11/23/20 18:30:34
alpha-Chlordane	ND	0.106	0.0114	D	mg/Kg-dry	10	11/23/20 18:30:34
Dieldrin	ND	0.106	0.00859	D	mg/Kg-dry	10	11/23/20 18:30:34
4,4´-DDE	ND	0.106	0.0102	D	mg/Kg-dry	10	11/23/20 18:30:34
Endrin	ND	0.106	0.00971	D	mg/Kg-dry	10	11/23/20 18:30:34
Endosulfan II	ND	0.106	0.0108	D	mg/Kg-dry	10	11/23/20 18:30:34
4,4´-DDD	ND	0.106	0.00847	D	mg/Kg-dry	10	11/23/20 18:30:34
Endrin aldehyde	ND	0.106	0.0120	D	mg/Kg-dry	10	11/23/20 18:30:34
Endosulfan sulfate	ND	0.106	0.0110	D	mg/Kg-dry	10	11/23/20 18:30:34
4,4´-DDT	ND	0.106	0.00574	D	mg/Kg-dry	10	11/23/20 18:30:34
Endrin ketone	ND	0.106	0.00900	D	mg/Kg-dry	10	11/23/20 18:30:34
Methoxychlor	ND	0.106	0.00930	D	mg/Kg-dry	10	11/23/20 18:30:34
Surr: Decachlorobiphenyl	130	27 - 166		D	%Rec	10	11/23/20 18:30:34
Surr: Tetrachloro-m-xylene	94.5	28.1 - 171		D	%Rec	10	11/23/20 18:30:34
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	11.7	0.215	0.0674		mg/Kg-dry	1	11/20/20 21:48:41
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	6.31	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-008
Client Sample ID: **SS-8**

Collection Date: 11/12/2020 9:55:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	5.08	0.448	D	mg/Kg-dry	10	11/23/20 18:40:10
Alpha BHC	ND	0.102	0.00722	D	mg/Kg-dry	10	11/23/20 18:40:10
Beta BHC	ND	0.102	0.0105	D	mg/Kg-dry	10	11/23/20 18:40:10
Gamma BHC (Lindane)	ND	0.102	0.00807	D	mg/Kg-dry	10	11/23/20 18:40:10
Delta BHC	ND	0.102	0.00687	D	mg/Kg-dry	10	11/23/20 18:40:10
Heptachlor	ND	0.102	0.00902	D	mg/Kg-dry	10	11/23/20 18:40:10
Aldrin	ND	0.102	0.00896	D	mg/Kg-dry	10	11/23/20 18:40:10
Heptachlor epoxide	ND	0.102	0.0108	D	mg/Kg-dry	10	11/23/20 18:40:10
gamma-Chlordane	ND	0.102	0.0102	D	mg/Kg-dry	10	11/23/20 18:40:10
Endosulfan I	ND	0.102	0.0116	D	mg/Kg-dry	10	11/23/20 18:40:10
alpha-Chlordane	ND	0.102	0.0109	D	mg/Kg-dry	10	11/23/20 18:40:10
Dieldrin	ND	0.102	0.00821	D	mg/Kg-dry	10	11/23/20 18:40:10
4,4´-DDE	ND	0.102	0.00974	D	mg/Kg-dry	10	11/23/20 18:40:10
Endrin	ND	0.102	0.00928	D	mg/Kg-dry	10	11/23/20 18:40:10
Endosulfan II	ND	0.102	0.0103	D	mg/Kg-dry	10	11/23/20 18:40:10
4,4´-DDD	ND	0.102	0.00810	D	mg/Kg-dry	10	11/23/20 18:40:10
Endrin aldehyde	ND	0.102	0.0114	D	mg/Kg-dry	10	11/23/20 18:40:10
Endosulfan sulfate	ND	0.102	0.0105	D	mg/Kg-dry	10	11/23/20 18:40:10
4,4´-DDT	ND	0.102	0.00549	D	mg/Kg-dry	10	11/23/20 18:40:10
Endrin ketone	ND	0.102	0.00860	D	mg/Kg-dry	10	11/23/20 18:40:10
Methoxychlor	ND	0.102	0.00889	D	mg/Kg-dry	10	11/23/20 18:40:10
Surr: Decachlorobiphenyl	115	27 - 166		D	%Rec	10	11/23/20 18:40:10
Surr: Tetrachloro-m-xylene	85.1	28.1 - 171		D	%Rec	10	11/23/20 18:40:10
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	9.50	0.204	0.0640		mg/Kg-dry	1	11/20/20 21:54:15
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	2.77	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-009
Client Sample ID: **SS-9**

Collection Date: 11/12/2020 10:05:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	4.60	0.406	D	mg/Kg-dry	10	11/24/20 10:28:09
Alpha BHC	ND	0.0920	0.00655	D	mg/Kg-dry	10	11/23/20 14:39:26
Beta BHC	ND	0.0920	0.00951	D	mg/Kg-dry	10	11/23/20 14:39:26
Gamma BHC (Lindane)	ND	0.0920	0.00732	D	mg/Kg-dry	10	11/23/20 14:39:26
Delta BHC	ND	0.0920	0.00623	D	mg/Kg-dry	10	11/23/20 14:39:26
Heptachlor	ND	0.0920	0.00818	D	mg/Kg-dry	10	11/23/20 14:39:26
Aldrin	ND	0.0920	0.00812	D	mg/Kg-dry	10	11/23/20 14:39:26
Heptachlor epoxide	ND	0.0920	0.00978	D	mg/Kg-dry	10	11/23/20 14:39:26
gamma-Chlordane	ND	0.0920	0.00924	D	mg/Kg-dry	10	11/23/20 14:39:26
Endosulfan I	ND	0.0920	0.0105	D	mg/Kg-dry	10	11/23/20 14:39:26
alpha-Chlordane	ND	0.0920	0.00989	D	mg/Kg-dry	10	11/23/20 14:39:26
Dieldrin	ND	0.0920	0.00744	D	mg/Kg-dry	10	11/23/20 14:39:26
4,4´-DDE	ND	0.0920	0.00882	D	mg/Kg-dry	10	11/23/20 14:39:26
Endrin	ND	0.0920	0.00841	D	mg/Kg-dry	10	11/23/20 14:39:26
Endosulfan II	ND	0.0920	0.00934	D	mg/Kg-dry	10	11/23/20 14:39:26
4,4´-DDD	ND	0.0920	0.00734	D	mg/Kg-dry	10	11/23/20 14:39:26
Endrin aldehyde	ND	0.0920	0.0104	D	mg/Kg-dry	10	11/23/20 14:39:26
Endosulfan sulfate	ND	0.0920	0.00955	D	mg/Kg-dry	10	11/23/20 14:39:26
4,4´-DDT	ND	0.0920	0.00497	D	mg/Kg-dry	10	11/23/20 14:39:26
Endrin ketone	ND	0.0920	0.00780	D	mg/Kg-dry	10	11/23/20 14:39:26
Methoxychlor	ND	0.0920	0.00806	D	mg/Kg-dry	10	11/23/20 14:39:26
Surr: Decachlorobiphenyl	104	27 - 166		D	%Rec	10	11/23/20 14:39:26
Surr: Tetrachloro-m-xylene	82.7	28.1 - 171		D	%Rec	10	11/23/20 14:39:26
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	12.6	0.196	0.0613		mg/Kg-dry	1	11/20/20 21:59:48
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	3.92	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Project: 283903.2
Lab ID: 2011353-010
Client Sample ID: **SS-10**

Collection Date: 11/12/2020 10:15:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	5.16	0.455	D	mg/Kg-dry	10	11/24/20 10:37:55
Alpha BHC	ND	0.103	0.00734	D	mg/Kg-dry	10	11/23/20 14:49:01
Beta BHC	ND	0.103	0.0107	D	mg/Kg-dry	10	11/23/20 14:49:01
Gamma BHC (Lindane)	ND	0.103	0.00821	D	mg/Kg-dry	10	11/23/20 14:49:01
Delta BHC	ND	0.103	0.00698	D	mg/Kg-dry	10	11/23/20 14:49:01
Heptachlor	ND	0.103	0.00917	D	mg/Kg-dry	10	11/23/20 14:49:01
Aldrin	ND	0.103	0.00910	D	mg/Kg-dry	10	11/23/20 14:49:01
Heptachlor epoxide	ND	0.103	0.0110	D	mg/Kg-dry	10	11/23/20 14:49:01
gamma-Chlordane	ND	0.103	0.0104	D	mg/Kg-dry	10	11/23/20 14:49:01
Endosulfan I	ND	0.103	0.0118	D	mg/Kg-dry	10	11/23/20 14:49:01
alpha-Chlordane	ND	0.103	0.0111	D	mg/Kg-dry	10	11/23/20 14:49:01
Dieldrin	ND	0.103	0.00835	D	mg/Kg-dry	10	11/23/20 14:49:01
4,4´-DDE	ND	0.103	0.00990	D	mg/Kg-dry	10	11/23/20 14:49:01
Endrin	ND	0.103	0.00943	D	mg/Kg-dry	10	11/23/20 14:49:01
Endosulfan II	ND	0.103	0.0105	D	mg/Kg-dry	10	11/23/20 14:49:01
4,4´-DDD	ND	0.103	0.00823	D	mg/Kg-dry	10	11/23/20 14:49:01
Endrin aldehyde	ND	0.103	0.0116	D	mg/Kg-dry	10	11/23/20 14:49:01
Endosulfan sulfate	ND	0.103	0.0107	D	mg/Kg-dry	10	11/23/20 14:49:01
4,4´-DDT	ND	0.103	0.00558	D	mg/Kg-dry	10	11/23/20 14:49:01
Endrin ketone	ND	0.103	0.00874	D	mg/Kg-dry	10	11/23/20 14:49:01
Methoxychlor	ND	0.103	0.00903	D	mg/Kg-dry	10	11/23/20 14:49:01
Surr: Decachlorobiphenyl	124	27 - 166		D	%Rec	10	11/23/20 14:49:01
Surr: Tetrachloro-m-xylene	89.9	28.1 - 171		D	%Rec	10	11/23/20 14:49:01
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	15.0	0.206	0.0646		mg/Kg-dry	1	11/20/20 22:05:21
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	6.65	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Collection Date: 11/12/2020 10:25:00 AM
Project: 283903.2
Lab ID: 2011353-011
Matrix: Soil
Client Sample ID: SS-11

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	4.90	0.432	D	mg/Kg-dry	10	11/24/20 10:47:34
Alpha BHC	ND	0.0980	0.00697	D	mg/Kg-dry	10	11/23/20 14:58:37
Beta BHC	ND	0.0980	0.0101	D	mg/Kg-dry	10	11/23/20 14:58:37
Gamma BHC (Lindane)	ND	0.0980	0.00780	D	mg/Kg-dry	10	11/23/20 14:58:37
Delta BHC	ND	0.0980	0.00664	D	mg/Kg-dry	10	11/23/20 14:58:37
Heptachlor	ND	0.0980	0.00871	D	mg/Kg-dry	10	11/23/20 14:58:37
Aldrin	ND	0.0980	0.00865	D	mg/Kg-dry	10	11/23/20 14:58:37
Heptachlor epoxide	ND	0.0980	0.0104	D	mg/Kg-dry	10	11/23/20 14:58:37
gamma-Chlordane	ND	0.0980	0.00985	D	mg/Kg-dry	10	11/23/20 14:58:37
Endosulfan I	ND	0.0980	0.0112	D	mg/Kg-dry	10	11/23/20 14:58:37
alpha-Chlordane	ND	0.0980	0.0105	D	mg/Kg-dry	10	11/23/20 14:58:37
Dieldrin	ND	0.0980	0.00793	D	mg/Kg-dry	10	11/23/20 14:58:37
4,4´-DDE	ND	0.0980	0.00940	D	mg/Kg-dry	10	11/23/20 14:58:37
Endrin	ND	0.0980	0.00896	D	mg/Kg-dry	10	11/23/20 14:58:37
Endosulfan II	ND	0.0980	0.00995	D	mg/Kg-dry	10	11/23/20 14:58:37
4,4´-DDD	ND	0.0980	0.00782	D	mg/Kg-dry	10	11/23/20 14:58:37
Endrin aldehyde	ND	0.0980	0.0110	D	mg/Kg-dry	10	11/23/20 14:58:37
Endosulfan sulfate	ND	0.0980	0.0102	D	mg/Kg-dry	10	11/23/20 14:58:37
4,4´-DDT	ND	0.0980	0.00530	D	mg/Kg-dry	10	11/23/20 14:58:37
Endrin ketone	ND	0.0980	0.00831	D	mg/Kg-dry	10	11/23/20 14:58:37
Methoxychlor	ND	0.0980	0.00858	D	mg/Kg-dry	10	11/23/20 14:58:37
Surr: Decachlorobiphenyl	159	27 - 166		D	%Rec	10	11/23/20 14:58:37
Surr: Tetrachloro-m-xylene	102	28.1 - 171		D	%Rec	10	11/23/20 14:58:37
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	9.65	0.196	0.0613		mg/Kg-dry	1	11/20/20 22:10:55
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	7.45	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Collection Date: 11/12/2020 10:35:00 AM
Project: 283903.2
Lab ID: 2011353-012
Matrix: Soil
Client Sample ID: SS-12

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	5.01	0.442	D	mg/Kg-dry	10	11/24/20 10:57:14
Alpha BHC	ND	0.100	0.00712	D	mg/Kg-dry	10	11/23/20 15:08:16
Beta BHC	ND	0.100	0.0103	D	mg/Kg-dry	10	11/23/20 15:08:16
Gamma BHC (Lindane)	ND	0.100	0.00796	D	mg/Kg-dry	10	11/23/20 15:08:16
Delta BHC	ND	0.100	0.00678	D	mg/Kg-dry	10	11/23/20 15:08:16
Heptachlor	ND	0.100	0.00890	D	mg/Kg-dry	10	11/23/20 15:08:16
Aldrin	ND	0.100	0.00883	D	mg/Kg-dry	10	11/23/20 15:08:16
Heptachlor epoxide	ND	0.100	0.0106	D	mg/Kg-dry	10	11/23/20 15:08:16
gamma-Chlordane	ND	0.100	0.0101	D	mg/Kg-dry	10	11/23/20 15:08:16
Endosulfan I	ND	0.100	0.0114	D	mg/Kg-dry	10	11/23/20 15:08:16
alpha-Chlordane	ND	0.100	0.0108	D	mg/Kg-dry	10	11/23/20 15:08:16
Dieldrin	ND	0.100	0.00810	D	mg/Kg-dry	10	11/23/20 15:08:16
4,4´-DDE	ND	0.100	0.00960	D	mg/Kg-dry	10	11/23/20 15:08:16
Endrin	ND	0.100	0.00915	D	mg/Kg-dry	10	11/23/20 15:08:16
Endosulfan II	ND	0.100	0.0102	D	mg/Kg-dry	10	11/23/20 15:08:16
4,4´-DDD	ND	0.100	0.00799	D	mg/Kg-dry	10	11/23/20 15:08:16
Endrin aldehyde	ND	0.100	0.0113	D	mg/Kg-dry	10	11/23/20 15:08:16
Endosulfan sulfate	ND	0.100	0.0104	D	mg/Kg-dry	10	11/23/20 15:08:16
4,4´-DDT	ND	0.100	0.00541	D	mg/Kg-dry	10	11/23/20 15:08:16
Endrin ketone	ND	0.100	0.00848	D	mg/Kg-dry	10	11/23/20 15:08:16
Methoxychlor	ND	0.100	0.00876	D	mg/Kg-dry	10	11/23/20 15:08:16
Surr: Decachlorobiphenyl	163	27 - 166		D	%Rec	10	11/23/20 15:08:16
Surr: Tetrachloro-m-xylene	108	28.1 - 171		D	%Rec	10	11/23/20 15:08:16
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	13.4	0.206	0.0646		mg/Kg-dry	1	11/20/20 22:27:38
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	10.1	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Collection Date: 11/12/2020 10:45:00 AM
Project: 283903.2
Lab ID: 2011353-013
Matrix: Soil
Client Sample ID: SS-13

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	4.89	0.432	D	mg/Kg-dry	10	11/24/20 11:06:54
Alpha BHC	ND	0.0979	0.00696	D	mg/Kg-dry	10	11/23/20 15:17:56
Beta BHC	ND	0.0979	0.0101	D	mg/Kg-dry	10	11/23/20 15:17:56
Gamma BHC (Lindane)	ND	0.0979	0.00778	D	mg/Kg-dry	10	11/23/20 15:17:56
Delta BHC	ND	0.0979	0.00662	D	mg/Kg-dry	10	11/23/20 15:17:56
Heptachlor	ND	0.0979	0.00870	D	mg/Kg-dry	10	11/23/20 15:17:56
Aldrin	ND	0.0979	0.00863	D	mg/Kg-dry	10	11/23/20 15:17:56
Heptachlor epoxide	ND	0.0979	0.0104	D	mg/Kg-dry	10	11/23/20 15:17:56
gamma-Chlordane	ND	0.0979	0.00983	D	mg/Kg-dry	10	11/23/20 15:17:56
Endosulfan I	ND	0.0979	0.0112	D	mg/Kg-dry	10	11/23/20 15:17:56
alpha-Chlordane	ND	0.0979	0.0105	D	mg/Kg-dry	10	11/23/20 15:17:56
Dieldrin	ND	0.0979	0.00792	D	mg/Kg-dry	10	11/23/20 15:17:56
4,4´-DDE	ND	0.0979	0.00938	D	mg/Kg-dry	10	11/23/20 15:17:56
Endrin	ND	0.0979	0.00895	D	mg/Kg-dry	10	11/23/20 15:17:56
Endosulfan II	ND	0.0979	0.00994	D	mg/Kg-dry	10	11/23/20 15:17:56
4,4´-DDD	ND	0.0979	0.00781	D	mg/Kg-dry	10	11/23/20 15:17:56
Endrin aldehyde	ND	0.0979	0.0110	D	mg/Kg-dry	10	11/23/20 15:17:56
Endosulfan sulfate	ND	0.0979	0.0102	D	mg/Kg-dry	10	11/23/20 15:17:56
4,4´-DDT	ND	0.0979	0.00529	D	mg/Kg-dry	10	11/23/20 15:17:56
Endrin ketone	ND	0.0979	0.00829	D	mg/Kg-dry	10	11/23/20 15:17:56
Methoxychlor	ND	0.0979	0.00857	D	mg/Kg-dry	10	11/23/20 15:17:56
Surr: Decachlorobiphenyl	124	27 - 166		D	%Rec	10	11/23/20 15:17:56
Surr: Tetrachloro-m-xylene	89.7	28.1 - 171		D	%Rec	10	11/23/20 15:17:56
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	10.3	0.201	0.0629		mg/Kg-dry	1	11/20/20 22:33:12
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	4.95	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Analytical Report

Work Order: **2011353**
Date Reported: **11/24/2020**

Client: ESN Northwest
Collection Date: 11/12/2020 10:55:00 AM
Project: 283903.2
Lab ID: 2011353-014
Matrix: Soil
Client Sample ID: SS-14

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Organochlorine Pesticides by EPA Method 8081				Batch ID: 30493			Analyst: DW
Toxaphene	ND	5.03	0.444	D	mg/Kg-dry	10	11/24/20 11:16:34
Alpha BHC	ND	0.101	0.00716	D	mg/Kg-dry	10	11/23/20 15:27:32
Beta BHC	ND	0.101	0.0104	D	mg/Kg-dry	10	11/23/20 15:27:32
Gamma BHC (Lindane)	ND	0.101	0.00800	D	mg/Kg-dry	10	11/23/20 15:27:32
Delta BHC	ND	0.101	0.00681	D	mg/Kg-dry	10	11/23/20 15:27:32
Heptachlor	ND	0.101	0.00894	D	mg/Kg-dry	10	11/23/20 15:27:32
Aldrin	ND	0.101	0.00887	D	mg/Kg-dry	10	11/23/20 15:27:32
Heptachlor epoxide	ND	0.101	0.0107	D	mg/Kg-dry	10	11/23/20 15:27:32
gamma-Chlordane	ND	0.101	0.0101	D	mg/Kg-dry	10	11/23/20 15:27:32
Endosulfan I	ND	0.101	0.0115	D	mg/Kg-dry	10	11/23/20 15:27:32
alpha-Chlordane	ND	0.101	0.0108	D	mg/Kg-dry	10	11/23/20 15:27:32
Dieldrin	ND	0.101	0.00814	D	mg/Kg-dry	10	11/23/20 15:27:32
4,4´-DDE	ND	0.101	0.00965	D	mg/Kg-dry	10	11/23/20 15:27:32
Endrin	ND	0.101	0.00920	D	mg/Kg-dry	10	11/23/20 15:27:32
Endosulfan II	ND	0.101	0.0102	D	mg/Kg-dry	10	11/23/20 15:27:32
4,4´-DDD	ND	0.101	0.00803	D	mg/Kg-dry	10	11/23/20 15:27:32
Endrin aldehyde	ND	0.101	0.0113	D	mg/Kg-dry	10	11/23/20 15:27:32
Endosulfan sulfate	ND	0.101	0.0104	D	mg/Kg-dry	10	11/23/20 15:27:32
4,4´-DDT	ND	0.101	0.00544	D	mg/Kg-dry	10	11/23/20 15:27:32
Endrin ketone	ND	0.101	0.00852	D	mg/Kg-dry	10	11/23/20 15:27:32
Methoxychlor	ND	0.101	0.00881	D	mg/Kg-dry	10	11/23/20 15:27:32
Surr: Decachlorobiphenyl	119	27 - 166		D	%Rec	10	11/23/20 15:27:32
Surr: Tetrachloro-m-xylene	93.5	28.1 - 171		D	%Rec	10	11/23/20 15:27:32
Total Metals by EPA Method 6020B				Batch ID: 30485			Analyst: CO
Arsenic	11.1	0.195	0.0611		mg/Kg-dry	1	11/20/20 22:38:46
Sample Moisture (Percent Moisture)				Batch ID: R63548			Analyst: LB
Percent Moisture	7.71	0.500	0.100		wt%	1	11/20/20 10:02:43

Original

Date: *11/24/2020*

Work Order: 2011353
CLIENT: ESN Northwest
Project: 283903.2

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID: **MB-30493** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63593**
Client ID: **MBLKS** Batch ID: **30493** Analysis Date: **11/20/2020** SeqNo: **1276564**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	ND	0.500									
Alpha BHC	ND	0.0100									
Beta BHC	ND	0.0100									
Gamma BHC (Lindane)	ND	0.0100									
Delta BHC	ND	0.0100									
Heptachlor	ND	0.0100									
Aldrin	ND	0.0100									
Heptachlor epoxide	ND	0.0100									
gamma-Chlordane	ND	0.0100									
Endosulfan I	ND	0.0100									
alpha-Chlordane	ND	0.0100									
Dieldrin	ND	0.0100									
4,4´-DDE	ND	0.0100									
Endrin	ND	0.0100									
Endosulfan II	ND	0.0100									
4,4´-DDD	ND	0.0100									
Endrin aldehyde	ND	0.0100									
Endosulfan sulfate	ND	0.0100									
4,4´-DDT	ND	0.0100									
Endrin ketone	ND	0.0100									
Methoxychlor	ND	0.0100									
Surr: Decachlorobiphenyl	0.0625		0.05000		125	27	166				
Surr: Tetrachloro-m-xylene	0.0454		0.05000		90.9	28.1	171				

Sample ID: **LCS2-30493** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63593**
Client ID: **LCSS** Batch ID: **30493** Analysis Date: **11/20/2020** SeqNo: **1276566**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	0.989	0.500	1.000	0	98.9	57.3	134				
Surr: Decachlorobiphenyl	0.0601		0.05000		120	27	166				

Date: *11/24/2020*

Work Order: 2011353
CLIENT: ESN Northwest
Project: 283903.2

QC SUMMARY REPORT

Total Metals by EPA Method 6020B

Sample ID: **MB-30485** SampType: **MBLK** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63589**
Client ID: **MBLKS** Batch ID: **30485** Analysis Date: **11/20/2020** SeqNo: **1276453**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.195									

Sample ID: **LCS-30485** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63589**
Client ID: **LCSS** Batch ID: **30485** Analysis Date: **11/20/2020** SeqNo: **1276454**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	40.9	0.203	40.65	0	101	80	120				

Sample ID: **2011354-004AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/20/2020** RunNo: **63589**
Client ID: **BATCH** Batch ID: **30485** Analysis Date: **11/20/2020** SeqNo: **1276459**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	67.1	0.290	57.98	4.979	107	75	125				

Sample ID: **2011354-004AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/20/2020** RunNo: **63589**
Client ID: **BATCH** Batch ID: **30485** Analysis Date: **11/20/2020** SeqNo: **1276460**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	66.0	0.290	57.98	4.979	105	75	125	67.15	1.66	20	

Date: *11/24/2020*

Work Order: 2011353
CLIENT: ESN Northwest
Project: 283903.2

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID: **2011353-004AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/20/2020** RunNo: **63619**
Client ID: **SS-4** Batch ID: **30493** Analysis Date: **11/23/2020** SeqNo: **1277217**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alpha BHC	0.201	0.0928	0.1856	0	108	76.1	143				D
Beta BHC	0.194	0.0928	0.1856	0	104	70.1	143				D
Gamma BHC (Lindane)	0.202	0.0928	0.1856	0	109	76.1	145				D
Delta BHC	0.181	0.0928	0.1856	0	97.3	61.1	142				D
Heptachlor	0.224	0.0928	0.1856	0	121	76.3	157				D
Aldrin	0.208	0.0928	0.1856	0	112	73.9	152				D
Heptachlor epoxide	0.206	0.0928	0.1856	0	111	75.1	154				D
gamma-Chlordane	0.206	0.0928	0.1856	0	111	69.4	152				D
Endosulfan I	0.208	0.0928	0.1856	0	112	75.3	153				D
alpha-Chlordane	0.208	0.0928	0.1856	0	112	68.7	155				D
Dieldrin	0.210	0.0928	0.1856	0	113	74	152				D
4,4´-DDE	0.210	0.0928	0.1856	0	113	70.7	152				D
Endrin	0.223	0.0928	0.1856	0	120	80.4	152				D
Endosulfan II	0.210	0.0928	0.1856	0	113	67.2	144				D
4,4´-DDD	0.226	0.0928	0.1856	0	122	71.1	155				D
Endrin aldehyde	0.187	0.0928	0.1856	0	101	22.5	147				D
Endosulfan sulfate	0.204	0.0928	0.1856	0	110	49.5	145				D
4,4´-DDT	0.247	0.0928	0.1856	0	133	61.5	169				D
Endrin ketone	0.221	0.0928	0.1856	0	119	67.1	144				D
Methoxychlor	0.238	0.0928	0.1856	0	128	58	170				D
Surr: Decachlorobiphenyl	0.0739		0.04641		159	27	166				D
Surr: Tetrachloro-m-xylene	0.0535		0.04641		115	28.1	171				D

Sample ID: **2011353-004AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/20/2020** RunNo: **63619**
Client ID: **SS-4** Batch ID: **30493** Analysis Date: **11/23/2020** SeqNo: **1277218**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alpha BHC	0.172	0.0898	0.1797	0	95.5	76.1	143	0.2012	15.9	30	D
Beta BHC	0.161	0.0898	0.1797	0	89.4	70.1	143	0.1939	18.8	30	D
Gamma BHC (Lindane)	0.173	0.0898	0.1797	0	96.1	76.1	145	0.2021	15.7	30	D

Date: *11/24/2020*

Work Order: 2011353
CLIENT: ESN Northwest
Project: 283903.2

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID: **LCS2-30493** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63593**
Client ID: **LCSS** Batch ID: **30493** Analysis Date: **11/20/2020** SeqNo: **1276566**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	0.0464		0.05000		92.8	28.1	171				

Sample ID: **LCS1-30493** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/20/2020** RunNo: **63619**
Client ID: **LCSS** Batch ID: **30493** Analysis Date: **11/23/2020** SeqNo: **1277209**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alpha BHC	0.200	0.0100	0.2000	0	100	70.8	143				
Beta BHC	0.203	0.0100	0.2000	0	102	70.5	143				
Gamma BHC (Lindane)	0.203	0.0100	0.2000	0	101	70.8	144				
Delta BHC	0.203	0.0100	0.2000	0	101	67.8	143				
Heptachlor	0.209	0.0100	0.2000	0	105	70.7	151				
Aldrin	0.203	0.0100	0.2000	0	101	68.5	149				
Heptachlor epoxide	0.211	0.0100	0.2000	0	106	67.8	152				
gamma-Chlordane	0.203	0.0100	0.2000	0	101	63.8	150				
Endosulfan I	0.206	0.0100	0.2000	0	103	73.3	151				
alpha-Chlordane	0.203	0.0100	0.2000	0	101	63.5	150				
Dieldrin	0.209	0.0100	0.2000	0	105	72.8	149				
4,4´-DDE	0.203	0.0100	0.2000	0	101	71.1	146				
Endrin	0.219	0.0100	0.2000	0	109	62.7	158				
Endosulfan II	0.218	0.0100	0.2000	0	109	53.5	154				
4,4´-DDD	0.212	0.0100	0.2000	0	106	66.3	154				
Endrin aldehyde	0.229	0.0100	0.2000	0	114	43.8	133				
Endosulfan sulfate	0.227	0.0100	0.2000	0	114	59.5	149				
4,4´-DDT	0.219	0.0100	0.2000	0	109	70.5	149				
Endrin ketone	0.224	0.0100	0.2000	0	112	58	157				
Methoxychlor	0.222	0.0100	0.2000	0	111	52	159				
Surr: Decachlorobiphenyl	0.0497		0.05000		99.5	27	166				
Surr: Tetrachloro-m-xylene	0.0398		0.05000		79.5	28.1	171				

Fremont Analytical

Work Order: 2011353
CLIENT: ESN Northwest
Project: 283903.2

Date: *11/24/2020*

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID: **2011353-004AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/20/2020** RunNo: **63619**
Client ID: **SS-4** Batch ID: **30493** Analysis Date: **11/23/2020** SeqNo: **1277218**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Delta BHC	0.151	0.0898	0.1797	0	84.0	61.1	142	0.1806	17.9	30	D
Heptachlor	0.191	0.0898	0.1797	0	107	76.3	157	0.2240	15.7	30	D
Aldrin	0.177	0.0898	0.1797	0	98.5	73.9	152	0.2079	16.1	30	D
Heptachlor epoxide	0.173	0.0898	0.1797	0	96.1	75.1	154	0.2055	17.3	30	D
gamma-Chlordane	0.173	0.0898	0.1797	0	96.1	69.4	152	0.2055	17.4	30	D
Endosulfan I	0.176	0.0898	0.1797	0	97.9	75.3	153	0.2076	16.6	30	D
alpha-Chlordane	0.176	0.0898	0.1797	0	97.9	68.7	155	0.2078	16.6	30	D
Dieldrin	0.178	0.0898	0.1797	0	99.3	74	152	0.2104	16.5	30	D
4,4'-DDE	0.179	0.0898	0.1797	0	99.9	70.7	152	0.2103	15.9	30	D
Endrin	0.190	0.0898	0.1797	0	106	80.4	152	0.2234	16.0	30	D
Endosulfan II	0.174	0.0898	0.1797	0	96.8	67.2	144	0.2096	18.7	30	D
4,4'-DDD	0.193	0.0898	0.1797	0	108	71.1	155	0.2264	15.7	30	D
Endrin aldehyde	0.154	0.0898	0.1797	0	85.6	22.5	147	0.1872	19.6	30	D
Endosulfan sulfate	0.168	0.0898	0.1797	0	93.4	49.5	145	0.2043	19.7	30	D
4,4'-DDT	0.213	0.0898	0.1797	0	118	61.5	169	0.2473	15.0	30	D
Endrin ketone	0.186	0.0898	0.1797	0	103	67.1	144	0.2212	17.5	30	D
Methoxychlor	0.200	0.0898	0.1797	0	111	58	170	0.2376	17.2	30	D
Surr: Decachlorobiphenyl	0.0624		0.04492		139	27	166		0	0	D
Surr: Tetrachloro-m-xylene	0.0472		0.04492		105	28.1	171		0		D

Fremont Analytical

Sample Log-In Check List

Client Name:	**ESN**	Work Order Number:	**2011353**
Logged by:	**Clare Griggs**	Date Received:	**11/18/2020 9:33:00 AM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☐ No ☑ Not Present ☐
2. How was the sample delivered? FedEx

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☑
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☐ No ☑
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☑ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☑ No ☐ NA ☐

Person Notified:	ESN	Date:	11/19/2020
By Whom:	Clare Griggs	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Requesting sampling date/times.		
Client Instructions:	See revised COC.		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: | Page: 2 of: 2 | Laboratory Project No (internal): 2011353

Project Name: 283903.2

Special Remarks:

Client:

Project No:

Address:

Collected by:

City, State, Zip:

Location:

Telephone:

Report To (PM):

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Cl, Perchlorate, Arsenic				Comments
1 SS-11																	X	X			
2 SS-12																					
3 SS-13																					
4 SS-14																					
5																					
6																					
7																					
8																					
9																					
10																					

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time: ☐ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Jennifer Arnold	11-17-2020		x Clare Anderson	Clare Anderson	09:20 11/18/20
Relinquished (Signature) x	Print Name	Date/Time	Received (Signature) x	Print Name	Date/Time

COC 1.3 - 11.06.20 www.fremontanalytical.com Page 1 of 2

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11-12-2020 | Page: 1 of: 2 | Laboratory Project No (internal): 2011353

Project Name: 283903.2

Special Remarks:

Client: ESN NW

Project No: 283903.2

Address: 1210 Eastside St Ste 200

Collected by:

City, State, Zip: Olympia, WA 98502

Location: Waiehu Beach, Hawaii

Telephone: 360-459-4670

Report To (PM): Jennifer Arnold

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

~~Fax~~

PM Email: lab@esnnw.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Cl, Perchlorate, Arsenic				Comments
1 SS-1																	X	X			
2 SS-2																					
3 SS-3																					
4 SS-4																					
5 SS-5																					
6 SS-6																					
7 SS-7																					
8 SS-8																					
9 SS-9																					
10 SS-10																					

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time: ☐ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day 11-23 (specify)

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x Jennifer Arnold	Jennifer Arnold	11-17-2020	x Clare Anderson	Clare Anderson	09:20 11/18/20
Relinquished (Signature) x	Print Name	Date/Time	Received (Signature) x	Print Name	Date/Time

COC 1.3 - 11.06.20 www.fremontanalytical.com Page 1 of 2

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date:
Page: 2 of: 2
Laboratory Project No (internal): 2011353
Project Name: 283903.2
Special Remarks:
Client:
Project No:
Address:
Collected by:
City, State, Zip:
Location:
Telephone:
Report To (PM):
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)
Fax:
PM Email:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Cl, Perchlorate, Arsenic				Comments
1	SS-11	11/12/20	10:25	S														X	X			
2	SS-12	11/12/20	10:35	S																		
3	SS-13	11/12/20	10:45	S																		
4	SS-14	11/12/20	10:55	S																		
5																						
6																						
7																						
8																						
9																						
10																						

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time: ☐ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day (specify)

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Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Jennifer Arnold	11-17-2020		x Clare Anderson	Clare Anderson	09:29 11/18/20
Relinquished (Signature) x	Print Name	Date/Time	Received (Signature) x	Print Name	Date/Time

COC 1.3 - 11.06.20 www.fremontanalytical.com Page 1 of 2

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 11-12-2020
Page: 1 of: 2
Laboratory Project No (internal): 2011353
Project Name: 283903.2
Special Remarks:
edits 11/19/20 -CG
Client: ESN NW
Project No: 283903.2
Address: 1210 Eastside St Ste 200
Collected by:
City, State, Zip: Olympia, WA 98502
Location: Waikiki Beach, Hawaii
Telephone: 360-459-4670
Report To (PM): Jennifer Arnold
Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)
~~Fax~~
PM Email: lab@esnnw.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Cl, Perchlorate, Arsenic				Comments
1	SS-1	11/12/20	8:45	S														X	X			
2	SS-2	11/12/20	8:55	S																		
3	SS-3	11/12/20	9:05	S																		
4	SS-4	11/12/20	9:15	S																		
5	SS-5	11/12/20	9:25	S																		
6	SS-6	11/12/20	9:35	S																		
7	SS-7	11/12/20	9:45	S																		
8	SS-8	11/12/20	9:55	S																		
9	SS-9	11/12/20	10:05	S																		
10	SS-10	11/12/20	10:15	S																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time: ☐ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day 11-23 (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Jennifer Arnold	Jennifer Arnold	11-17-2020	x Clare Anderson	Clare Anderson	09:29 11/18/20
Relinquished (Signature) x	Print Name	Date/Time	Received (Signature) x	Print Name	Date/Time

COC 1.3 - 11.06.20 www.fremontanalytical.com Page 1 of 2

TRAFFIC IMPACT ANALYSIS REPORT

APPENDIX J

TRAFFIC IMPACT ANALYSIS REPORT
HALE MAHAOLU KE KAHUA HOUSING COMMUNITY
WAIEHU, MAUI, HAWAII

DRAFT FINAL

April 20, 2022

Prepared for:

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TRAFFIC IMPACT ANALYSIS REPORT

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

Waiehu, Maui, Hawaii

1. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the proposed Hale Mahaolu Ke Kahua Housing Community (hereinafter referred to as the "Project").

1.1 Location

The Project is located upon approximately 11.5 acres of vacant land in Waiehu, east of Kahekili Highway and south of Waiehu Beach Road. Figure 1.1 shows the location of the proposed Project site.

1.2 Project Description

The Project proposes to construct 120 units of affordable housing, an approximately 3,231 SF community clubhouse and an approximately 3,477 SF non-profit building. The Project will be accessible from three (3) driveways along Kahekili Highway. The northern (Project Driveway 1) and southernmost (Project Driveway 3) accesses will be restricted to right-in, right-out access only. The middle access (Project Driveway 2) will be an unsignalized full-access driveway. The site plan can be found in Figure 1.2.

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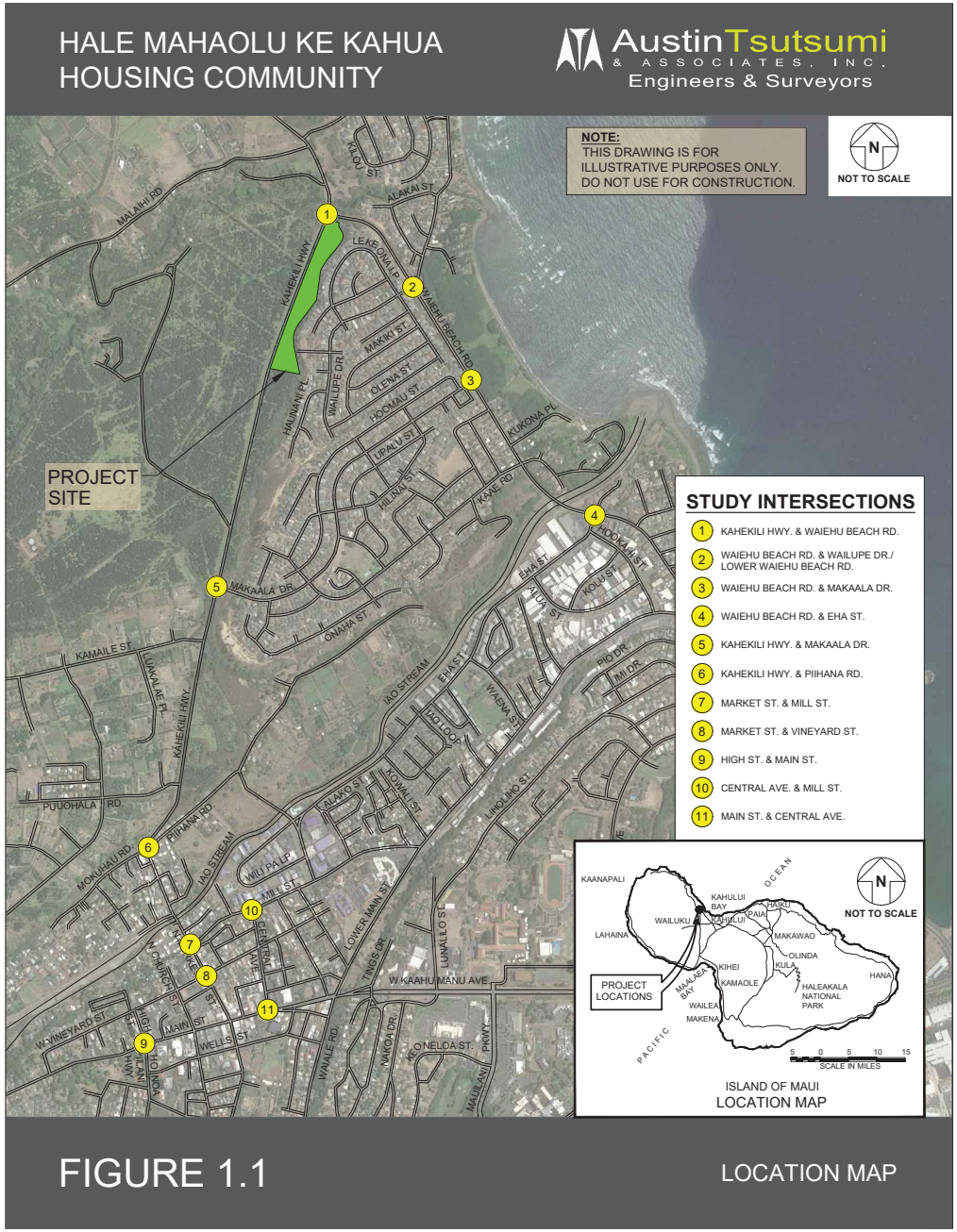
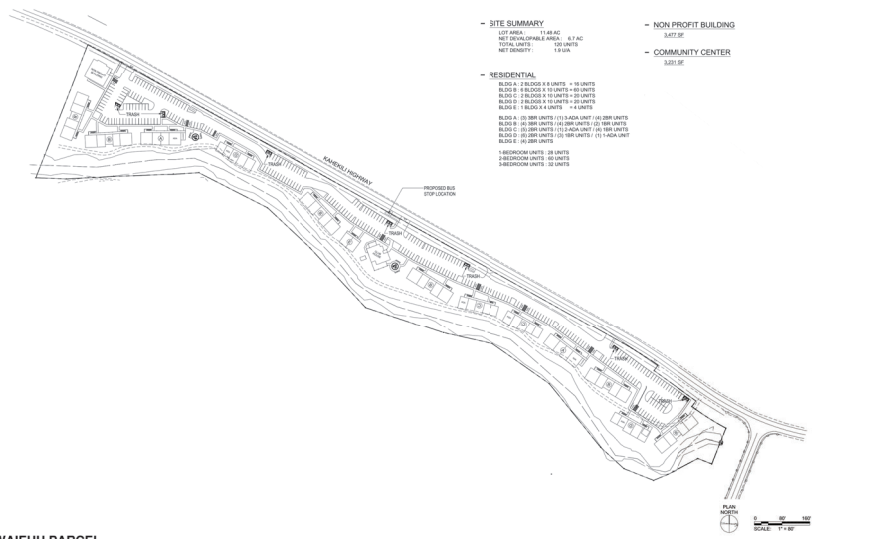


FIGURE 1.1 LOCATION MAP

HALE MAHAOLU KE KAHUA
HOUSING COMMUNITY

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors



WAIEHU PARCEL
WAIEHU HOUSING, LLP

Site Plan
JANUARY 21, 2022

DESIGN PARTNERS INCORPORATED

FIGURE 1.2

SITE PLAN

2. METHODOLOGY

2.1 Study Methodology

This study will address the following:

- Assess existing traffic operating conditions at key intersections during the weekday morning (AM) and afternoon (PM) peak hours of traffic within the study area.
- Traffic projections for Year 2024 without the Project including traffic generated by other known developments in the vicinity of the Project in addition to an ambient growth rate. These other known developments are projects that are currently under construction or known new/future developments that are anticipated to affect traffic demand and operations within the study area.
- Traffic projections for Year 2024 with the Project, which includes Year 2024 without Project traffic volumes in addition to traffic volumes generated by the Project.
- Recommendations as needed to mitigate any impacts resulting from the addition of Project traffic.

2.2 Intersection Analysis

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM), 6th Edition, includes methods for calculating volume to capacity ratios, delays, and corresponding Levels of Service that were utilized in this study. LOS definitions for signalized and unsignalized intersections are provided in Appendix B.

Analyses for the study intersections were performed using the traffic analysis software Synchro, which is able to prepare reports based on the methodologies described in the HCM. These reports contain control delay results as based on intersection lane geometry, signal timing, and hourly traffic volumes. Based on the vehicular delay at each intersection, a LOS is assigned to each approach and intersection movement as a qualitative measure of performance. These results, as confirmed or refined by field observations, constitute the technical analysis that will form the basis of the recommendations outlined in this report.

2.3 Study Area Intersection Analysis

Intersection analysis within the Project study area was performed on the following intersections due to their proximity to the Project:

- Kahekili Highway/Waiehu Beach Road (unsignalized)
- Kahekili Highway/Piihana Road/Mokuhau Road/Market Street (unsignalized)
- Kahekili Highway/Makaala Road (unsignalized)
- Waiehu Beach Road/Eha Street (signalized)
- Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road (unsignalized)
- Waiehu Beach Road/Makaala Drive (unsignalized)

- Main Street/Central Avenue (signalized)
- Main Street/High Street (signalized)
- Market Street/Mill Street (unsignalized)
- Market Street/Vineyard Street (unsignalized)
- Mill Street/Central Avenue (unsignalized)

3. EXISTING CONDITIONS

3.1 Roadway System

The following are brief descriptions of the existing roadways in the vicinity of the Project:

Central Avenue is a north-south, two-way, two-lane roadway that begins to the north at its intersection with Mill Street and continues southward until its intersection with Main Street.

Eha Street is a two-way, two-lane, east-west roadway that provides access to commercial and residential areas. Eha Street begins to the west at its intersection of Wili Pa Loop and Imi Kala Street and continues eastward until its intersection with Waiehu Beach Road.

High Street – is a north-south, two-way, two-lane, County roadway that begins to the north at its intersection with Vineyard Street and continues southward until its intersection with Keanu Street, where it transitions to Honoapiilani Highway.

Kahekili Highway is a two-way roadway. This roadway begins to the south at its intersection with Mokuhau Road and Piihana Road and North Market Street and extends northward and then westward, generally following the coastline until it transitions to Honoapiilani Highway west of its intersection with Honokohau Valley Road.

Lower Waiehu Beach Road is a two-way, two-lane local roadway that begins to the west at its intersection with Waiehu Beach Road and Wailupe Drive and extends northeast generally following the coastline until it terminates at Waiehu Beach Park.

Main Street is an east-west, two-way, two-lane roadway that provides connectivity to commercial areas in Wailuku. Main Street begins to the east at its intersection with Lower Main Street and Kaahumanu Avenue and continues westward where it splits into Iao Valley Road and West Alu Road. Along Main Street near Central Avenue and High Street, marked curbside parking is available. This roadway begins to the west with its intersection with Kahekili Highway and continues eastward until its intersection with Waiehu Beach Road.

Market Street is a north-south, two-way, two-lane roadway that begins to the north as North Market Street at its intersection with Kahekili Highway, Piihana Road and Mokuhau Road, and extends southward until its intersection with Main Street, where it transitions into South Market Street. Market Street is a two-way, two-lane roadway between its northern terminus and Vineyard Street. Between Vineyard Street and Main Street, Vineyard Street is a one-lane, one-way northbound roadway. Market Street serves many businesses and homes in Wailuku Town and provides regional access to Waihee via Kahekili Highway.

Mill Street is an east-west, two-way, two-lane roadway that begins to the west at its intersection with North Market Street and extends westward until it terminates to the east at its intersection with Lower Main Street. Mill Street serves a number of businesses and homes in Wailuku.

Mokuhau Road is an east-west, two-way, two-lane roadway that begins to the east at its intersection with Kahekili Highway, Piihana Road, and North Market Street, and extends westward until it terminates in a cul-de-sac near the Konko Mission of Wailuku.

Piihana Road is an east-west, two-way roadway that begins to the west at its intersection with Kahekili Highway, Mokuhau Road, and North Market Street and extends eastward for approximately one mile, where it terminates in a cul-de-sac. Piihana Road serves mostly residential and agricultural uses.

Vineyard Street is an east-west, two-way, two-lane roadway that begins to the east as a cul-de-sac near the Vineyard Street/Mission Street intersection and extends westward until it transitions into Ilina Street about 600 feet west of Uhiwai Place.

Waiehu Beach Road is generally a north-south, two-way roadway that begins to the south at its intersection with Kahului Beach Road and Lower Main Street, and extends northward and terminates at its intersection with Kahekili Highway near the Waiehu Stream.

Wailupe Drive is a two-way, two-lane roadway that provides access for residences in Waiehu Heights. Waielupe Drive begins to the east at its intersection with Waiehu Beach Road and Lower Waiehu Beach Road and extends westward and southwest until it terminates in a cul-de-sac near its intersection with Olena Street.

3.2 Existing Traffic Volumes

The hourly turning movement counts utilized in this report were recorded on the dates shown below:

- Kahekili Highway/Waiehu Beach Road (Tuesday May 1, 2018)
- Kahekili Highway/Piihana Road/Mokuhau Road/Market Street (Tuesday September 20, 2016)
- Kahekili Highway/Makaala Road (Thursday April 11, 2019)
- Waiehu Beach Road/Eha Street (Thursday May 3, 2018)
- Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road (February 18, 2021)
- Waiehu Beach Road/Makaala Drive (Tuesday September 20, 2016)
- Main Street/Central Avenue (Tuesday May 8, 2018)
- Main Street/High Street (Tuesday May 1, 2018)
- Market Street/Mill Street (Tuesday May 1, 2018)
- Market Street/Vineyard Street (Thursday February 2, 2017)
- Mill Street/Central Avenue (Tuesday May 1, 2018)

Based on traffic count data, the weekday AM and PM peak hours of traffic were determined to generally occur between 6:45 AM - 7:45 AM, and 4:00 PM - 5:00 PM, respectively. Turning movement count data may be found in Appendix A.

Due to COVID-19, traffic volumes throughout Maui were significantly lower than normal levels. For this reason, turning movement counts that were collected in 2016-2019, prior to COVID-19, were utilized for this study. Based on early consultation with State DOT and County Department of Public Works, the use of historic counts were acceptable to reflect existing conditions. To be conservative, a growth rate of 2.0% per year along Kahekili Highway, 1.4% per year along Waiehu Beach Road, 1.0% per year along Main Street, and 0.9% along Honoapiilani Highway/High Street was applied to increase counts recorded between 2016-2019 to constitute "Existing 2020" volumes analyzed in this study.

Historic counts for the Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road intersection were not available; therefore turning movement counts were collected in February 2021. To adjust these counts to pre-COVID-19 levels, traffic counts were concurrently taken at the Waiehu Beach Road/Makaala Drive intersection in 2021, and was compared to pre-COVID 2016 volumes for that intersection to determine calculated rate increase from 2021 to 2016. Counts at the Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road were increased by 20-57% along most movements based on these calculated rates.

3.3 Existing Traffic Conditions Analysis and Observations

The analysis and observations described below are based on prevailing conditions during the time at which the data was collected. For purposes of this study, Kahekili Highway and Waiehu Beach Road are assumed to be in the north-south direction except at its intersection, where the Waiehu Beach Road approach is designated in the westbound direction.

3.3.1 Regional Observations

The Waiehu area in the immediate vicinity of the Project is largely comprised of single-family homes, with a few community parks. This area is served by Waiehu Beach Road and Kahekili Highway – the two regional roadways that provide access to schools and commercial areas in Kahului and Wailuku.

During the AM peak hour as residents leave for work and school, southbound Waiehu Beach Road experiences extensive queueing which stems from the Waiehu Beach Road/Eha Street intersection and at its maximum queue, extends over 1 mile near to the Kahekili Highway/Waiehu Beach Road intersection. The length of time in queue can vary between 6-15 minutes from the back of the maximum queue to clear the Waiehu Beach Road/Eha Street intersection. As a result of the queue spillback along Waiehu Beach Road, right-turning movements from side streets turning onto southbound Waiehu Beach Road can experience slower progression or blockages, resulting in varying lengths of side street queues. However, these right-turn vehicles were also observed to slowly but consistently filter into the Waiehu Beach Road queue, which helped to process lengthy side street queues. The congestion along Waiehu Beach Road generally lasted for about an hour and dissipated completely by 8:00 AM.

Also during the AM peak period (roughly 7:15-7:45 am), southbound traffic along Kahekili Highway was observed to queue from the Happy Valley area and extend to between Puohala Road and Makaala Drive. By 8:00 AM, all queues had dissipated. The length of time in queue can

vary between 4-8 minutes. No persistent queueing was observed along Kahekili Highway or Waiehu Beach Road during the PM peak hour.

Main Street experiences relatively slow-moving stop-and-go traffic conditions due to on-street parking stalls, pedestrian crossing and numerous businesses and driveways throughout the stretch in the study area.

3.3.2 Existing Intersection Analysis

Kahekili Highway/Waiehu Beach Road

All movements operate at LOS C or better across both peak hours. All approaches are currently single shared lanes. The following operational observations were made:

- Relatively low westbound left-turn peak traffic of only 36(31) left-turners during the AM(PM) peak hours of traffic that infrequently blocked westbound right-turn progression.
- Low conflicting northbound traffic provided frequent gaps in traffic that allowed multiple westbound right-turn vehicles and southbound left-turn vehicles to proceed unimpeded.
- No lengthy queues were observed along the southbound Kahekili Highway approach due to low conflicting northbound traffic.
- Southbound left-turn vehicles were observed to frequently slow down or stop to allow the more critical westbound left-turn vehicles to proceed through the intersection, thereby reducing overall westbound approach delays and right-turn obstructions. Westbound approach queues along Waiehu Beach Road were manageable, extending about 250-350 feet long at its maximum.

Although LOS operations are acceptable and queuing was observed to be moderate during the heavier AM peak hour, signal warrant analysis indicated a signal would be warranted ONLY if both westbound left-turn and right-turn movement volumes are included in the warrant (due to the shared lane). In lieu of a signal, the County could consider widening to provide exclusive left-turn and right-turn lanes along the westbound Waiehu Beach Road approach and an exclusive left-turn lane along the southbound Kahekili Highway approach. With this widening improvement, the intersection would just fall short of warranting a signal. Alternatively, a roundabout could be considered. However, existing corners of the intersection are relatively steep drop-offs that would need to be shored up to contain the wider pavement footprint for any auxiliary lane widening improvements or a roundabout.

Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road

During the AM and PM peak hours, the eastbound and westbound stop-controlled movements along Wailupe Drive and Lower Waiehu Beach Road operate at LOS E/F, though these movements continued to operate under capacity. As previously mentioned, during the AM peak hour, traffic along Waiehu Beach Road was observed to queue beyond the Waiehu Beach Road/Wailupe Drive/Waiehu Beach Road intersection. When this occurs, right-turning movements from Wailupe Drive turning onto southbound Waiehu Beach Road can experience slower progression, but they consistently filtered into the slow-moving Waiehu Beach Road queue.

Waiehu Beach Road/Makaala Drive

All movements at the Waiehu Beach Road/Makaala Drive intersection operate at LOS D or better across both peak hours, with the exception of the eastbound right-turn movement, which operates at LOS F during the AM peak hour due to high southbound Waiehu Beach Road traffic conflicting with a high 417-vehicle right-turn volume from Makaala Drive. Similar to the Waiehu Beach Road/Wailupe Drive/Lower Waiehu Beach Road intersection, extensive queueing during the AM peak hour along Waiehu Beach Road resulted in the eastbound Makaala Drive right-turn movement experiencing slower progression, but they consistently filtered into the slow-moving Waiehu Beach Road queue. Queues along Makaala Drive ranged from 10-40 vehicles long and at its longest, require 2-4 minutes to turn onto Waiehu Beach Road.

The northbound left-turn movement volume along Waiehu Beach Road exceeds 300 vehicles during the PM peak hour, but observations indicate that frequent gaps in traffic resulted in minimal delays and queues. Left-turn queues remained within the left-turn auxiliary lane, with queues only stacking from 1-3 vehicles at a time.

Waiehu Beach Road/Eha Street

During the AM peak hour, the Eha Street and Nukuwai Place approaches and Waiehu Beach Road northbound left-turn and southbound through movements operate at LOS F. Turning movements suggest that a significantly high volume – about one-third of the total southbound Waiehu Beach Road volume in the AM peak hour – turns right onto Eha Street. An existing right-turn auxiliary lane is provided, but is relatively short (150' long) due to the constraints of the upstream bridge over Wailuku River that limits the lengthening of this right-turn pocket. This short right-turn lane along Waiehu Beach Road leads to two issues during the AM peak hour that contributes to the lengthy AM queues along Waiehu Beach Road:

- Forces these right-turning vehicles to decelerate in the through lane, slowing progression along Waiehu Beach Road and through the intersection.
- When given a red light, southbound through vehicles will queue up in the through lane, blocking access to the right-turn lane. When this occurs, right-turning vehicles will be locked up in the same queue as through vehicles, further expanding the queues along Waiehu Beach Road.

Kahekili Highway/Makaala Drive

All movements operate adequately at LOS C or better across both peak hours. Based on observations when southbound queues extended beyond Makaala Drive, southbound vehicles allowed westbound left-turn vehicles to proceed through the intersection. As a result, westbound left-turn queues were observed to extend by only 5-6 cars at its maximum.

Kahekili Highway/Market Street/Mokuhau Road/Piihana Road

All movements at this intersection operate at LOS D or better across both peak hours with the exception of the westbound approach along Piihana Road, which operates at LOS E during the AM peak hour, though significantly under capacity. Due to the skewed alignment of this intersection, the Piihana Road approach is provided with limited sight-distance to conflicting southbound traffic along Kahekili Highway.

Market Street/Mill Street

During the AM peak hour, lengthy southbound congestion occurs along Market Street, primarily stemming from this intersection. Turning movements suggest that a significantly high volume – about half of the total southbound Market Street approach volume in the AM peak hour – turns left onto Mill Street. An existing left-turn auxiliary lane is provided, but is relatively short (100' long). This short left-turn lane along Market Street locks up southbound left-turn vehicles in the same queue as through vehicles, lengthening the queues beyond Happy Valley.

The westbound Mill Street left-turn movement operates at LOS F during the AM and PM peak hour. However, observations show that mainline traffic along Market Street frequently stopped to allow left-turners to proceed, resulting in significantly less delays and queues. Average westbound approach queues were relatively minimal with only 1-4 vehicles and occasional maximum queues of 5-7 vehicles.

Main Street/Central Avenue

All movements at this intersection operate at LOS D or better across both peak hours with the exception of the southbound left-turn movement which operates at LOS E during the AM peak hour due to the coordinated signal timings which favor progression along Main Street. Queues along Central Avenue can spill back near to Vineyard Street in the southbound direction for portions of the AM and PM peak periods.

Main Street/High Street

All movements operate at LOS B or better across both peak hours. During both peaks, southbound traffic can queue back from Main Street to Vineyard Street in part, due to the single shared lane approach. Traffic along the northbound approach varies during the AM peak hour due to commuter traffic and school related traffic.

Mill Street/Central Avenue

All movements operate at LOS D or better across both peak hours. Left and right-turn movements into Central Avenue towards Main Street and right-turns out of Central Avenue towards Imi Kala Drive are relatively high, ranging from 150-250 vehicles. All approaches are shared lane approaches with no auxiliary lanes. Queues can vary based on platoons of conflicting vehicles, but no consistent congestion was observed.

Market Street/Vineyard Street

This four-way stop controlled intersection operates adequately with all movements at LOS D or better. Based on AM observations, southbound traffic occasionally spilled back into the Market Street/Mill Street intersection, which partly contributed to heavy AM congestion on Kahekili Highway.

See Figure 3.1 for the laneage, volumes and LOS for Existing Conditions and Table 3.1 for a summary of LOS.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

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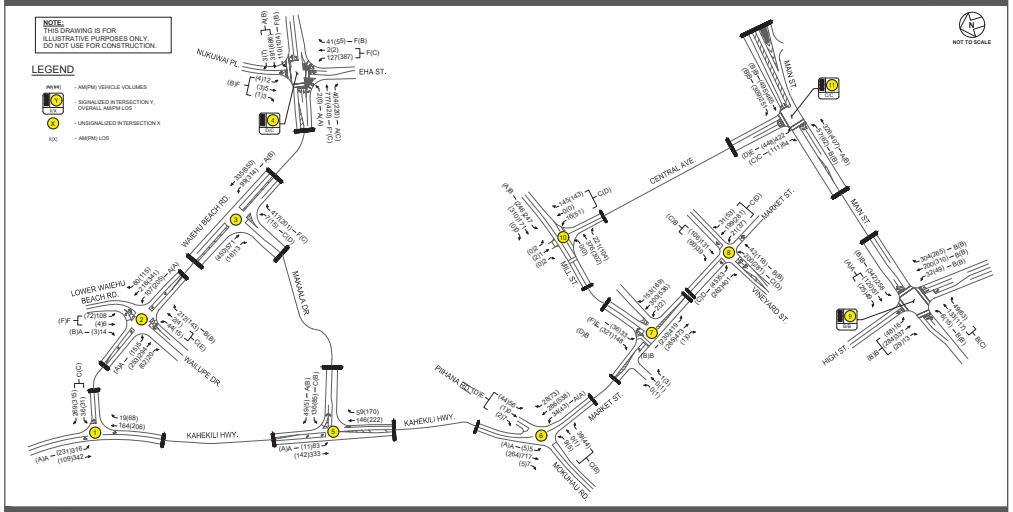

FIGURE 3.1

EXISTING CONDITIONS, LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 3.1: Existing 2020 Conditions
Level of Service Summary

Intersection	Existing 2020 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy & Waiehu Beach Road						
WB LT/RT	23.4	0.64	C	17.7	0.58	C
SB LT	8.5	0.25	A	8.6	0.20	A
Overall	8.6	-	-	8.4	-	-
2: Waiehu Beach Rd & Wailupe Dr./Lower Waiehu Beach Rd						
NB LT	8.3	0.10	A	8.6	0.18	A
EB LT/TH	22.8	0.20	C	37.9	0.16	E
EB RT	12.5	0.32	B	11.3	0.21	B
WB LT/TH	61.0	0.69	F	116.2	0.80	F
WB RT	9.8	0.02	A	10.8	0.01	B
SB LT	7.9	0.00	A	8.4	0.02	A
Overall	10.7	-	-	10.6	-	-
3: Waiehu Beach Rd & Makaala Dr						
NB LT	9.3	0.11	A	10.0	0.32	B
EB LT	16.7	0.02	C	30.6	0.10	D
EB RT	56.4	0.94	F	15.1	0.38	C
Overall	17.0	-	-	4.1	-	-
4: Waiehu Beach Rd & Eha St						
NB LT	105.4	0.87	F	15.6	0.29	B
NB TH/RT	5.8	0.29	A	19.9	0.77	B
EB LT/TH	105.7	0.70	F	30.8	0.70	C
EB RT	89.6	0.25	F	19.8	0.10	B
WB LT/TH/RT	86.4	0.09	F	18.9	0.01	B
SB LT	5.2	0.00	A	0.0	0.00	A
SB TH	79.8	1.07	F*	24.1	0.57	C
SB RT	9.4	0.36	A	20.3	0.35	C
Overall	52.6	-	D	22.9	-	C
5: Kahekili Hwy & Makaala Dr						
WB LT	21.6	0.41	C	13.5	0.18	B
WB RT	9.5	0.06	A	10.1	0.01	B
SB LT	7.9	0.07	A	8.2	0.01	A
Overall	5.0	-	-	2.0	-	-
6: Market St/Kahekili Hwy & Mokuhau Rd/Pilihana Rd						
NB LT	9.5	0.04	A	7.9	0.04	A
EB LT/TH/RT	19.2	0.17	C	12.0	0.10	B
WB LT/TH/RT	49.2	0.47	E	31.0	0.27	D
SB LT	8.0	0.00	A	8.9	0.01	A
Overall	3.7	-	-	2.4	-	-
7: Market St & Mill St						
WB LT	191.8	0.75	F	62.5	0.39	F
WB RT	12.5	0.25	B	34.7	0.77	D
SB LT	10.8	0.43	B	11.0	0.30	B
Overall	8.3	-	-	10.2	-	-

Table 3.1: Existing 2020 Conditions
Level of Service Summary Cont'd

Intersection	Existing 2020 Conditions					
	AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
8: Market St & Vineyard St						
NB LT/TH/RT	15.6	0.49	C	29.7	0.76	D
EB LT	17.2	0.47	C	26.4	0.68	D
EB TH	10.7	0.09	B	13.0	0.26	B
WB TH/RT	13.9	0.36	B	15.4	0.38	C
SB LT/RT	25.1	0.77	D	20.0	0.62	C
Overall	19.3	-	C	23.1	-	C
9: High St. & Main St						
NB LT	10.9	0.08	B	11.3	0.12	B
NB TH	12.2	0.38	B	13.5	0.55	B
NB RT	14.9	0.68	B	11.2	0.18	B
EB LT	14.8	0.02	B	17.2	0.05	B
EB TH/RT	18.6	0.63	B	20.7	0.60	C
WB LT	10.4	0.47	B	11.5	0.59	B
WB TH/RT	6.8	0.14	A	7.5	0.16	A
SB LT/TH/RT	14.2	0.61	B	14.7	0.63	B
Overall	13.4	-	B	13.4	-	B
10: Central Ave. & Mill St						
NB LT/RT	19.9	0.42	C	34.6	0.65	D
WB LT	10.4	0.29	B	9.2	0.24	A
Overall	4.9	-	-	7.8	-	-
11: Main St & Central Ave.						
EB LT	11.5	0.13	B	13.1	0.15	B
EB TH	0.6	0.30	A	13.0	0.38	B
WB TH	17.8	0.47	B	19.8	0.52	B
WB RT	12.4	0.05	B	14.0	0.13	B
SB LT	56.9	0.91	E	52.8	0.90	D
SB RT	34.9	0.02	C	32.2	0.14	C
Overall	25.7	-	C	27.3	-	C

* Denotes over-capacity conditions

3.4 Multimodal Facilities

3.4.1 Bicycle and Pedestrian Facilities

Sidewalks are provided along the majority of roadways in the adjacent Waiehu Heights subdivision, although there is minimal connectivity to nearby Wailuku or Kahului. There are currently no sidewalks provided along Kahekili Highway in the study area.

HDOT completed the Bike Plan Hawaii Master Plan. This Bike Master Plan identifies existing and proposed bicycle facilities. The following locations provide existing bike facilities:

- Waiehu Beach Road between Kahekili Highway and Kahului Beach Road
- Kahekili Highway between Waiehu Beach Road and Piihana Road
- Kaahumanu from Lunalilo Street, through to Hana Highway
- Kanaloa Avenue from Kahului Beach Road, through to Mahalani Street.

The Bike Plan Hawaii Master Plan identifies the following locations as future signed-shared roadways in the vicinity of the Project:

- Main Street between High Street and Kaahumanu Avenue
- Market Street between Main Street and Piihana Road

A map of the existing and proposed pedestrian and bicycle facilities can be found in Figure 3.2.

3.4.2 Transit Accessibility Plan

The Maui Bus system offers several routes that connect the major areas in Maui. There are several routes in the Project vicinity:

- Waihee Villager Route 8 runs between Queen Kaahumanu Center in Kahului and the Richard Pablo Caldito Sr Park, via Kahului Beach Road, Waiehu Beach Road, and Kahekili Highway.
- Wailuku Loop Routes 1 and 2 serves a number of locations throughout Waiale, Waikapu and Wailuku. Near the Project, there are several stops for both routes along Makaala Drive and Waiehu Beach Road.

In the vicinity of the Project, the nearest bus stop is located along Kahekili Highway about 0.20 miles north of the Kahekili Highway/Waiehu Beach Road intersection. A map of the transit routes are shown in Figure 3.3.

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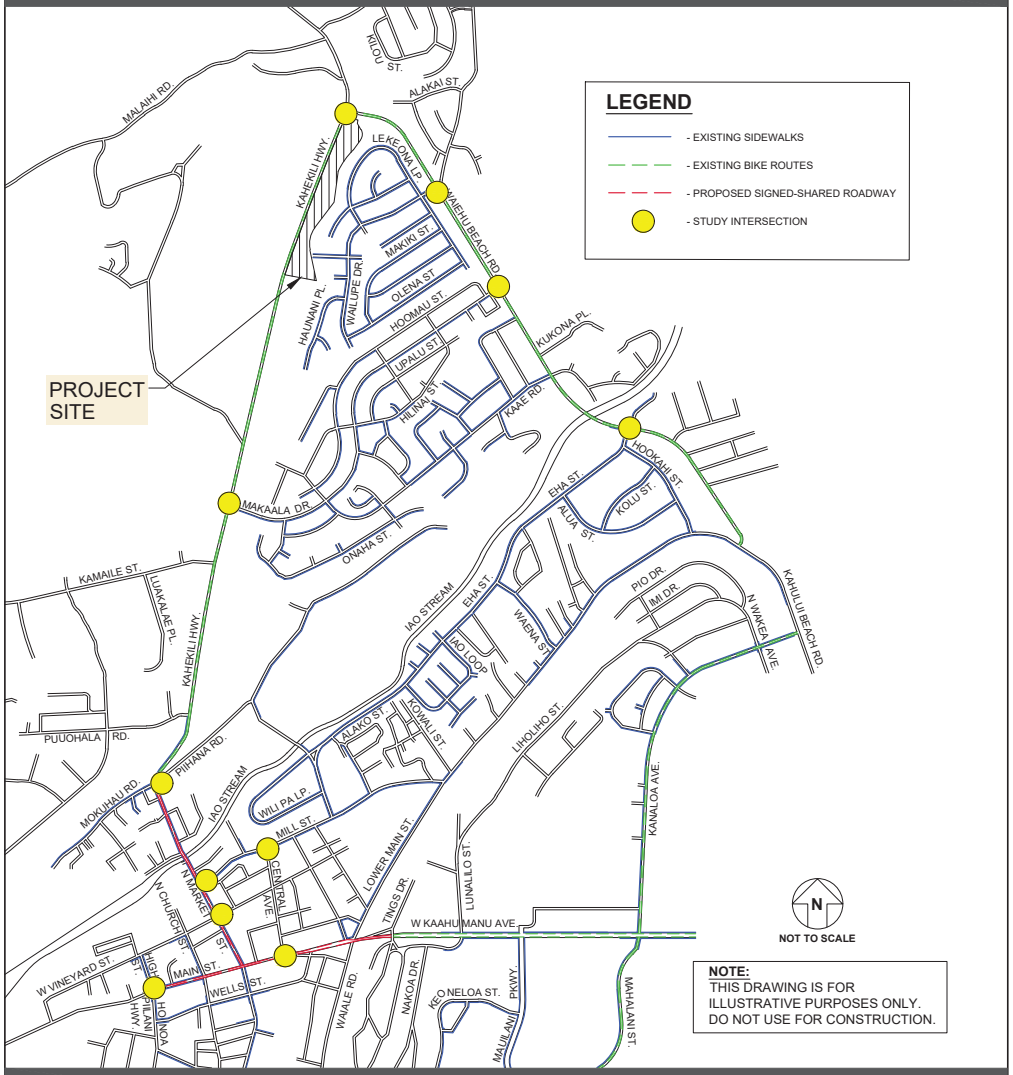

FIGURE 3.2

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

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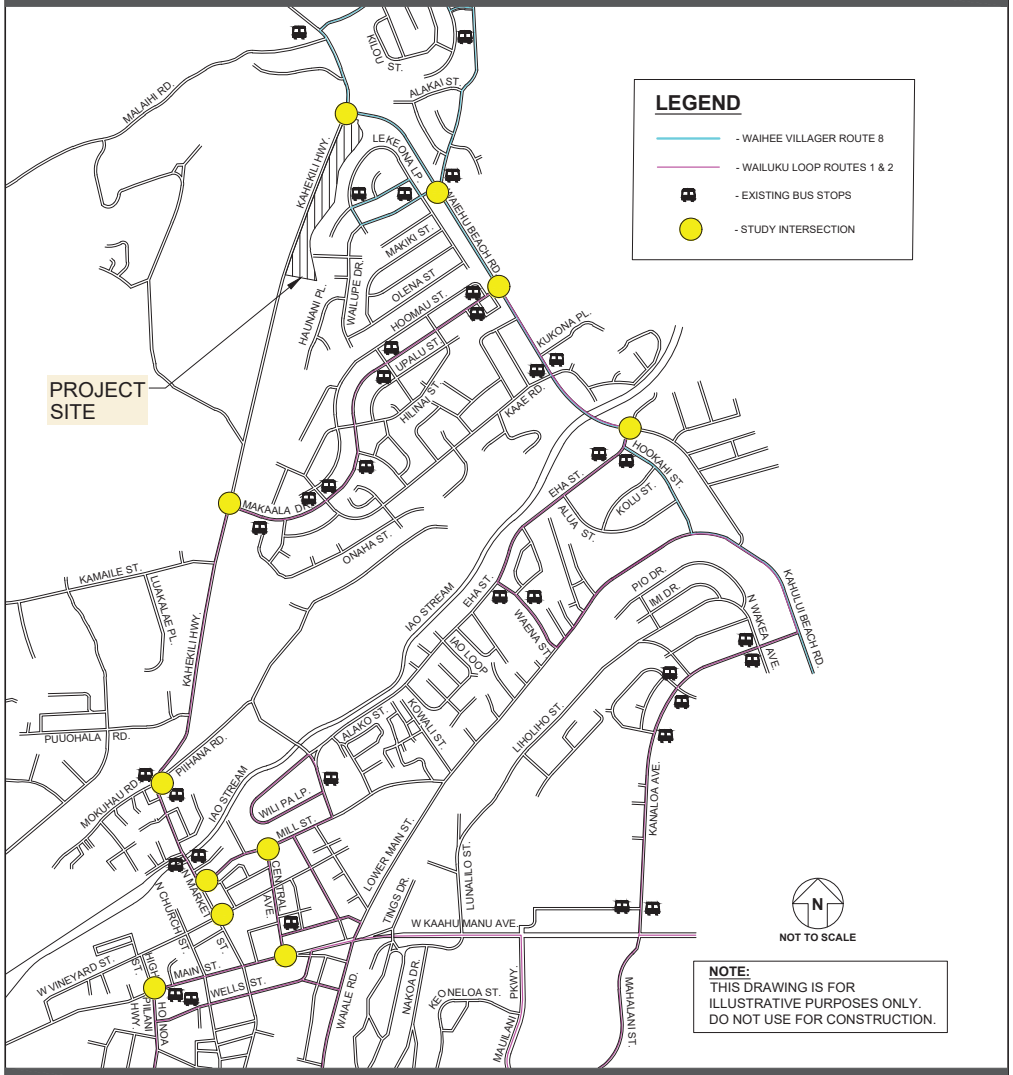

FIGURE 3.3

EXISTING TRANSIT FACILITIES

4. BASE YEAR 2024 TRAFFIC CONDITIONS

The Year 2024 was selected to reflect the completion year of the Project.

4.1 Defacto Growth Rate

Projections for Base Year 2024 traffic were based upon existing traffic counts performed by ATA, ambient regional growth, and nearby developments in the immediate vicinity of the Project. Based on historic regional growth comparisons and traffic forecasts based on the Maui Regional Travel Demand Model (MRTDM), ambient growth was conservatively estimated to be approximately 1.4% per year along Waiehu Beach Road, 2% per year along Kahekili Highway, 1.0% per year along Main Street, and 0.9% per year along Honoapiilani Highway/High Street.

4.2 Traffic Forecasts for Known Developments

The following developments are anticipated to be completed in the vicinity of Study Area by the Year 2024:

- Boys & Girls Clubhouse proposes a two-story clubhouse that will replace the existing covered basketball court adjacent to the Paukukalo Community Center in Waiehu.
- Wailuku Civic Complex (WCC) proposes infrastructure improvements along Church Street and Vineyard Street as part of phase 1A. Phase 1B will construct a new multi-level parking. Phase 2 of WCC, which would construct a civic building and plaza remains uncertain due to funding issues. To remain conservative, all phases of WCC was assumed to be constructed by Year 2024 for purposes of this TIAR.
- Wailuku Hotel proposes a 160-room hotel with café/eating establishment at the corner of Main Street/Market Street. Full build-out and occupany is anticipated by year 2024.

The former Hale Mua residential development adjacent and mauka of the Project site is actively being planned, but since final plans and build-out of this development is currently unknown and likely to be completed after construction of the Project, it was not included in this study. Table 4.1 shows the trips generated by each respective development and Figure 4.1 shows the locations of the known developments.

Table 4.1: Trips Generated by Known Developments

Known Development	AM Peak Hour			PM Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Boys & Girls Clubhouse	21	11	32	10	11	21
Wailuku Civic Complex	335	92	427	240	387	627
Wailuku Hotel	44	31	75	49	47	96

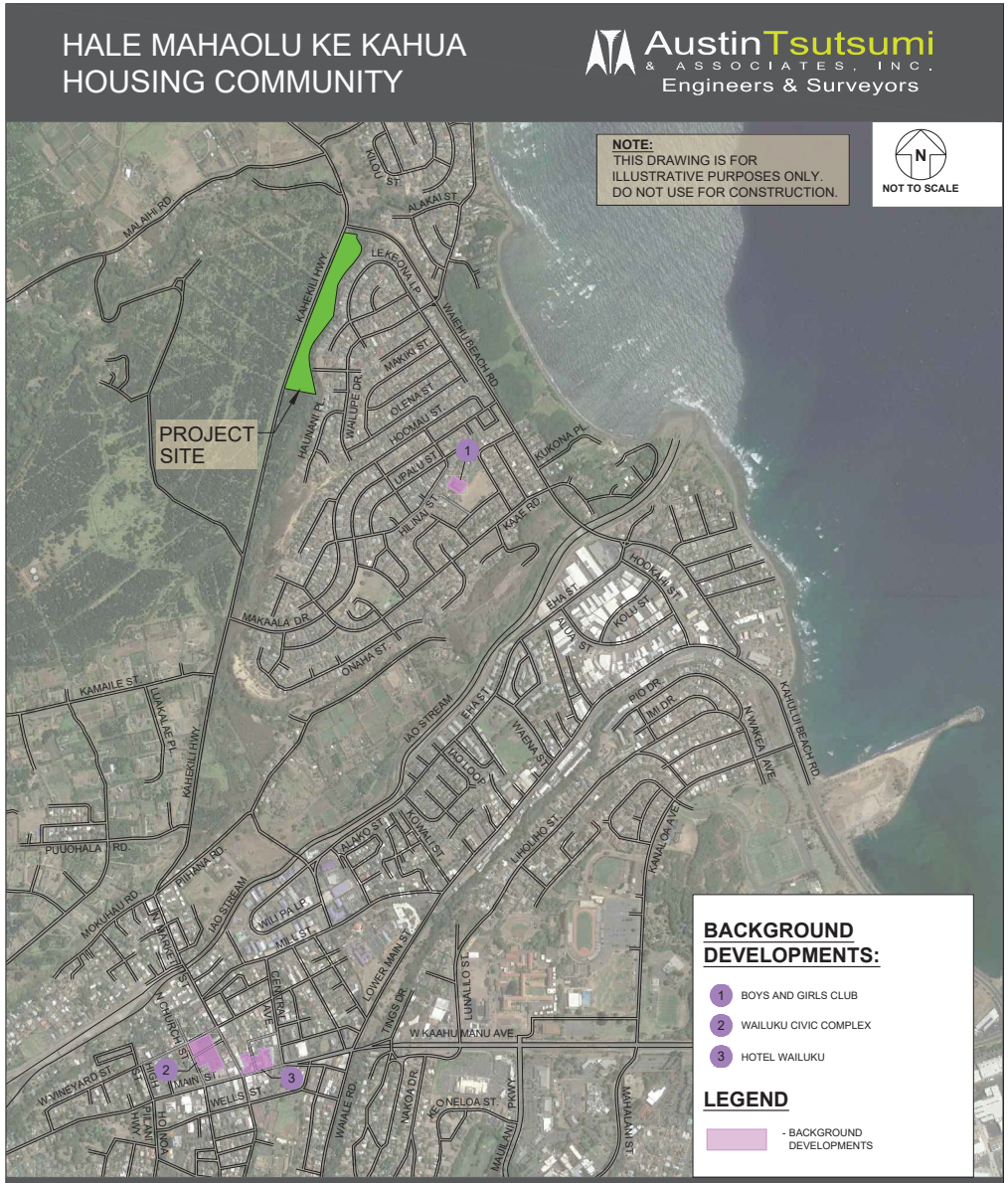

FIGURE 4.1 BACKGROUND PROJECTS

4.3 Planned Roadway Improvements

The Maui Metropolitan Planning Organization prepared The Hele Mai Maui Long Range Transportation Plan 2040 dated December 2019 (hereinafter referred to as "Hele Mai Maui LRTP 2040 Plan"). The Hele Mai Maui LRTP 2040 Plan identifies various long-range transportation improvements for the island of Maui, many of which are improvements previously identified as future planned, programmed or funded improvements by Maui County or The State of Hawaii.

The Hele Mai Maui LRTP 2040 Plan identifies several improvements in the Study Area. However, the only active Project in the area is the following:

- Mill Street Pavement Reconstruction – Pavement along Mill Street is planned to be reconstructed. No widening capacity improvements, additional lanes or traffic control changes are planned and will therefore not impact vehicular operational conditions on Mill Street. Future intersection improvements have been identified at the Mill Street/Imi Kala Street Intersection, but is not planned as part of the Mill Street Pavement Reconstruction Project.

The following roadway improvements are identified in the Hele Mai Maui LRTP 2040 Plan, but since they are not anticipated to be constructed by Year 2024, they were not included in this TIAR:

- Imi Kala Street Extension (Phase I) & Imi Kala Bridge Improvements - This regional improvement would provide a new paved roadway stemming from Kahekili Highway to the north and traversing south, intersecting with Piihana Road and terminating at the south end at the existing Imi Kala Street/Wili Pa Loop/Eha Street intersection. The existing Imi Kala Bridge will also be reconstructed to meet the traffic demands. This improvement is planned to alleviate some of the traffic congestion along Kahekili Highway and Waiehu Beach Road. This improvement was previously tied to the conditions of approval for the former Hale Mua development. However, since these conditions of approval have been terminated, there is currently no timeframe for completion of this improvement and was therefore not included in this TIAR.
- Imi Kala Street Extension (Phase II) – This improvement is planned by Maui County and would provide a new paved roadway stemming from the existing Imi Kala Street/Mill Street intersection and traverse south, adjacent to St. Anthony School, terminating at the south end at Lower Main Street. Based on discussions with County DPW, there is currently no timeframe for completion of this improvement and was therefore not included in this TIAR.

4.4 Base Year 2024 Analysis

The ambient traffic growth and trips generated by background developments are anticipated to increase traffic by 30-60 vehicles along Kahekili Highway and 10-15 vehicles along Waiehu Beach Road in the vicinity of the Project site. Based on these increases, most intersections will operate similar to existing conditions. Various intersections along Kahekili Highway and Waiehu Beach Road will continue to operate with LOS E/F movements during the AM peak hour, reflective of existing congestive conditions. The following intersections will experience movements that worsen to LOS E/F conditions. As discussed above, the Imi Kala Bridge Street Extension and Bridge Improvements is the long-range improvement planned to mitigate some of the congestive conditions along Kahekili Highway and Waiehu Beach Road.

Kahekili Highway/Market Street/Mokuhau Road/Piihana Road

All movements at this intersection operate at LOS C or better across both peak hours with the exception of the westbound approach, which is anticipated to worsen from LOS E to LOS F during the AM peak hour and LOS D to LOS E during the PM peak hour. The westbound approach will continue to service a relatively low volume of 50-70 peak vehicles per hour and will continue to operate under capacity with little to no queuing.

Market Street/Vineyard Street

At the Market Street/Vineyard Street intersection, the southbound approach is anticipated to worsen from LOS D to LOS F during the AM peak hour, primarily due to traffic increases potentially generated by the proposed Wailuku Civic Complex. During the PM peak hour, the northbound approach and the eastbound left-turn are anticipated to lower to LOS F, and the southbound approach is anticipated to lower to LOS E over existing conditions. Widening and/or traffic control improvements are limited at this location due to right-of-way constraints and existing buildings at three of the four corners of the intersections.

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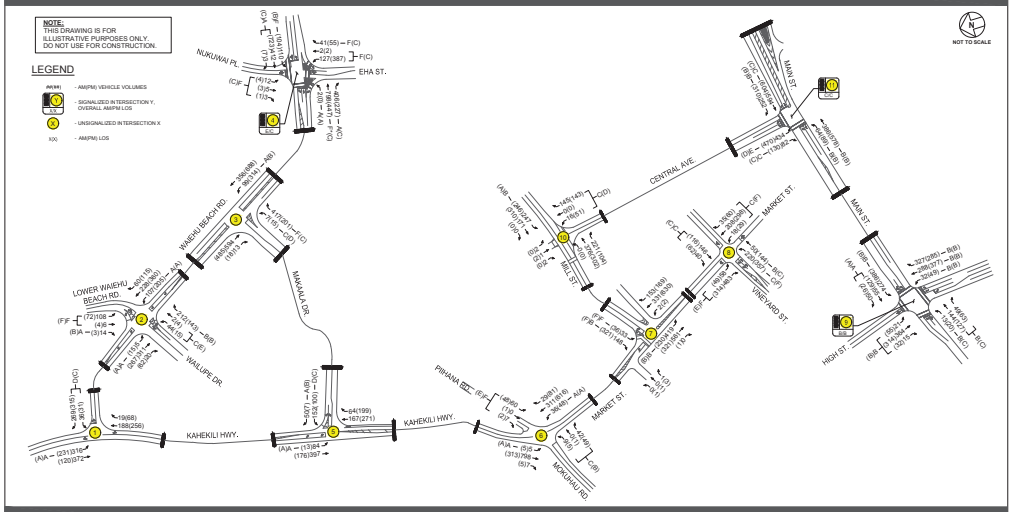

FIGURE 4.2

BASE YEAR 2024 LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 4.2: Existing and Base Year 2024 Level of Service Summary

Intersection	Existing 2020 Conditions						Base Year 2024					
	AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy/Market St & Waiehu Beach Rd												
WB LT/RT	23.4	0.64	C	17.7	0.58	C	27.0	0.68	D	20.2	0.62	C
SB LT	8.5	0.25	A	8.6	0.20	A	8.6	0.26	A	8.8	0.21	A
Overall	8.6	-	-	8.4	-	-	9.1	-	-	8.8	-	-
2: Waiehu Beach Rd & Wailupe Dr./Lower Waiehu Beach Rd												
NB LT	8.3	0.10	A	8.6	0.18	A	8.3	0.10	A	8.7	0.19	A
EB LT/TH	22.8	0.20	C	37.9	0.16	E	24.0	0.21	C	40.1	0.17	E
EB RT	12.5	0.32	B	11.3	0.21	B	12.7	0.33	B	11.4	0.22	B
WB LT/TH	61.0	0.69	F	116.2	0.80	F	69.4	0.73	F	132.6	0.85	F
WB RT	9.8	0.02	A	10.8	0.01	B	9.8	0.02	A	11.0	0.01	B
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.5	0.02	A
Overall	10.7	-	-	10.6	-	-	11.4	-	-	11.4	-	-
3: Waiehu Beach Rd & Makaala Dr												
NB LT	9.3	0.11	A	10.0	0.32	B	9.4	0.12	A	10.3	0.33	B
EB LT	16.7	0.02	C	30.6	0.10	D	17.2	0.03	C	32.3	0.11	D
EB RT	56.4	0.94	F	15.1	0.38	C	64.5	0.97	F	16.0	0.40	C
Overall	17.0	-	-	4.1	-	-	18.8	-	-	4.0	-	-
4: Waiehu Beach Rd & Eha St												
NB LT	105.4	0.87	F	15.6	0.29	B	105.4	0.87	F	16.2	0.29	B
NB TH/RT	5.8	0.29	A	19.9	0.77	B	5.9	0.30	A	21.1	0.80	C
EB LT/TH	105.7	0.70	F	30.8	0.70	C	105.7	0.70	F	32.8	0.71	C
EB RT	89.6	0.25	F	19.8	0.10	B	89.6	0.25	F	21.0	0.10	C
WB LT/TH/RT	86.4	0.09	F	18.9	0.01	B	86.4	0.09	F	20.1	0.01	C
SB LT	5.2	0.00	A	0.0	0.00	A	5.3	0.00	A	0.0	0.00	A
SB TH	79.8	1.07	F*	24.1	0.57	C	89.6	1.10	F*	24.9	0.59	C
SB RT	9.4	0.36	A	20.3	0.35	C	9.5	0.37	A	20.5	0.36	C
Overall	52.6	-	D	22.9	-	C	56.5	-	E	23.9	-	C
5: Kahekili Hwy & Makaala Dr												
WB LT	21.6	0.41	C	13.5	0.18	B	28.1	0.52	D	15.7	0.25	C
WB RT	9.5	0.06	A	10.1	0.01	B	9.7	0.07	A	10.6	0.01	B
SB LT	7.9	0.07	A	8.2	0.01	A	7.9	0.07	A	8.5	0.01	A
Overall	5.0	-	-	2.0	-	-	5.9	-	-	2.3	-	-
6: Market St/Kahekili Hwy & Mokuhau Rd/Piilihana Rd												
NB LT	9.5	0.04	A	7.9	0.04	A	9.9	0.05	A	8.1	0.04	A
EB LT/TH/RT	19.2	0.17	C	12.0	0.10	B	22.1	0.21	C	13.0	0.12	B
WB LT/TH/RT	49.2	0.47	E	31.0	0.27	D	76.7	0.62	F	44.9	0.39	E
SB LT	8.0	0.00	A	8.9	0.01	A	8.0	0.01	A	9.2	0.01	A
Overall	3.7	-	-	2.4	-	-	5.1	-	-	2.9	-	-

Table 4.2: Existing and Base Year 2024 Level of Service Summary Cont'd

Intersection	Existing 2020 Conditions						Base Year 2024					
	AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
7: Market St & Mill St												
WB LT	191.8	0.75	F	62.5	0.39	F	275.5	0.92	F	94.5	0.52	F
WB RT	12.5	0.25	B	34.7	0.77	D	12.9	0.26	B	52.6	0.88	F
SB LT	10.8	0.43	B	11.0	0.30	B	11.1	0.44	B	11.8	0.32	B
Overall	8.3	-	-	10.2	-	-	9.5	-	-	13.5	-	-
8: Market St & Vineyard St												
NB LT/TH/RT	15.6	0.49	C	29.7	0.76	D	19.5	0.57	C	54.6	0.93	F
EB LT	17.2	0.47	C	26.4	0.68	D	21.6	0.56	C	65.0	0.95	F
EB TH	10.7	0.09	B	13.0	0.26	B	11.8	0.12	B	15.9	0.37	C
WB TH/RT	13.9	0.36	B	15.4	0.38	C	16.9	0.44	C	20.2	0.48	C
SB LT/RT	25.1	0.77	D	20.0	0.62	C	61.6	0.99	F	39.8	0.84	E
Overall	19.3	-	C	23.1	-	C	37.3	-	E	45.3	-	E
9: High St. & Main St												
NB LT	10.9	0.08	B	11.3	0.12	B	10.9	0.08	B	12.9	0.14	B
NB TH	12.2	0.38	B	13.5	0.55	B	13.1	0.51	B	15.5	0.59	B
NB RT	14.9	0.68	B	11.2	0.18	B	11.2	0.20	B	12.9	0.26	B
EB LT	14.8	0.02	B	17.2	0.05	B	16.1	0.04	B	21.6	0.07	C
EB TH/RT	18.6	0.63	B	20.7	0.60	C	19.9	0.63	B	26.5	0.68	C
WB LT	10.4	0.47	B	11.5	0.59	B	11.2	0.50	B	15.0	0.69	B
WB TH/RT	6.8	0.14	A	7.5	0.16	A	7.2	0.11	A	9.6	0.19	A
SB LT/TH/RT	14.2	0.61	B	14.7	0.63	B	14.6	0.64	B	17.6	0.70	B
Overall	13.4	-	B	13.4	-	B	13.5	-	B	16.2	-	B
10: Central Ave. & Mill St												
NB LT/RT	19.9	0.42	C	34.6	0.65	D	19.9	0.42	C	34.6	0.65	D
WB LT	10.4	0.29	B	9.2	0.24	A	10.4	0.29	B	9.2	0.24	A
Overall	4.9	-	-	7.8	-	-	4.9	-	-	7.8	-	-
11: Main St & Central Ave.												
EB LT	11.5	0.13	B	13.1	0.15	B	14.6	0.19	B	16.6	0.28	B
EB TH	0.6	0.30	A	13.0	0.38	B	12.4	0.35	B	16.7	0.55	B
WB TH	17.8	0.47	B	19.8	0.52	B	21.4	0.60	C	24.2	0.65	C
WB RT	12.4	0.05	B	14.0	0.13	B	13.5	0.11	B	15.3	0.16	B
SB LT	56.9	0.91	E	52.8	0.90	D	56.6	0.91	E	52.5	0.91	D
SB RT	34.9	0.02	C	32.2	0.14	C	34.5	0.05	C	31.2	0.15	C
Overall	25.7	-	C	27.3	-	C	28.3	-	C	28.2	-	C

* Denotes over-capacity conditions

5. FUTURE YEAR 2024 WITH PROJECT CONDITIONS

5.1 Background

The Project proposes to construct 120 units of affordable housing and will also include a 3,231 SF community clubhouse and an approximately 3,477 SF non-profit building. The Project will be accessible from three (3) proposed unsignalized accesses along Kahekili Highway. The northern (Project Driveway 1) and southernmost (Project Driveway 3) accesses will be restricted to right-in, right-out access only. The middle access (Project Driveway 2) will be a full-access driveway.

5.1.1 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 10th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular traffic with independent variables. The independent variables can range from Dwelling Units (DU) for single and multi-family attached homes to Square-Foot Gross Leasable Area (SF GLA) for commercial development. These trip rates/formulae and their associated directional distributions were used to estimate increases in vehicular trips generated by the proposed Project. The rates selected were based on the land use description. See Tables 5.1 and 5.2 for Trip Generation formulae and projections for the Project.

Table 5.1: Project Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour		PM Peak Hour	
		% Enter	Trip Rate	% Enter	Trip Rate
Multifamily Housing Low-Rise (220)	DU	23%	[a]	63%	[b]
Small Office Building (712)	1000 SF GFA	83%	1.92	32%	2.45

Notes
DU = Dwelling Unit
GFA = Gross Floor Area
[a] T = 0.95Ln(X)-0.51
[b] T = EXP(0.89Ln(X)-0.02)

Table 5.2: Project Trip Generation

Land Use (ITE Code)	Quantity	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing Low-Rise (ITE 220)	120 DU	13	44	57	44	26	70
Small Office Building (ITE 712)	3500 SF GFA	6	1	7	3	6	9
TOTAL PROJECT-GENERATED TRIPS		**19**	**45**	**64**	**47**	**32**	**79**

5.1.2 Trip Distribution/Assignment

Traffic generated by the Project was added to the forecast Base Year 2024 traffic volumes within the vicinity of the Project to constitute the traffic volumes for the Future Year 2024 traffic conditions. Trips generated by the Project were assigned throughout the study area based upon regional origins and destinations as well as existing travel patterns within the vicinity of the Project. Project-generated trips are shown in Figure 5.1.

5.2 Future Year 2024 Analysis

As shown in Table 5.2, the Project is anticipated to generate 64(79) trips during the AM and PM peak hours, respectively. Regionally, the majority of Project trips will route to/from the Kahului-Wailuku areas and will add about 10-35 vehicles along Waiehu Beach Road and 5-10 vehicles along Kahekili Highway, per direction. This corresponds to an approximately 3.5% increase in traffic from Base conditions along both Kahekili Highway and Waiehu Beach Road. With the added Project trips, operations at the study intersections are generally anticipated to be similar to Base Year 2024 conditions.

Various intersections along Kahekili Highway and Waiehu Beach Road will continue to operate with LOS E/F movements during the AM peak hour, reflective of existing congestive conditions. As discussed above, the Imi Kala Bridge Street Extension and Bridge Improvements is the long-range improvement planned to mitigate some of the congestive conditions along Kahekili Highway and Waiehu Beach Road.

Kahekili Highway/Waiehu Beach Road

All movements are anticipated to continue operating at LOS D or better across both peak hours.

Waiehu Beach Road/Makaala Drive

All movements at the intersection are anticipated to operate at LOS D or better across both peak hours with the exception of the eastbound right-turn movement during the AM peak hour. The approach will continue operating at LOS F and overcapacity conditions during the AM peak hour. As previously discussed, extensive queueing during the AM peak hour along Waiehu Beach Road resulted in the eastbound Makaala Drive right-turn movement experiencing slower progression, but they consistently filtered into the slow-moving Waiehu Beach Road queue. Queues along Makaala Drive ranged from 10-40 vehicles long and at its longest, require 2-4 minutes to turn onto

Waiehu Beach Road. The Project adds 10 vehicles to the eastbound approach during the critical AM peak hour, which translates to one additional car every 6 minutes on average, which will add to, but not significantly worsen the queuing.

Waiehu Beach Road/Eha Street

The Waiehu Beach Road/Eha Street intersection is anticipated to operate similar to Base Year 2024 conditions, with slight increases in delay of less than 10-15 seconds. The queue along Waiehu Beach Road that was observed in Existing conditions will continue to occur with the Project. The Project will only add 32 vehicles along Waiehu Beach Road along the critical southbound direction during the AM peak hour, which translates to approximately one car every 2 minutes on average, and will account for approximately 2.4% of the traffic at the intersection during Future Year 2024. The overall delays will increase by about 2-5 seconds during the AM and PM peak hours.

Market Street/Vineyard Street

Numerous movements at this intersection will continue operating with the same LOS E/F as Base Year conditions. The Project will minimally add 1-3 vehicles for various turn movements, which should not significantly worsen forecast operations.

Main Street/Central Avenue

All movements at this intersection operate at LOS D or better across both peak hours with the exception of the southbound left-turn movement operating at LOS E during the AM peak hour due to the coordinated timings which favor progression along Main Street, similar to Base Year 2024.

Kahekili Highway/Project Driveway 1, 2 and 3

The Project's Driveways 1 and 3 are proposed to operate as right-in, right-out (RIRO) intersections. Project Driveway 2 is proposed as a full access intersection. Due to relatively low turning movements generated by the Project, signals are not warranted and all intersections are recommended to be unsignalized with stop control along the westbound Project exit approaches. Consistent with County standards, a roundabout was not considered since a signal was not warranted. For the full-access Driveway 2, a southbound entering left-turn auxiliary lane is recommended. In addition, at all three (3) Project Driveways, a northbound entering right-turn auxiliary lane is recommended. However, at Project Driveway 2, it is anticipated that only one of the two auxiliary lanes (southbound left-turn lane OR northbound right-turn lane) can be accommodated due to right-of-way constraints. If this is the case, the provision of the southbound left-turn lane should be prioritized over the northbound right-turn lane. Table 5.3 shows the recommended auxiliary lane lengths with full storage, deceleration and taper lengths. Provisions for accommodating full lane length to be verified upon design. All movements at the three Project Driveways are anticipated to operate at LOS B or better across both peak hours. As vacant lands along Kahekili Highway get developed, speeds should be enforced to ensure vehicles adhere to posted 30 mph speed limits.

Northbound traffic along Kahekili Highway will continue to be relatively low with only 200-280 northbound vehicles per peak hour, or on average 4-5 vehicles per minute. This should provide numerous gaps for entering left-turn and exiting right-turn Project vehicles to complete turns with less conflicts and delays. With low northbound traffic, no northbound queues were observed at the Kahekili Highway/Waiehu Beach Road intersection. Therefore, queue spillback into the

nearest Project's Driveway 1 should not occur. Future Year 2024 laneage, volumes, and LOS can be found in Figure 5.2 and Table 5.4.

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

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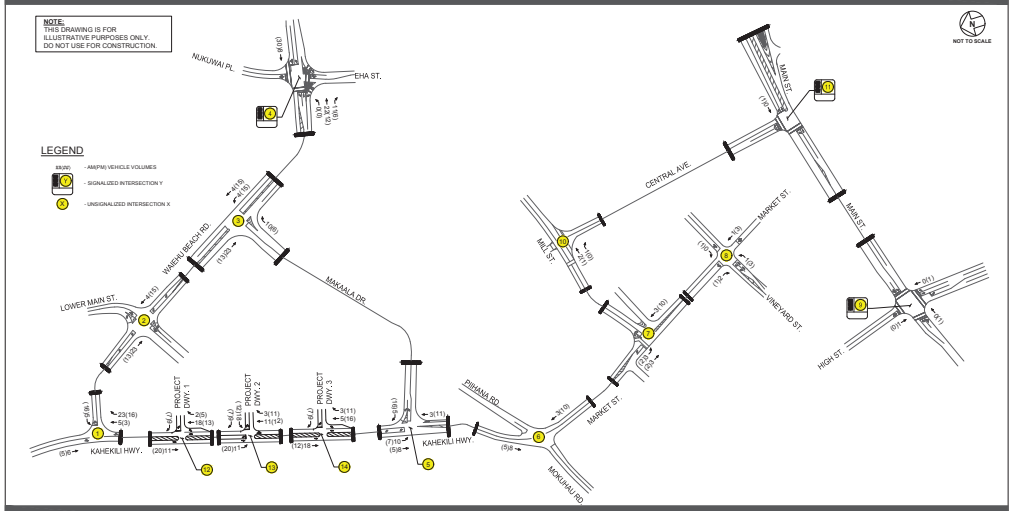

FIGURE 5.1

PROJECT-GENERATED TRAFFIC

HALE MAHAOLU KE KAHUA HOUSING COMMUNITY

AustinTsutsumi ASSOCIATES INC. Engineers & Surveyors

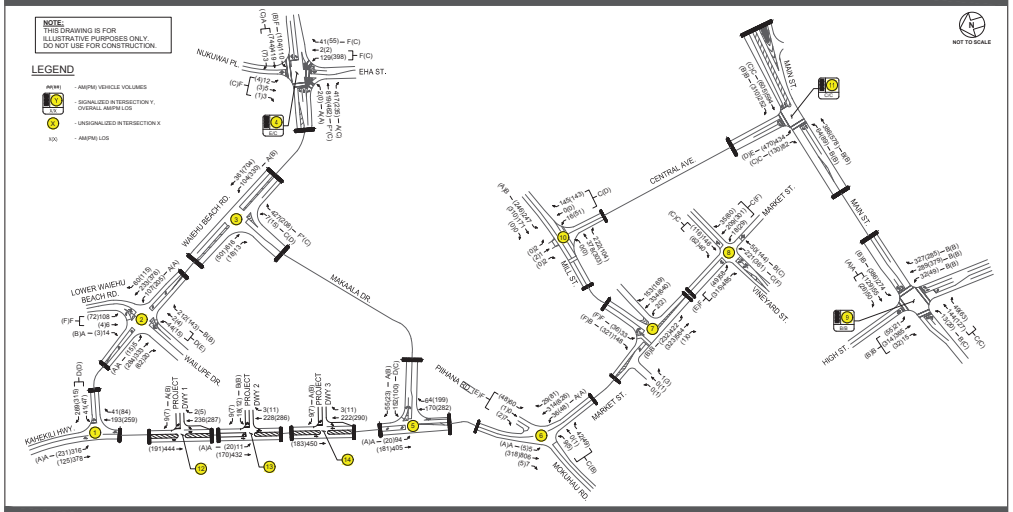

FIGURE 5.2

FUTURE YEAR 2024 LANE CONFIGURATIONS, TRAFFIC VOLUMES AND LOS

Table 5.3: Future Year 2024
Auxiliary Storage Lane Length Calculations (AASHTO)

Movement	Peak Hour	Passenger Car Volume (veh/hr)	Storage Length [1]	Full Deceleration Length [2]	Taper Length [3]	Total Lane Length (ft) [4]
Kakekili Highway & Project Driveway 1 (North - RIRO)						
Northbound right-turn lane	AM	1	50 ft.	350 ft.	100 ft.	500 ft.
	PM	5				
Kakekili Highway & Project Driveway 2 (Central - Full Access)						
Northbound right-turn lane	AM	2	50 ft.	350 ft.	100 ft.	500 ft.
	PM	10				
Southbound left-turn lane	AM	9	50 ft.	350 ft.	100 ft.	500 ft.
	PM	19				
Kakekili Highway & Project Driveway 3 (South - RIRO)						
Northbound right-turn lane	AM	3	50 ft.	350 ft.	100 ft.	500 ft.
	PM	10				

Notes:

1. Minimum storage length provides space for at least two passenger cars.
2. Full deceleration length based on design speed of 45 mph --> measured by speed data conducted by ATA in 2016. Interpolated from AASHTO Table 9-22. Feasibility of full length to be verified on design. Assumes
3. Taper length based on 8:1 (100 ft.) along Kahekili Highway.
4. Total Lane Length = Storage Length + Full Deceleration Length + Taper Length
   Shorter lane length may be permitted if impractical to accommodate full length of auxiliary lane.

Table 5.4: Existing, Base Year 2024, and Future Year 2024 Level of Service Summary

Intersection	Existing Conditions						Base Year 2024 Conditions						Future Year 2024 Conditions					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kahekili Hwy/Market St & Waiehu Beach Rd																		
WB LT/RT	23.4	0.64	C	17.7	0.58	C	27.0	0.68	D	20.2	0.62	C	34.2	0.76	D	26.3	0.72	D
SB LT	8.5	0.25	A	8.6	0.20	A	8.6	0.26	A	8.8	0.21	A	8.7	0.26	A	8.9	0.21	A
Overall	8.6	-	-	8.4	-	-	9.1	-	-	8.8	-	-	10.8	-	-	10.9	-	-
2: Waiehu Beach Rd & Wailupe Dr./Lower Waiehu Beach Rd																		
NB LT	8.3	0.10	A	8.6	0.18	A	8.3	0.10	A	8.7	0.19	A	8.4	0.10	A	8.8	0.19	A
EB LT/TH	22.8	0.20	C	37.9	0.16	E	24.0	0.21	C	40.1	0.17	E	25.2	0.22	D	43.0	0.18	E
EB RT	12.5	0.32	B	11.3	0.21	B	12.7	0.33	B	11.4	0.22	B	13.1	0.34	B	11.6	0.22	B
WB LT/TH	61.0	0.69	F	116.2	0.80	F	69.4	0.73	F	132.6	0.85	F	80.0	0.78	F	156.4	0.92	F
WB RT	9.8	0.02	A	10.8	0.01	B	9.8	0.02	A	11.0	0.01	B	9.9	0.02	A	11.1	0.01	B
SB LT	7.9	0.00	A	8.4	0.02	A	7.9	0.00	A	8.5	0.02	A	7.9	0.00	A	8.5	0.02	A
Overall	10.7	-	-	10.6	-	-	11.4	-	-	11.4	-	-	12.3	-	-	12.6	-	-
3: Waiehu Beach Rd & Makaala Dr																		
NB LT	9.3	0.11	A	10.0	0.32	B	9.4	0.12	A	10.3	0.33	B	9.5	0.12	A	10.5	0.36	B
EB LT	16.7	0.02	C	30.6	0.10	D	17.2	0.03	C	32.3	0.11	D	17.7	0.03	C	34.6	0.12	D
EB RT	56.4	0.94	F	15.1	0.38	C	64.5	0.97	F	16.0	0.40	C	79.3	1.03	F*	16.7	0.43	C
Overall	17.0	-	-	4.1	-	-	18.8	-	-	4.0	-	-	22.9	-	-	4.2	-	-
4: Waiehu Beach Rd & Eha St																		
NB LT	105.4	0.87	F	15.6	0.29	B	105.4	0.87	F	16.2	0.29	B	105.5	0.87	F	17.2	0.31	B
NB TH/RT	5.8	0.29	A	19.9	0.77	B	5.9	0.30	A	21.1	0.80	C	6.0	0.31	A	22.9	0.83	C
EB LT/TH	105.7	0.70	F	30.8	0.70	C	105.7	0.70	F	32.8	0.71	C	105.7	0.70	F	34.4	0.72	C
EB RT	89.6	0.25	F	19.8	0.10	B	89.6	0.25	F	21.0	0.10	C	89.4	0.24	F	21.7	0.10	C
WB LT/TH/RT	86.4	0.09	F	18.9	0.01	B	86.4	0.09	F	20.1	0.01	C	86.2	0.09	F	20.8	0.01	C
SB LT	5.2	0.00	A	0.0	0.00	A	5.3	0.00	A	0.0	0.00	A	5.3	0.00	A	0.0	0.00	A
SB TH	79.8	1.07	F*	24.1	0.57	C	89.6	1.10	F*	24.9	0.59	C	101.6	1.13	F*	26.4	0.61	C
SB RT	9.4	0.36	A	20.3	0.35	C	9.5	0.37	A	20.5	0.36	C	9.7	0.38	A	21.5	0.37	C
Overall	52.6	-	D	22.9	-	C	56.5	-	E	23.9	-	C	61.5	-	E	25.5	-	C
5: Kahekili Hwy & Makaala Dr																		
WB LT	21.6	0.41	C	13.5	0.18	B	28.1	0.52	D	15.7	0.25	C	30.8	0.55	D	16.5	0.26	C
WB RT	9.5	0.06	A	10.1	0.01	B	9.7	0.07	A	10.6	0.01	B	9.7	0.07	A	10.9	0.04	B
SB LT	7.9	0.07	A	8.2	0.01	A	7.9	0.07	A	8.5	0.01	A	8.0	0.08	A	8.5	0.02	A
Overall	5.0	-	-	2.0	-	-	5.9	-	-	2.3	-	-	6.3	-	-	2.6	-	-
6: Market St/Kahekili Hwy & Mokuhau Rd/Piilihana Rd																		
NB LT	9.5	0.04	A	7.9	0.04	A	9.9	0.05	A	8.1	0.04	A	10.0	0.05	A	8.1	0.04	A
EB LT/TH/RT	19.2	0.17	C	12.0	0.10	B	22.1	0.21	C	13.0	0.12	B	22.4	0.21	C	13.1	0.12	B
WB LT/TH/RT	49.2	0.47	E	31.0	0.27	D	76.7	0.62	F	44.9	0.39	E	79.2	0.63	F	46.6	0.40	E
SB LT	8.0	0.00	A	8.9	0.01	A	8.0	0.01	A	9.2	0.01	A	8.1	0.01	A	9.3	0.01	A
Overall	3.7	-	-	2.4	-	-	5.1	-	-	2.9	-	-	5.2	-	-	2.9	-	-
7: Market St & Mill St																		
WB LT	191.8	0.75	F	62.5	0.39	F	275.5	0.92	F	94.5	0.52	F	288.1	0.94	F	98.7	0.53	F
WB RT	12.5	0.25	B	34.7	0.77	D	12.9	0.26	B	52.6	0.88	F	13.0	0.26	B	55.4	0.89	F
SB LT	10.8	0.43	B	11.0	0.30	B	11.1	0.44	B	11.8	0.32	B	11.2	0.44	B	12.0	0.33	B
Overall	8.3	-	-	10.2	-	-	9.5	-	-	13.5	-	-	9.8	-	-	14.0	-	-

Table 5.4: Existing, Base Year 2024, and Future Year 2024 Level of Service Summary Cont'd

Intersection	Existing Conditions						Base Year 2024 Conditions						Future Year 2024 Conditions					
	AM			PM			AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
8: Market St & Vineyard St																		
NB LT/TH/RT	15.6	0.49	C	29.7	0.76	D	19.5	0.57	C	54.6	0.93	F	19.6	0.57	C	57.4	0.93	F
EB LT	17.2	0.47	C	26.4	0.68	D	21.6	0.56	C	65.0	0.95	F	21.5	0.57	C	68.9	0.96	F
EB TH	10.7	0.09	B	13.0	0.26	B	11.8	0.12	B	15.9	0.37	C	11.8	0.12	B	16.0	0.37	C
WB TH/RT	13.9	0.36	B	15.4	0.38	C	16.9	0.44	C	20.2	0.48	C	16.8	0.44	C	20.5	0.49	C
SB LT/RT	25.1	0.77	D	20.0	0.62	C	61.6	0.99	F	39.8	0.84	E	63.0	0.99	F	41.1	0.85	E
Overall	19.3	-	C	23.1	-	C	37.3	-	E	45.3	-	E	37.9	-	E	47.4	-	E
9: High St. & Main St																		
NB LT	10.9	0.08	B	11.3	0.12	B	10.9	0.08	B	12.9	0.14	B	10.9	0.08	B	13.4	0.15	B
NB TH	12.2	0.38	B	13.5	0.55	B	13.1	0.51	B	15.5	0.59	B	13.1	0.51	B	16.0	0.59	B
NB RT	14.9	0.68	B	11.2	0.18	B	11.2	0.20	B	12.9	0.26	B	11.3	0.20	B	13.1	0.22	B
EB LT	14.8	0.02	B	17.2	0.05	B	16.1	0.04	B	21.6	0.07	C	16.3	0.04	B	22.7	0.08	C
EB TH/RT	18.6	0.63	B	20.7	0.60	C	19.9	0.63	B	26.5	0.68	C	20.1	0.63	C	27.6	0.68	C
WB LT	10.4	0.47	B	11.5	0.59	B	11.2	0.50	B	15.0	0.69	B	11.3	0.50	B	15.7	0.69	B
WB TH/RT	6.8	0.14	A	7.5	0.16	A	7.2	0.11	A	9.6	0.19	A	7.3	0.10	A	9.6	0.18	A
SB LT/TH/RT	14.2	0.61	B	14.7	0.63	B	14.6	0.64	B	17.6	0.70	B	14.6	0.64	B	18.2	0.71	B
Overall	13.4	-	B	13.4	-	B	13.5	-	B	16.2	-	B	13.6	-	B	16.8	-	B
10: Central Ave. & Mill St																		
NB LT/RT	19.9	0.42	C	34.6	0.65	D	19.9	0.42	C	34.6	0.65	D	19.9	0.42	C	34.6	0.65	D
WB LT	10.4	0.29	B	9.2	0.24	A	10.4	0.29	B	9.2	0.24	A	10.4	0.29	B	9.2	0.24	A
Overall	4.9	-	-	7.8	-	-	4.9	-	-	7.8	-	-	4.9	-	-	7.8	-	-
11: Main St & Central Ave.																		
EB LT	11.5	0.13	B	13.1	0.15	B	14.6	0.19	B	16.6	0.28	B	14.6	0.19	B	16.6	0.28	B
EB TH	0.6	0.30	A	13.0	0.38	B	12.4	0.35	B	16.7	0.55	B	12.4	0.35	B	16.7	0.55	B
WB TH	17.8	0.47	B	19.8	0.52	B	21.4	0.60	C	24.2	0.65	C	21.4	0.60	C	24.3	0.65	C
WB RT	12.4	0.05	B	14.0	0.13	B	13.5	0.11	B	15.3	0.16	B	13.6	0.11	B	15.3	0.16	B
SB LT	56.9	0.91	E	52.8	0.90	D	56.6	0.91	E	52.5	0.91	D	56.6	0.91	E	52.5	0.91	D
SB RT	34.9	0.02	C	32.2	0.14	C	34.5	0.05	C	31.2	0.15	C	34.4	0.05	C	31.2	0.15	C
Overall	25.7	-	C	27.3	-	C	28.3	-	C	28.2	-	C	28.3	-	C	28.2	-	C
12: Kahekili Hwy & Project Dwy 1																		
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	9.7	0.01	A	10.0	0.01	B
Overall	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-	-
13: Kahekili Hwy & Project Dwy 2																		
WB LT/TH	-	-	-	-	-	-	-	-	-	-	-	-	13.4	0.06	B	11.7	0.04	B
SB LT	-	-	-	-	-	-	-	-	-	-	-	-	7.8	0.01	A	8.0	0.02	A
Overall	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	0.7	-	-
14: Kahekili Hwy & Project Dwy 3																		
WB RT	-	-	-	-	-	-	-	-	-	-	-	-	9.6	0.01	A	10.0	0.01	B
Overall	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-	-

* Denotes over-capacity conditions

6. CONCLUSION & RECOMMENDATIONS

The Project proposes to construct 120 units of affordable housing, a 3,231 SF community clubhouse and an approximately 3,477 SF non-profit building. The Project will be accessible from three (3) driveways along Kahekili Highway. The northern (Project Driveway 1) and southernmost (Project Driveway 3) accesses will be restricted to right-in, right-out access only. The middle access (Project Driveway 2) will be an unsignalized full-access driveway.

6.1 Existing Conditions

The Waiehu area in the immediate vicinity of the Project is largely comprised of single-family homes, with a few community parks. This area is served by Waiehu Beach Road and Kahekili Highway – the two regional roadways that provide access to schools and commercial areas in Kahului and Wailuku.

During the AM peak hour as residents leave for work and school, southbound Waiehu Beach Road experiences extensive queueing which stems from the Waiehu Beach Road/Eha Street intersection and at its maximum queue, extends over 1 mile near to the Kahekili Highway/Waiehu Beach Road intersection. The length of time in queue can vary between 6-15 minutes from the back of the maximum queue to clear the Waiehu Beach Road/Eha Street intersection. As a result of the queue spillback along Waiehu Beach Road, right-turning movements from side streets turning onto southbound Waiehu Beach Road can experience slower progression or blockages, resulting in varying lengths of side street queues. However, these right-turn vehicles were also observed to slowly but consistently filter into the Waiehu Beach Road queue, which helped to process lengthy side street queues. The congestion along Waiehu Beach Road generally lasted for about an hour and dissipated completely by 8:00 AM.

Also during the AM peak period (roughly 7:15-7:45 am), southbound traffic along Kahekili Highway was observed to queue from the Market Street/Mill Street intersection and extend to between Puohala Road and Makaala Drive. Turning movements suggest that a significantly high volume – about half of the total southbound Market Street approach volume in the AM peak hour – turns left onto Mill Street. An existing left-turn auxiliary lane is provided, but is relatively short (100' long). This short left-turn lane along Market Street locks up southbound left-turn vehicles in the same queue as through vehicles, lengthening the queues beyond Happy Valley. By 8:00 AM, all queues had dissipated. The length of time in queue can vary between 4-8 minutes. No persistent queueing was observed along Kahekili Highway or Waiehu Beach Road during the PM peak hour.

Main Street experiences relatively slow-moving stop-and-go traffic conditions due to on-street parking stalls, pedestrian crossing and numerous businesses and driveways throughout the stretch in the study area.

6.2 Base Year 2024

By Year 2024, the ambient traffic growth and trips generated by background developments are anticipated to increase traffic by 30-60 vehicles along Kahekili Highway and 10-15 vehicles along Waiehu Beach Road in the vicinity of the Project site. The former Hale Mua residential development adjacent and mauka of the Project site is actively being planned, but since final plans and build-out of this development is currently unknown and likely to be completed after construction of the Project, it was not included in this study.

Based on these increases, most intersections will operate similar to existing conditions. Various intersections along Kahekili Highway and Waiehu Beach Road will continue to operate with LOS E/F movements during the AM peak hour, reflective of existing congestive conditions. In addition, various movements at the Market Street/Vineyard Street intersection will worsen to LOS E/F conditions however, widening and/or traffic control improvements are limited at this location due to right-of-way constraints and existing buildings at three of the four corners of the intersections.

The two following major long-range regional roadway extension improvements are planned on Imi Kala Street, but since they are not anticipated to be constructed by Year 2024, they were not included in this TIAR:

- Imi Kala Street Extension (Phase I) & Imi Kala Bridge Improvements- This regional improvement would provide a new paved roadway stemming from Kahekili Highway to the north and traversing south, intersecting with Piihana Road and terminating at the south end at the existing Imi Kala Street/Wili Pa Loop/Eha Street intersection.

- Imi Kala Street Extension (Phase II) – This improvement is planned by Maui County and would provide a new paved roadway stemming from the existing Imi Kala Street/Mill Street intersection and traverse south, adjacent to St. Anthony School, terminating at the south end at Lower Main Street.

Both improvements are the major capacity improvement projects that will alleviate some of the existing AM traffic congestion along both Kahekili Highway and Waiehu Beach Road.

6.3 Future Year 2024

The Project is anticipated to generate 64(79) trips during the AM(PM) peak hours. Regionally, the majority of Project trips will route to/from the greater Kahului-Wailuku areas and will add about 10-35 vehicles along Waiehu Beach Road and 5-10 vehicles along Kahekili Highway. This corresponds to a 3.46% increase in traffic from Base conditions along both Kahekili Highway and Waiehu Beach Road. With the added Project trips, operations at the study intersections are generally anticipated to be similar to Base Year 2024 conditions.

The Waiehu Beach Road/Eha Street intersection is anticipated to operate generally similar to Base Year 2024 conditions, with slight increases in delay. The existing heavy AM queue along Waiehu Beach Road will continue to occur. The Project will only add 32 vehicles along Waiehu Beach Road along the critical southbound direction during the AM peak hour, which translates to approximately one car every 2 minutes on average, and will account for approximately 2.4% of the traffic at the intersection during Future Year 2024. The overall delays will increase by about 5 seconds during the AM and PM peak hours.

Numerous movements at the Market Street/Vineyard Street intersection will continue operating with the same LOS E/F as Base Year conditions. The Project will minimally add 1-3 vehicles for various turn movements, which should not significantly worsen forecast operations.

The Project's Driveways 1 and 3 are proposed to operate as right-in, right-out (RIRO) intersections. Project Driveway 2 is proposed as a full access intersection. Due to relatively low turning movements generated by the Project, signals are not warranted and all intersections are recommended to be unsignalized with stop control along the westbound Project exit approaches. For the full-access Driveway 2, a southbound entering left-turn auxiliary lane is recommended. In addition, at all three (3) Project Driveways, a northbound entering right-turn auxiliary lane is

recommended. However, at Project Driveway 2, it is anticipated that only one of the two auxiliary lanes (southbound left-turn lane OR northbound right-turn lane) can be accommodated due to right-of-way constraints. If this is the case, the provision of the southbound left-turn lane should be prioritized over the northbound right-turn lane. Table 5.3 shows the recommended auxiliary lane lengths with full storage, deceleration and taper lengths. Provisions for accommodating full lane length to be verified upon design. All movements at the three Project Driveways are anticipated to operate at LOS B or better across both peak hours. As vacant lands along Kahekili Highway get developed, speeds should be enforced to ensure vehicles adhere to posted 30 mph speed limits.

Northbound traffic along Kahekili Highway will continue to be relatively low with only 200-280 northbound vehicles per peak hour, or on average 4-5 vehicles per minute. This should provide numerous gaps for entering left-turn and exiting right-turn Project vehicles to complete turns with less conflicts and delays. With low northbound traffic, no northbound queues were observed at the Kahekili Highway/Waiehu Beach Road intersection. Therefore, queue spillback into the nearest Project's Driveway 1 should not occur.

7. REFERENCES

1. County of Maui, Maui Bus Public Transit System, mauicounty.gov.
2. Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2009.
3. Institute of Transportation Engineers, Trip Generation, 10th Edition, 2017.
4. Maui Metropolitan Organization, Hele Mai Maui Long Range Transportation Plan 2040, 2019.
5. State of Hawaii Department of Transportation, Bike Plan Hawaii Master Plan, 2003.
6. Transportation Research Board, Highway Capacity Manual, 6th Edition, 2016.

APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX A

TRAFFIC COUNT DATA

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646 Fax: (808) 526-1267

File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 1

Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAHEKILI HWY Southbound				WAIEHU BEACH RD Westbound				KAHEKILI HWY Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	44	39	0	0	1	0	15	0	0	11	5	0	0	0	0	0	115
06:15 AM	66	34	0	0	7	0	15	0	0	12	8	0	0	0	0	0	142
06:30 AM	107	51	0	0	4	0	34	0	0	25	3	0	0	0	0	0	224
06:45 AM	109	60	0	0	5	0	69	0	0	37	2	0	0	0	0	0	282
Total	326	184	0	0	17	0	133	0	0	85	18	0	0	0	0	0	763
07:00 AM	130	97	0	0	10	0	74	0	0	43	5	0	0	0	0	0	359
07:15 AM	53	100	0	0	9	0	74	0	0	57	5	0	0	0	0	0	298
07:30 AM	61	91	0	0	10	0	69	0	0	32	4	0	0	0	0	0	267
07:45 AM	63	41	0	0	6	0	45	0	0	26	4	0	0	0	0	0	185
Total	307	329	0	0	35	0	262	0	0	158	18	0	0	0	0	0	1109
08:00 AM	50	29	0	0	4	0	50	0	0	27	7	0	0	0	0	0	167
08:15 AM	43	32	0	0	19	0	29	0	0	21	8	0	0	0	0	0	152
08:30 AM	58	21	0	0	8	0	25	0	0	32	11	2	0	0	0	0	157
08:45 AM	50	20	0	0	7	0	37	0	0	13	6	0	0	0	0	0	133
Total	201	102	0	0	38	0	141	0	0	93	32	2	0	0	0	0	609
Grand Total	834	615	0	0	90	0	536	0	0	336	68	2	0	0	0	0	2481
Apprch %	57.6	42.4	0	0	14.4	0	85.6	0	0	82.8	16.7	0.5	0	0	0	0	
Total %	33.6	24.8	0	0	3.6	0	21.6	0	0	13.5	2.7	0.1	0	0	0	0	
Motorcycles	3	5	0	0	2	0	3	0	0	1	0	0	0	0	0	0	14
% Motorcycles	0.4	0.8	0	0	2.2	0	0.6	0	0	0.3	0	0	0	0	0	0	0.6
Cars & Light Goods	813	600	0	0	86	0	517	0	0	325	67	0	0	0	0	0	2408
% Cars & Light Goods	97.5	97.6	0	0	95.6	0	96.5	0	0	96.7	98.5	0	0	0	0	0	97.1
Buses	14	6	0	0	0	0	13	0	0	7	1	0	0	0	0	0	41
% Buses	1.7	1	0	0	0	0	2.4	0	0	2.1	1.5	0	0	0	0	0	1.7
Single-Unit Trucks	3	2	0	0	2	0	1	0	0	2	0	0	0	0	0	0	10
% Single-Unit Trucks	0.4	0.3	0	0	2.2	0	0.2	0	0	0.6	0	0	0	0	0	0	0.4
Articulated Trucks	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
% Articulated Trucks	0.1	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4
% Bicycles on Road	0	0.3	0	0	0	0	0.2	0	0	0.3	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
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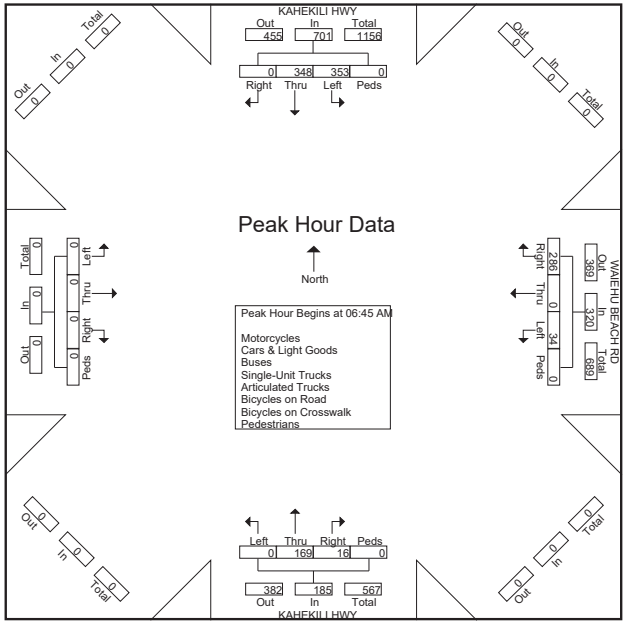
File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 2

	KAHEKILI HWY Southbound					WAIEHU BEACH RD Westbound					KAHEKILI HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	109	60	0	0	169	5	0	69	0	74	0	37	2	0	39	0	0	0	0	0	282
07:00 AM	**130**	97	0	0	**227**	**10**	0	**74**	0	**84**	0	43	**5**	0	48	0	0	0	0	0	**359**
07:15 AM	53	**100**	0	0	153	9	0	74	0	83	0	**57**	5	0	**62**	0	0	0	0	0	298
07:30 AM	61	91	0	0	152	10	0	69	0	79	0	32	4	0	36	0	0	0	0	0	267
Total Volume	353	348	0	0	701	34	0	286	0	320	0	169	16	0	185	0	0	0	0	0	1206
% App. Total	50.4	49.6	0	0		10.6	0	89.4	0		0	91.4	8.6	0		0	0	0	0		
PHF	.679	.870	.000	.000	.772	.850	.000	.966	.000	.952	.000	.741	.800	.000	.746	.000	.000	.000	.000	.000	.840



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File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 1

Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAHEKILI HWY Southbound				WAIEHU BEACH RD Westbound				KAHEKILI HWY Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:00 PM	60	44	0	0	11	0	67	0	0	47	11	0	0	0	0	0	240
03:15 PM	56	27	0	0	7	0	64	0	0	30	9	0	0	0	0	0	193
03:30 PM	62	27	0	0	7	0	88	0	0	27	21	0	0	0	0	0	232
03:45 PM	63	35	0	0	5	0	64	0	0	37	17	0	0	0	0	0	221
Total	241	133	0	0	30	0	283	0	0	141	58	0	0	0	0	0	886
04:00 PM	55	26	0	0	9	0	67	0	0	50	13	0	0	0	0	0	220
04:15 PM	62	37	0	0	8	0	77	0	0	57	26	0	0	0	0	0	267
04:30 PM	49	31	0	0	10	0	84	0	0	44	10	0	0	0	0	0	228
04:45 PM	59	11	0	0	3	0	78	0	0	47	17	0	0	0	0	0	215
Total	225	105	0	0	30	0	306	0	0	198	66	0	0	0	0	0	930
05:00 PM	65	32	0	0	8	0	88	0	0	39	25	0	0	0	0	0	257
05:15 PM	61	26	0	0	4	0	72	0	0	30	19	0	0	0	0	0	212
05:30 PM	52	27	0	0	4	0	64	0	0	31	17	0	0	0	0	0	195
05:45 PM	36	31	0	0	13	0	62	0	0	42	11	0	0	0	0	0	195
Total	214	116	0	0	29	0	286	0	0	142	72	0	0	0	0	0	859
Grand Total	680	354	0	0	89	0	875	0	0	481	196	0	0	0	0	0	2675
Apprch %	65.8	34.2	0	0	9.2	0	90.8	0	0	71	29	0	0	0	0	0	
Total %	25.4	13.2	0	0	3.3	0	32.7	0	0	18	7.3	0	0	0	0	0	
Motorcycles	1	3	0	0	1	0	4	0	0	5	0	0	0	0	0	0	14
% Motorcycles	0.1	0.8	0	0	1.1	0	0.5	0	0	1	0	0	0	0	0	0	0.5
Cars & Light Goods	667	343	0	0	88	0	863	0	0	467	192	0	0	0	0	0	2620
% Cars & Light Goods	98.1	96.9	0	0	98.9	0	98.6	0	0	97.1	98	0	0	0	0	0	97.9
Buses	5	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	9
% Buses	0.7	0	0	0	0	0	0.2	0	0	0.4	0	0	0	0	0	0	0.3
Single-Unit Trucks	7	0	0	0	0	0	3	0	0	4	2	0	0	0	0	0	16
% Single-Unit Trucks	1	0	0	0	0	0	0.3	0	0	0.8	1	0	0	0	0	0	0.6
Articulated Trucks	0	1	0	0	0	0	2	0	0	0	1	0	0	0	0	0	4
% Articulated Trucks	0	0.3	0	0	0	0	0.2	0	0	0	0.5	0	0	0	0	0	0.1
Bicycles on Road	0	7	0	0	0	0	1	0	0	3	1	0	0	0	0	0	12
% Bicycles on Road	0	2	0	0	0	0	0.1	0	0	0.6	0.5	0	0	0	0	0	0.4
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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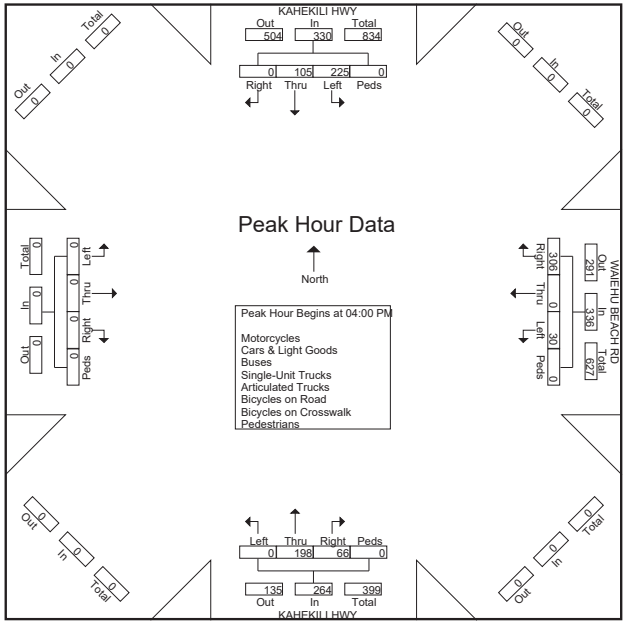
File Name : Kahekili Hwy - Waiehu Beach Rd
Site Code : 18-503 Waiehu Golf Course
Start Date : 5/1/2018
Page No : 2

	KAHEKILI HWY Southbound					WAIEHU BEACH RD Westbound					KAHEKILI HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	55	26	0	0	81	9	0	67	0	76	0	50	13	0	63	0	0	0	0	0	220
04:15 PM	**62**	**37**	0	0	**99**	8	0	77	0	85	0	**57**	**26**	0	**83**	0	0	0	0	0	**267**
04:30 PM	49	31	0	0	80	**10**	0	**84**	0	**94**	0	44	10	0	54	0	0	0	0	0	228
04:45 PM	59	11	0	0	70	3	0	78	0	81	0	47	17	0	64	0	0	0	0	0	215
Total Volume	225	105	0	0	330	30	0	306	0	336	0	198	66	0	264	0	0	0	0	0	930
% App. Total	68.2	31.8	0	0		8.9	0	91.1	0		0	75	25	0		0	0	0	0		
PHF	.907	.709	.000	.000	.833	.750	.000	.911	.000	.894	.000	.868	.635	.000	.795	.000	.000	.000	.000	.000	.871



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File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019
Page No : 1

Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAHEKILI HWY SOUTHBOUND				MAKAALA DR WESTBOUND				KAHEKILI HWY NORTHBOUND				EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30	2	64	0	0	53	0	11	0	0	18	6	0	0	0	0	0	154
06:45	7	100	0	0	45	0	15	0	0	45	18	0	0	0	0	0	230
Total	9	164	0	0	98	0	26	0	0	63	24	0	0	0	0	0	384
07:00	20	107	0	0	37	0	23	0	0	45	6	0	0	0	0	0	238
07:15	36	67	0	0	25	0	11	0	0	38	20	0	0	0	0	0	197
07:30	20	52	0	0	29	0	0	0	0	15	15	0	0	0	0	0	131
07:45	2	44	0	0	29	0	1	0	0	32	24	0	0	0	0	0	132
Total	78	270	0	0	120	0	35	0	0	130	65	0	0	0	0	0	698
08:00	3	25	0	0	25	0	2	0	0	37	23	0	0	0	0	0	115
08:15	1	38	0	0	21	0	2	0	0	24	17	0	0	0	0	0	103
Grand Total	91	497	0	0	264	0	65	0	0	254	129	0	0	0	0	0	1300
Apprch %	15.5	84.5	0	0	80.2	0	19.8	0	0	66.3	33.7	0	0	0	0	0	
Total %	7	38.2	0	0	20.3	0	5	0	0	19.5	9.9	0	0	0	0	0	
Motorcycles	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
% Motorcycles	1.1	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0.2
Cars & Light Goods	86	488	0	0	255	0	64	0	0	249	124	0	0	0	0	0	1266
% Cars & Light Goods	94.5	98.2	0	0	96.6	0	98.5	0	0	98	96.1	0	0	0	0	0	97.4
Buses	3	7	0	0	5	0	1	0	0	2	5	0	0	0	0	0	23
% Buses	3.3	1.4	0	0	1.9	0	1.5	0	0	0.8	3.9	0	0	0	0	0	1.8
Single-Unit Trucks	1	1	0	0	3	0	0	0	0	2	0	0	0	0	0	0	7
% Single-Unit Trucks	1.1	0.2	0	0	1.1	0	0	0	0	0.8	0	0	0	0	0	0	0.5
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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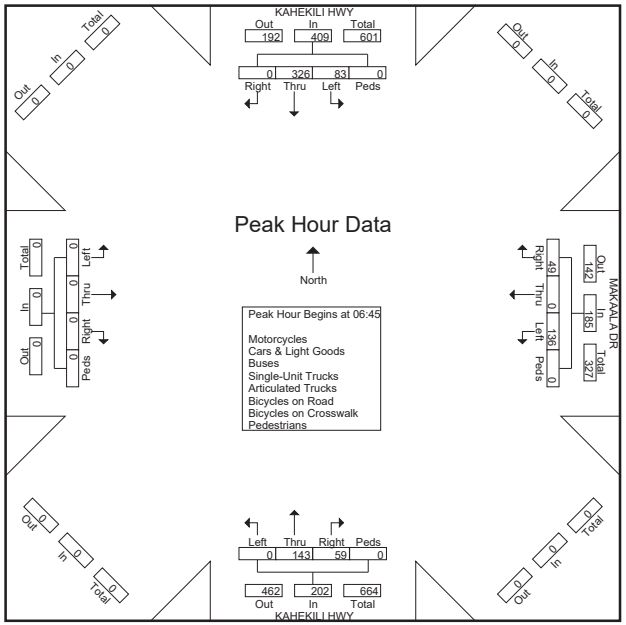
File Name : Kehekili Hwy - Makaala Dr
Site Code : 19-509 Boys & Girls Club
Start Date : 4/11/2019
Page No : 2

	KAHEKILI HWY SOUTHBOUND					MAKAALA DR WESTBOUND					KAHEKILI HWY NORTHBOUND					EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 to 07:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45																					
06:45	7	100	0	0	107	**45**	0	15	0	**60**	0	**45**	18	0	**63**	0	0	0	0	0	230
07:00	20	**107**	0	0	**127**	37	0	**23**	0	60	0	45	6	0	51	0	0	0	0	0	**238**
07:15	**36**	67	0	0	103	25	0	11	0	36	0	38	**20**	0	58	0	0	0	0	0	197
07:30	20	52	0	0	72	29	0	0	0	29	0	15	15	0	30	0	0	0	0	0	131
Total Volume	83	326	0	0	409	136	0	49	0	185	0	143	59	0	202	0	0	0	0	0	796
% App. Total	20.3	79.7	0	0		73.5	0	26.5	0		0	70.8	29.2	0		0	0	0	0		
PHF	.576	.762	.000	.000	.805	.756	.000	.533	.000	.771	.000	.794	.738	.000	.802	.000	.000	.000	.000	.000	.836



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAHEKILI HWY SOUTHBOUND				MAKAALA DR WESTBOUND				KAHEKILI HWY NORTHBOUND				EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:00	8	57	0	0	14	0	2	0	0	38	24	0	0	0	0	0	143
15:15	5	38	0	0	29	0	2	0	0	46	30	0	0	0	0	0	150
15:30	3	36	0	0	25	0	2	0	0	43	35	0	0	0	0	0	144
15:45	4	27	0	0	21	0	4	0	0	54	33	0	0	0	0	0	143
Total	20	158	0	0	89	0	10	0	0	181	122	0	0	0	0	0	580
16:00	2	43	0	0	26	0	1	0	0	47	48	0	0	0	0	0	167
16:15	4	36	0	0	12	0	1	0	0	52	47	0	0	0	0	0	152
16:30	1	33	0	0	26	0	3	0	0	65	42	0	0	0	0	0	170
16:45	4	40	0	0	24	0	0	0	0	50	55	0	0	0	0	0	173
Total	11	152	0	0	88	0	5	0	0	214	192	0	0	0	0	0	662
17:00	0	32	0	0	16	0	2	0	0	69	36	0	0	0	0	0	155
17:15	0	30	0	0	21	0	3	0	0	50	30	0	0	0	0	0	134
Grand Total	31	372	0	0	214	0	20	0	0	514	380	0	0	0	0	0	1531
Apprch %	7.7	92.3	0	0	91.5	0	8.5	0	0	57.5	42.5	0	0	0	0	0	
Total %	2	24.3	0	0	14	0	1.3	0	0	33.6	24.8	0	0	0	0	0	
Motorcycles	0	3	0	0	2	0	0	0	0	2	3	0	0	0	0	0	10
% Motorcycles	0	0.8	0	0	0.9	0	0	0	0	0.4	0.8	0	0	0	0	0	0.7
Cars & Light Goods	31	367	0	0	205	0	20	0	0	509	371	0	0	0	0	0	1503
% Cars & Light Goods	100	98.7	0	0	95.8	0	100	0	0	99	97.6	0	0	0	0	0	98.2
Buses	0	1	0	0	6	0	0	0	0	1	4	0	0	0	0	0	12
% Buses	0	0.3	0	0	2.8	0	0	0	0	0.2	1.1	0	0	0	0	0	0.8
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0.1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	1	0	0	1	0	0	0	0	1	2	0	0	0	0	0	5
% Bicycles on Road	0	0.3	0	0	0.5	0	0	0	0	0.2	0.5	0	0	0	0	0	0.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Start Date : 4/11/2019
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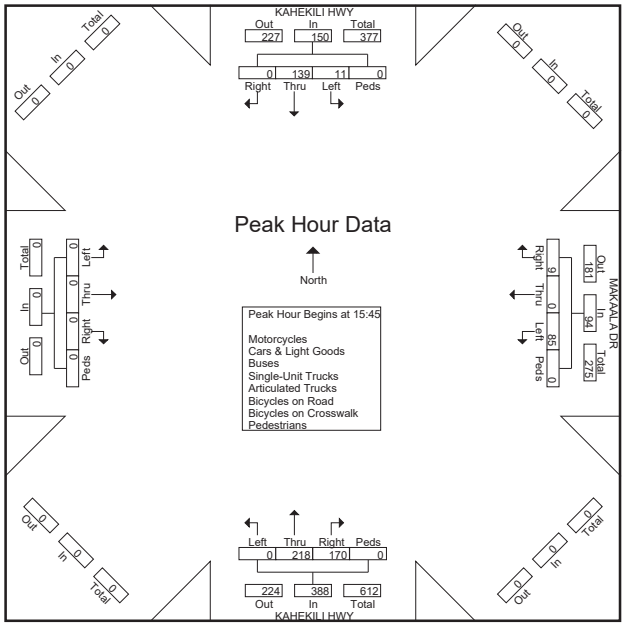
	KAHEKILI HWY SOUTHBOUND					MAKAALA DR WESTBOUND					KAHEKILI HWY NORTHBOUND					EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	**4**	27	0	0	31	21	0	**4**	0	25	0	54	33	0	87	0	0	0	0	0	143
16:00	2	**43**	0	0	**45**	**26**	0	1	0	27	0	47	**48**	0	95	0	0	0	0	0	167
16:15	4	36	0	0	40	12	0	1	0	13	0	52	47	0	99	0	0	0	0	0	152
16:30	1	33	0	0	34	26	0	3	0	**29**	0	**65**	42	0	**107**	0	0	0	0	0	**170**
Total Volume	11	139	0	0	150	85	0	9	0	94	0	218	170	0	388	0	0	0	0	0	632
% App. Total	7.3	92.7	0	0		90.4	0	9.6	0		0	56.2	43.8	0		0	0	0	0		
PHF	.688	.808	.000	.000	.833	.817	.000	.563	.000	.810	.000	.838	.885	.000	.907	.000	.000	.000	.000	.000	.929



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File Name : Waiehu Beach Rd - Eha St
Site Code : 16-014.07 Maui Signal Opt
Start Date : 5/3/2018
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIEHU BEACH RD SOUTHBOUND				EHA ST WESTBOUND				WAIEHU BEACH RD NORTHBOUND				EHA ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00 AM	0	117	35	0	2	5	2	0	17	50	0	0	9	1	7	0	245
06:15 AM	1	149	51	3	3	0	1	0	16	31	0	0	14	0	6	2	277
06:30 AM	0	207	84	0	3	1	0	0	22	60	1	0	15	0	3	0	396
06:45 AM	0	211	94	0	1	0	0	0	24	92	1	0	30	1	10	0	464
Total	1	684	264	3	9	6	3	0	79	233	2	0	68	2	26	2	1382
07:00 AM	0	178	99	1	3	1	2	0	24	107	0	0	30	1	6	0	452
07:15 AM	1	182	121	0	6	2	0	0	23	94	1	0	35	0	11	0	476
07:30 AM	1	185	90	0	2	2	1	0	39	87	1	0	32	0	14	0	454
07:45 AM	0	181	97	3	3	0	1	1	24	105	1	0	39	0	15	1	471
Total	2	726	407	4	14	5	4	1	110	393	3	0	136	1	46	1	1853
Grand Total	3	1410	671	7	23	11	7	1	189	626	5	0	204	3	72	3	3235
Apprch %	0.1	67.4	32.1	0.3	54.8	26.2	16.7	2.4	23	76.3	0.6	0	72.3	1.1	25.5	1.1	
Total %	0.1	43.6	20.7	0.2	0.7	0.3	0.2	0	5.8	19.4	0.2	0	6.3	0.1	2.2	0.1	
Motorcycles	0	9	4	0	0	0	0	0	0	2	0	0	1	0	1	0	17
% Motorcycles	0	0.6	0.6	0	0	0	0	0	0	0.3	0	0	0.5	0	1.4	0	0.5
Cars	2	919	422	0	18	7	5	0	132	416	3	0	149	2	51	0	2126
% Cars	66.7	65.2	62.9	0	78.3	63.6	71.4	0	69.8	66.5	60	0	73	66.7	70.8	0	65.7
Light Goods Vehicles	1	460	236	0	5	4	2	0	52	181	2	0	50	1	14	0	1008
% Light Goods Vehicles	33.3	32.6	35.2	0	21.7	36.4	28.6	0	27.5	28.9	40	0	24.5	33.3	19.4	0	31.2
Buses	0	14	5	0	0	0	0	0	2	20	0	0	2	0	0	0	43
% Buses	0	1	0.7	0	0	0	0	0	1.1	3.2	0	0	1	0	0	0	1.3
Single-Unit Trucks	0	4	2	0	0	0	0	0	2	6	0	0	2	0	5	0	21
% Single-Unit Trucks	0	0.3	0.3	0	0	0	0	0	1.1	1	0	0	1	0	6.9	0	0.6
Articulated Trucks	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	2	0	0	0	0	0	0	1	0	0	0	0	1	0	6
% Bicycles on Road	0	0.1	0.3	0	0	0	0	0	0	0.2	0	0	0	0	1.4	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	7	0	0	0	1	0	0	0	0	0	0	0	3	11
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.3

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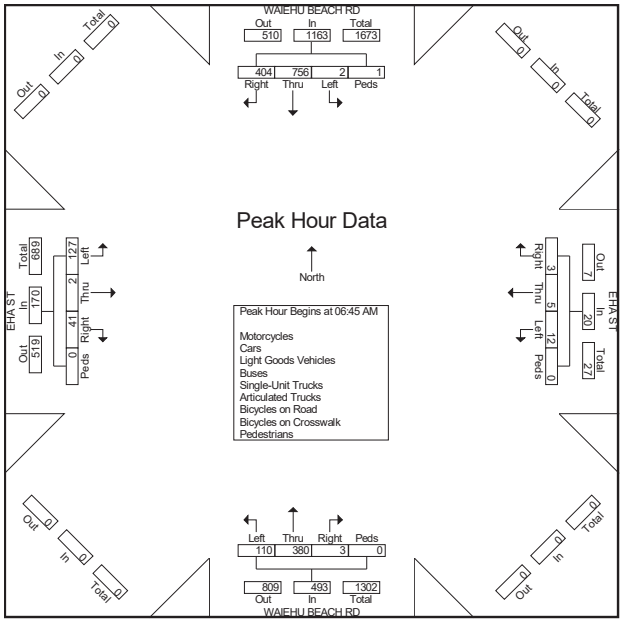
File Name : Waiehu Beach Rd - Eha St
Site Code : 16-014.07 Maui Signal Opt
Start Date : 5/3/2018
Page No : 2

	WAIEHU BEACH RD SOUTHBOUND					EHA ST WESTBOUND					WAIEHU BEACH RD NORTHBOUND					EHA ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	**211**	94	0	**305**	1	0	0	0	1	24	92	**1**	0	117	30	**1**	10	0	41	464
07:00 AM	0	178	99	**1**	278	3	1	**2**	0	6	24	**107**	0	0	**131**	30	1	6	0	37	452
07:15 AM	**1**	182	**121**	0	304	**6**	**2**	0	0	**8**	23	94	1	0	118	**35**	0	11	0	**46**	**476**
07:30 AM	1	185	90	0	276	2	2	1	0	5	**39**	87	1	0	127	32	0	**14**	0	46	454
Total Volume	2	756	404	1	1163	12	5	3	0	20	110	380	3	0	493	127	2	41	0	170	1846
% App. Total	0.2	65	34.7	0.1		60	25	15	0		22.3	77.1	0.6	0		74.7	1.2	24.1	0		
PHF	.500	.896	.835	.250	.953	.500	.625	.375	.000	.625	.705	.888	.750	.000	.941	.907	.500	.732	.000	.924	.970



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File Name : Waiehu Beach Rd - Eha St
Site Code : 16-014.07 Maui Signal Opt
Start Date : 5/3/2018
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	WAIEHU BEACH RD From North				EHA ST From East				WAIEHU BEACH RD From South				EHA ST From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	62	89	0	0	0	1	1	0	0	150	24	0	18	0	100	0	445
04:15 PM	54	111	0	0	0	0	0	0	3	180	21	0	2	0	93	0	464
04:30 PM	53	112	0	0	0	0	2	0	2	177	24	0	8	0	94	0	472
04:45 PM	51	96	0	0	1	2	1	0	2	160	35	0	27	2	100	0	477
Total	220	408	0	0	1	3	4	0	7	667	104	0	55	2	387	0	1858
Grand Total	220	408	0	0	1	3	4	0	7	667	104	0	55	2	387	0	1858
Apprch %	35	65	0	0	12.5	37.5	50	0	0.9	85.7	13.4	0	12.4	0.5	87.2	0	
Total %	11.8	22	0	0	0.1	0.2	0.2	0	0.4	35.9	5.6	0	3	0.1	20.8	0	
Motorcycles	0	0	0	0	0	0	0	0	0	2	2	0	0	0	4	0	8
% Motorcycles	0	0	0	0	0	0	0	0	0	0.3	1.9	0	0	0	1	0	0.4
Cars	151	281	0	0	0	2	2	0	6	429	72	0	44	2	242	0	1231
% Cars	68.6	68.9	0	0	0	66.7	50	0	85.7	64.3	69.2	0	80	100	62.5	0	66.3
Light Goods Vehicles	68	122	0	0	1	1	2	0	1	231	29	0	11	0	138	0	604
% Light Goods Vehicles	30.9	29.9	0	0	100	33.3	50	0	14.3	34.6	27.9	0	20	0	35.7	0	32.5
Buses	1	4	0	0	0	0	0	0	0	2	0	0	0	0	3	0	10
% Buses	0.5	1	0	0	0	0	0	0	0	0.3	0	0	0	0	0.8	0	0.5
Single-Unit Trucks	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
% Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0.3	1	0	0	0	0	0	0.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Road	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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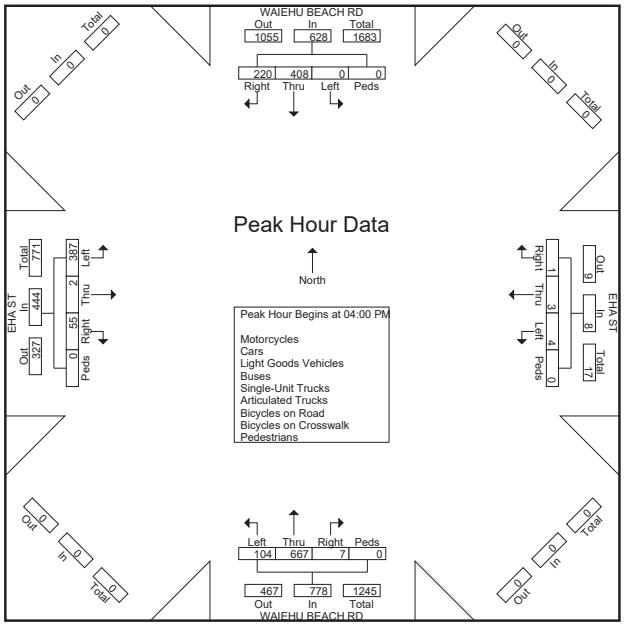
	WAIEHU BEACH RD From North					EHA ST From East					WAIEHU BEACH RD From South					EHA ST From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**62**	89	0	0	151	0	1	1	0	2	0	150	24	0	174	18	0	**100**	0	118	445
04:15 PM	54	111	0	0	**165**	0	0	0	0	0	**3**	**180**	21	0	**204**	2	0	93	0	95	464
04:30 PM	53	**112**	0	0	165	0	0	**2**	0	2	2	177	24	0	203	8	0	94	0	102	472
04:45 PM	51	96	0	0	147	**1**	**2**	1	0	**4**	2	160	**35**	0	197	**27**	**2**	100	0	**129**	**477**
Total Volume	220	408	0	0	628	1	3	4	0	8	7	667	104	0	778	55	2	387	0	444	1858
% App. Total	35	65	0	0		12.5	37.5	50	0		0.9	85.7	13.4	0		12.4	0.5	87.2	0		
PHF	.887	.911	.000	.000	.952	.250	.375	.500	.000	.500	.583	.926	.743	.000	.953	.509	.250	.968	.000	.860	.974



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File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	CENTRAL AVE SOUTHBOUND				MAIN ST WESTBOUND				NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	39	0	7	1	0	56	14	0	0	0	0	0	3	39	0	1	160
06:30 AM	74	0	14	0	0	77	21	0	0	0	0	0	6	46	0	2	240
06:45 AM	75	0	12	0	0	101	58	0	0	0	0	0	5	56	0	0	307
Total	188	0	33	1	0	234	93	0	0	0	0	0	14	141	0	3	707
07:00 AM	99	0	20	0	0	126	59	0	0	0	0	0	12	66	0	9	391
07:15 AM	119	0	18	0	0	124	64	0	0	0	0	0	17	80	0	0	422
07:30 AM	117	0	12	1	0	105	70	0	0	0	0	0	23	118	0	0	446
07:45 AM	87	0	18	1	0	122	96	1	0	0	0	0	19	88	0	0	432
Total	422	0	68	2	0	477	289	1	0	0	0	0	71	352	0	9	1691
Grand Total	610	0	101	3	0	711	382	1	0	0	0	0	85	493	0	12	2398
Apprch %	85.4	0	14.1	0.4	0	65	34.9	0.1	0	0	0	0	14.4	83.6	0	2	
Total %	25.4	0	4.2	0.1	0	29.6	15.9	0	0	0	0	0	3.5	20.6	0	0.5	
Motorcycles	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
% Motorcycles	0.3	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0.1
Cars & Light Goods	602	0	100	0	0	692	378	0	0	0	0	0	82	487	0	0	2341
% Cars & Light Goods	98.7	0	99	0	0	97.3	99	0	0	0	0	0	96.5	98.8	0	0	97.6
Buses	5	0	0	0	0	8	2	0	0	0	0	0	3	4	0	0	22
% Buses	0.8	0	0	0	0	1.1	0.5	0	0	0	0	0	3.5	0.8	0	0	0.9
Single-Unit Trucks	1	0	0	0	0	10	1	0	0	0	0	0	0	2	0	0	14
% Single-Unit Trucks	0.2	0	0	0	0	1.4	0.3	0	0	0	0	0	0	0.4	0	0	0.6
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
% Bicycles on Road	0	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	33.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	12	15
% Pedestrians	0	0	0	66.7	0	0	0	100	0	0	0	0	0	0	0	100	0.6

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Start Date : 5/8/2018
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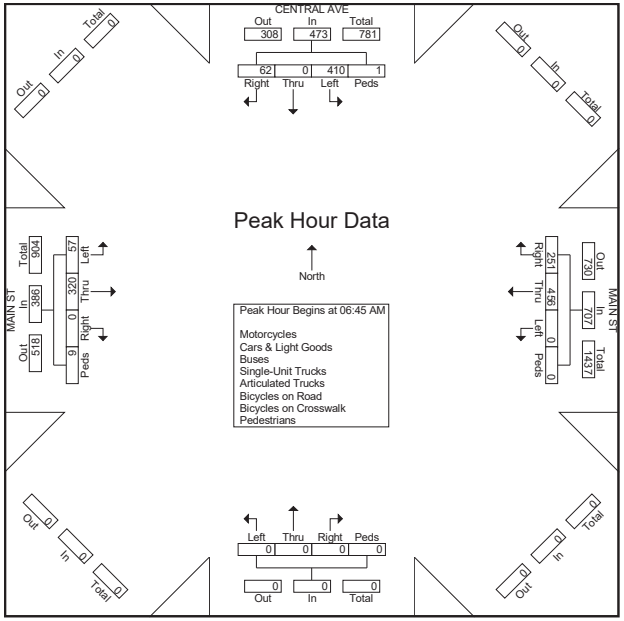
	CENTRAL AVE SOUTHBOUND					MAIN ST WESTBOUND					NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	75	0	12	0	87	0	101	58	0	159	0	0	0	0	0	5	56	0	0	61	307
07:00 AM	99	0	**20**	0	119	0	**126**	59	0	185	0	0	0	0	0	12	66	0	**9**	87	391
07:15 AM	**119**	0	18	0	**137**	0	124	64	0	**188**	0	0	0	0	0	17	80	0	0	97	422
07:30 AM	117	0	12	**1**	130	0	105	**70**	0	175	0	0	0	0	0	**23**	**118**	0	0	**141**	**446**
Total Volume	410	0	62	1	473	0	456	251	0	707	0	0	0	0	0	57	320	0	9	386	1566
% App. Total	86.7	0	13.1	0.2		0	64.5	35.5	0		0	0	0	0		14.8	82.9	0	2.3		
PHF	.861	.000	.775	.250	.863	.000	.905	.896	.000	.940	.000	.000	.000	.000	.000	.620	.678	.000	.250	.684	.878



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	CENTRAL AVE SOUTHBOUND				MAIN ST WESTBOUND				NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:15	96	0	25	1	0	126	82	0	0	0	0	0	11	74	0	2	417
15:30	112	0	18	3	0	123	70	0	0	0	0	0	8	78	0	1	413
15:45	93	0	32	2	0	134	80	0	0	0	0	0	18	86	0	2	447
Total	301	0	75	6	0	383	232	0	0	0	0	0	37	238	0	5	1277
16:00	121	0	18	0	0	119	62	0	0	0	0	0	16	107	0	1	444
16:15	118	0	25	2	0	121	84	0	0	0	0	0	16	81	0	1	448
16:30	103	0	33	2	0	111	83	0	0	0	0	0	12	125	0	0	469
16:45	107	0	35	0	0	130	82	0	0	0	0	0	8	107	0	1	470
Total	449	0	111	4	0	481	311	0	0	0	0	0	52	420	0	3	1831
17:00	115	0	15	1	0	94	66	0	0	0	0	0	8	79	0	1	379
Grand Total	865	0	201	11	0	958	609	0	0	0	0	0	97	737	0	9	3487
Apprch %	80.3	0	18.7	1	0	61.1	38.9	0	0	0	0	0	11.5	87.4	0	1.1	
Total %	24.8	0	5.8	0.3	0	27.5	17.5	0	0	0	0	0	2.8	21.1	0	0.3	
Motorcycles	0	0	0	0	0	3	3	0	0	0	0	0	1	1	0	0	8
% Motorcycles	0	0	0	0	0	0.3	0.5	0	0	0	0	0	1	0.1	0	0	0.2
Cars & Light Goods	858	0	198	0	0	948	603	0	0	0	0	0	93	723	0	0	3423
% Cars & Light Goods	99.2	0	98.5	0	0	99	99	0	0	0	0	0	95.9	98.1	0	0	98.2
Buses	3	0	0	0	0	7	2	0	0	0	0	0	2	11	0	0	25
% Buses	0.3	0	0	0	0	0.7	0.3	0	0	0	0	0	2.1	1.5	0	0	0.7
Single-Unit Trucks	4	0	3	0	0	0	1	0	0	0	0	0	1	2	0	0	11
% Single-Unit Trucks	0.5	0	1.5	0	0	0	0.2	0	0	0	0	0	1	0.3	0	0	0.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	9	20
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0.6

Austin Tsutsumi & Associates

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File Name : Central Ave - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/8/2018
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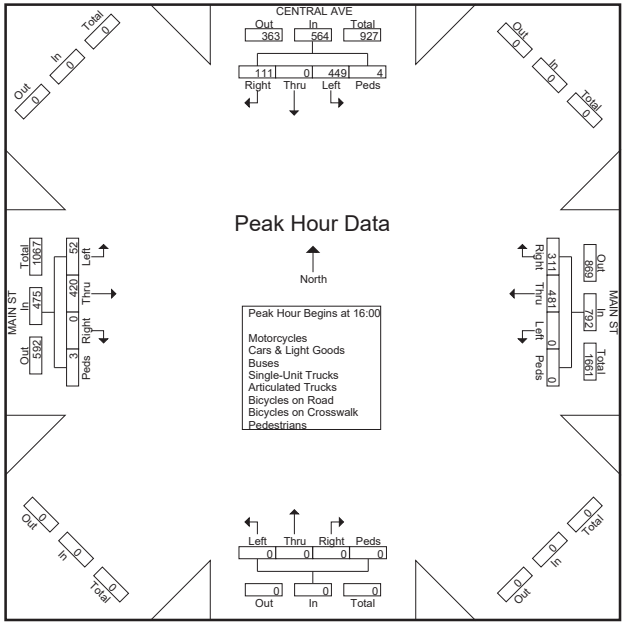
	CENTRAL AVE SOUTHBOUND					MAIN ST WESTBOUND					NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 15:15 to 17:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	**121**	0	18	0	139	0	119	62	0	181	0	0	0	0	0	**16**	107	0	**1**	124	444
16:15	118	0	25	**2**	**145**	0	121	**84**	0	205	0	0	0	0	0	16	81	0	1	98	448
16:30	103	0	33	2	138	0	111	83	0	194	0	0	0	0	0	12	**125**	0	0	**137**	469
16:45	107	0	**35**	0	142	0	**130**	82	0	**212**	0	0	0	0	0	8	107	0	1	116	**470**
Total Volume	449	0	111	4	564	0	481	311	0	792	0	0	0	0	0	52	420	0	3	475	1831
% App. Total	79.6	0	19.7	0.7		0	60.7	39.3	0		0	0	0	0		10.9	88.4	0	0.6		
PHF	.928	.000	.793	.500	.972	.000	.925	.926	.000	.934	.000	.000	.000	.000	.000	.813	.840	.000	.750	.867	.974



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File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 1

Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HIGH ST SOUTHBOUND				MAIN ST WESTBOUND				HIGH ST NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:15 AM	5	49	0	2	48	8	8	2	6	14	30	0	2	18	8	0	200
06:30 AM	1	53	1	1	54	0	6	0	5	26	29	0	2	15	8	0	201
06:45 AM	2	86	1	1	61	13	5	2	6	37	62	2	1	21	10	0	310
Total	8	188	2	4	163	21	19	4	17	77	121	2	5	54	26	0	711
07:00 AM	4	95	3	2	79	7	14	5	8	59	67	2	1	26	7	1	380
07:15 AM	5	77	4	2	58	15	16	7	4	50	85	6	2	25	14	1	371
07:30 AM	5	79	5	2	55	15	14	3	13	54	84	3	2	58	17	0	409
07:45 AM	2	64	5	1	40	17	9	6	13	87	86	0	7	33	13	0	383
Total	16	315	17	7	232	54	53	21	38	250	322	11	12	142	51	2	1543
Grand Total	24	503	19	11	395	75	72	25	55	327	443	13	17	196	77	2	2254
Apprch %	4.3	90.3	3.4	2	69.7	13.2	12.7	4.4	6.6	39	52.9	1.6	5.8	67.1	26.4	0.7	
Total %	1.1	22.3	0.8	0.5	17.5	3.3	3.2	1.1	2.4	14.5	19.7	0.6	0.8	8.7	3.4	0.1	
Motorcycles	0	3	0	0	3	0	0	0	0	1	4	0	0	0	0	0	11
% Motorcycles	0	0.6	0	0	0.8	0	0	0	0	0.3	0.9	0	0	0	0	0	0.5
Cars & Light Goods	24	493	19	0	380	72	72	0	51	325	430	0	17	192	74	0	2149
% Cars & Light Goods	100	98	100	0	96.2	96	100	0	92.7	99.4	97.1	0	100	98	96.1	0	95.3
Buses	0	5	0	0	4	1	0	0	1	0	3	0	0	1	0	0	15
% Buses	0	1	0	0	1	1.3	0	0	1.8	0	0.7	0	0	0.5	0	0	0.7
Single-Unit Trucks	0	2	0	0	8	1	0	0	2	1	3	0	0	2	1	0	20
% Single-Unit Trucks	0	0.4	0	0	2	1.3	0	0	3.6	0.3	0.7	0	0	1	1.3	0	0.9
Articulated Trucks	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	3
% Articulated Trucks	0	0	0	0	0	1.3	0	0	0	0	0.2	0	0	0	1.3	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	1	0	2	0	0	1	1	0	5
% Bicycles on Road	0	0	0	0	0	0	0	0	1.8	0	0.5	0	0	0.5	1.3	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	11	0	0	0	25	0	0	0	13	0	0	0	2	51
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	100	2.3

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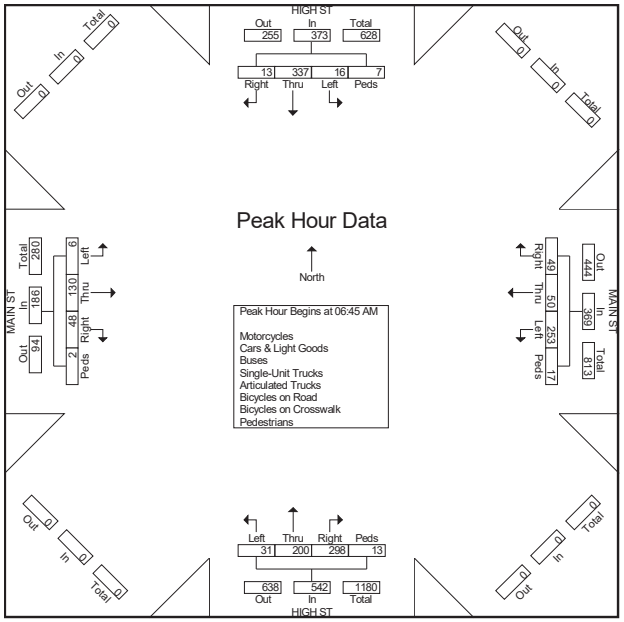
File Name : High St - Main St
Site Code : 16-014.07 Maui DOT Signal Optimization
Start Date : 5/1/2018
Page No : 2

	HIGH ST SOUTHBOUND					MAIN ST WESTBOUND					HIGH ST NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	2	86	1	1	90	61	13	5	2	81	6	37	62	2	107	1	21	10	0	32	310
07:00 AM	4	**95**	3	**2**	**104**	**79**	7	14	5	**105**	8	**59**	67	2	136	1	26	7	**1**	35	380
07:15 AM	**5**	77	4	2	88	58	**15**	**16**	**7**	96	4	50	**85**	**6**	145	**2**	25	14	1	42	371
07:30 AM	5	79	**5**	2	91	55	15	14	3	87	**13**	54	84	3	**154**	2	**58**	**17**	0	**77**	**409**
Total Volume	16	337	13	7	373	253	50	49	17	369	31	200	298	13	542	6	130	48	2	186	1470
% App. Total	4.3	90.3	3.5	1.9		68.6	13.6	13.3	4.6		5.7	36.9	55	2.4		3.2	69.9	25.8	1.1		
PHF	.800	.887	.650	.875	.897	.801	.833	.766	.607	.879	.596	.847	.876	.542	.880	.750	.560	.706	.500	.604	.899



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Groups Printed- Motorcycles - Cars & Light Goods - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	HIGH ST SOUTHBOUND				MAIN ST WESTBOUND				HIGH ST NORTHBOUND				MAIN ST EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	6	54	5	4	79	24	13	3	14	59	59	2	10	44	30	0	406
03:45 PM	11	59	10	1	73	26	10	2	14	78	76	2	6	22	14	0	404
Total	17	113	15	5	152	50	23	5	28	137	135	4	16	66	44	0	810
04:00 PM	10	82	7	3	75	29	9	6	10	84	73	1	4	35	16	0	444
04:15 PM	13	63	8	1	81	36	10	3	15	79	64	1	4	30	9	0	417
04:30 PM	12	65	7	8	97	22	4	5	10	76	72	10	6	25	25	5	449
04:45 PM	13	74	7	0	82	31	2	2	13	71	51	0	1	25	12	2	386
Total	48	284	29	12	335	118	25	16	48	310	260	12	15	115	62	7	1696
05:00 PM	12	75	2	0	88	18	9	2	14	64	68	0	4	18	15	0	389
05:15 PM	7	65	0	1	72	26	5	0	10	58	53	0	7	17	11	0	332
Grand Total	84	537	46	18	647	212	62	23	100	569	516	16	42	216	132	7	3227
Apprch %	12.3	78.4	6.7	2.6	68.5	22.5	6.6	2.4	8.3	47.4	43	1.3	10.6	54.4	33.2	1.8	
Total %	2.6	16.6	1.4	0.6	20	6.6	1.9	0.7	3.1	17.6	16	0.5	1.3	6.7	4.1	0.2	
Motorcycles	0	1	0	0	5	0	0	0	0	2	3	0	0	1	0	0	12
% Motorcycles	0	0.2	0	0	0.8	0	0	0	0	0.4	0.6	0	0	0.5	0	0	0.4
Cars & Light Goods	84	531	45	0	638	212	60	0	100	561	507	0	42	214	129	0	3123
% Cars & Light Goods	100	98.9	97.8	0	98.6	100	96.8	0	100	98.6	98.3	0	100	99.1	97.7	0	96.8
Buses	0	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	7
% Buses	0	0	0	0	0.2	0	0	0	0	0	1.2	0	0	0	0	0	0.2
Single-Unit Trucks	0	1	1	0	2	0	2	0	0	6	0	0	0	0	3	0	15
% Single-Unit Trucks	0	0.2	2.2	0	0.3	0	3.2	0	0	1.1	0	0	0	0	2.3	0	0.5
Articulated Trucks	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5
% Bicycles on Road	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.2
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	18	0	0	0	23	0	0	0	16	0	0	0	7	64
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	100	0	0	0	100	2

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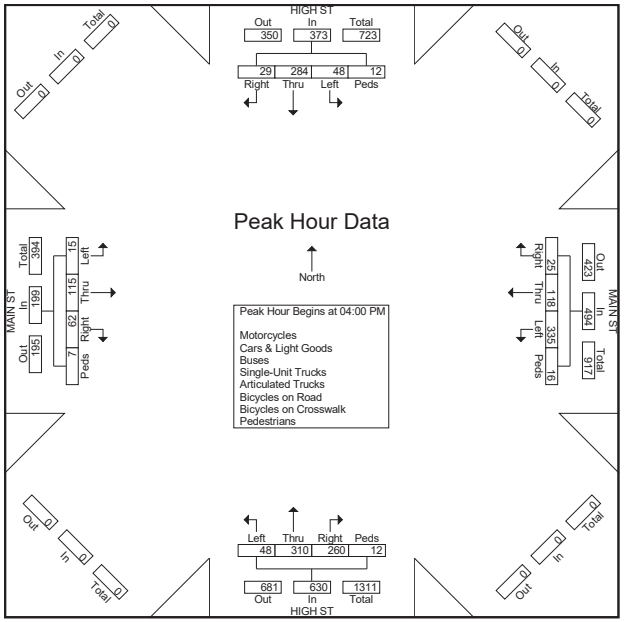
	HIGH ST SOUTHBOUND					MAIN ST WESTBOUND					HIGH ST NORTHBOUND					MAIN ST EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	10	**82**	7	3	**102**	75	29	9	**6**	119	10	**84**	**73**	1	**168**	4	**35**	16	0	55	444
04:15 PM	**13**	63	**8**	1	85	81	**36**	**10**	3	**130**	**15**	79	64	1	159	4	30	9	0	43	417
04:30 PM	12	65	7	**8**	92	**97**	22	4	5	128	10	76	72	**10**	168	**6**	25	**25**	**5**	**61**	**449**
04:45 PM	13	74	7	0	94	82	31	2	2	117	13	71	51	0	135	1	25	12	2	40	386
Total Volume	48	284	29	12	373	335	118	25	16	494	48	310	260	12	630	15	115	62	7	199	1696
% App. Total	12.9	76.1	7.8	3.2		67.8	23.9	5.1	3.2		7.6	49.2	41.3	1.9		7.5	57.8	31.2	3.5		
PHF	.923	.866	.906	.375	.914	.863	.819	.625	.667	.950	.800	.923	.890	.300	.938	.625	.821	.620	.350	.816	.944



APPENDIX B

LEVEL OF SERVICE CRITERIA

APPENDIX B – LEVEL OF SERVICE (LOS) CRITERIA

VEHICULAR LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 6th EDITION)

Level of service for vehicles at signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in the table below.

Level-of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec./veh.)
A	< 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	> 80.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

VEHICULAR LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 6th EDITION)

The level of service criteria for vehicles at unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Existing AM

Intersection	
Int Delay, s/veh	8.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	269	164	19	316	342
Future Vol, veh/h	36	269	164	19	316	342
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	292	178	21	343	372

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1247	189	0	0	199	0
Stage 1	189	-	-	-	-	-
Stage 2	1058	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	192	853	-	-	1373	-
Stage 1	843	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	132	853	-	-	1373	-
Mov Cap-2 Maneuver	132	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	229	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.4	0	4.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	519	1373	-
HCM Lane V/C Ratio	-	-	0.639	0.25	-
HCM Control Delay (s)	-	-	23.4	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	4.5	1	-

Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	216	60	5	294	20
Future Vol, veh/h	44	2	212	108	6	14	107	216	60	5	294	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	235	65	5	320	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	844	873	331	842	852	268	342	0	0	300	0	0
Stage 1	341	341	-	500	500	-	-	-	-	-	-	-
Stage 2	503	532	-	342	352	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	283	289	711	284	297	771	1217	-	-	1261	-	-
Stage 1	674	639	-	553	543	-	-	-	-	-	-	-
Stage 2	551	526	-	673	632	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	252	260	711	176	268	771	1217	-	-	1261	-	-
Mov Cap-2 Maneuver	252	260	-	176	268	-	-	-	-	-	-	-
Stage 1	610	636	-	500	491	-	-	-	-	-	-	-
Stage 2	482	476	-	452	629	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	55.4	2.3	0.1
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	252	711	179	771	1261	-	-
HCM Lane V/C Ratio	0.096	-	-	0.198	0.324	0.692	0.02	0.004	-	-
HCM Control Delay (s)	8.3	-	-	22.8	12.5	61	9.8	7.9	-	-
HCM Lane LOS	A	-	-	C	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	1.4	4.2	0.1	0	-	-

HCM 6th TWSC
3: Waiehu Beach Rd & Makaala Dr

04/27/2021

Intersection	
Int Delay, s/veh	17

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	417	99	335	571	13
Future Vol, veh/h	7	417	99	335	571	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	453	108	364	621	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1208	628	635	0	-	0
Stage 1	628	-	-	-	-	-
Stage 2	580	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	202	483	948	-	-	-
Stage 1	532	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	179	483	948	-	-	-
Mov Cap-2 Maneuver	314	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	55.7	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	948	-	314	483	-	-
HCM Lane V/C Ratio	0.114	-	0.024	0.938	-	-
HCM Control Delay (s)	9.3	-	16.7	56.4	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	11.3	-	-

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/27/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	2	41	12	5	3	110	391	3	2	777	404
Future Volume (veh/h)	127	2	41	12	5	3	110	391	3	2	777	404
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	138	2	45	13	5	3	120	425	3	2	845	439
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	2	183	147	55	29	137	1482	10	780	787	1207
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.06	0.80	0.80	0.02	0.76	0.76
Sat Flow, veh/h	1419	21	1578	1034	474	251	1781	1855	13	1781	1034	1585
Grp Volume(v), veh/h	140	0	45	21	0	0	120	0	428	2	845	439
Grp Sat Flow(s),veh/h/ln	1440	0	1578	1759	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	18.4	0.0	5.7	0.0	0.0	0.0	10.5	0.0	13.0	0.1	166.0	19.9
Cycle Q Clear(g_c), s	20.6	0.0	5.7	2.3	0.0	0.0	10.5	0.0	13.0	0.1	166.0	19.9
Prop In Lane	0.99		1.00	0.62		0.14	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	200	0	183	231	0	0	137	0	1493	780	787	1207
V/C Ratio(X)	0.70	0.00	0.25	0.09	0.00	0.00	0.87	0.00	0.29	0.00	1.07	0.36
Avail Cap(c_a), veh/h	811	0	869	893	0	0	286	0	1594	833	787	1207
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.1	0.0	87.7	86.2	0.0	0.0	89.9	0.0	5.7	5.2	26.0	8.6
Incr Delay (d2), s/veh	11.6	0.0	1.9	0.2	0.0	0.0	15.5	0.0	0.1	0.0	53.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	2.5	1.1	0.0	0.0	7.4	0.0	5.2	0.0	49.9	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	105.7	0.0	89.6	86.4	0.0	0.0	105.4	0.0	5.8	5.2	79.8	9.4
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	A
Approach Vol, veh/h		185			21			548			1286	
Approach Delay, s/veh		101.8			86.4			27.6			55.6	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.8	171.0		30.3	8.5	179.3		30.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0
Max Q Clear Time (g_c+I1), s	12.5	168.0		4.3	2.1	15.0		22.6
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	3.1		2.6

Intersection Summary	
HCM 6th Ctrl Delay	52.6
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	136	49	146	59	83	333
Future Vol, veh/h	136	49	146	59	83	333
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	148	53	159	64	90	362

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	733	191	0	0	223	0
Stage 1	191	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	388	851	-	-	1346	-
Stage 1	841	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	362	851	-	-	1346	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	362	851	1346	-
HCM Lane V/C Ratio	-	-	0.408	0.063	0.067	-
HCM Control Delay (s)	-	-	21.6	9.5	7.9	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	1.9	0.2	0.2	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	39	56	0	7	34	286	28	5	717	7
Future Vol, veh/h	9	0	39	56	0	7	34	286	28	5	717	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	42	61	0	8	37	311	30	5	779	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1197	1208	783	1214	1197	326	787	0	0	341	0	0
Stage 1	793	793	-	400	400	-	-	-	-	-	-	-
Stage 2	404	415	-	814	797	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	163	183	394	158	186	715	832	-	-	1218	-	-
Stage 1	382	400	-	626	602	-	-	-	-	-	-	-
Stage 2	623	592	-	372	399	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	154	172	394	134	174	715	832	-	-	1218	-	-
Mov Cap-2 Maneuver	154	172	-	134	174	-	-	-	-	-	-	-
Stage 1	361	397	-	592	569	-	-	-	-	-	-	-
Stage 2	582	559	-	330	396	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	49.2	0.9	0.1
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	832	-	-	305	147	1218	-	-
HCM Lane V/C Ratio	0.044	-	-	0.171	0.466	0.004	-	-
HCM Control Delay (s)	9.5	0	-	19.2	49.2	8	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	2.1	0	-	-

Intersection	
Int Delay, s/veh	8.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	148	300	153	419	473
Future Vol, veh/h	33	148	300	153	419	473
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	161	326	166	455	514

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1833	409	0	0	492	0
Stage 1	409	-	-	-	-	-
Stage 2	1424	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	84	642	-	-	1071	-
Stage 1	671	-	-	-	-	-
Stage 2	222	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	48	642	-	-	1071	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	128	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.2	0	5.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	48	642	1071	-
HCM Lane V/C Ratio	-	-	0.747	0.251	0.425	-
HCM Control Delay (s)	-	-	191.8	12.5	10.8	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	3	1	2.2	-

Intersection	
Intersection Delay, s/veh	19.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	200	42	0	0	131	39	21	199	31	53	0	401
Future Vol, veh/h	200	42	0	0	131	39	21	199	31	53	0	401
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	217	46	0	0	142	42	23	216	34	58	0	436
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	16.1	13.9	15.6	25.1
HCM LOS	C	B	C	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	8%	100%	0%	0%	12%
Vol Thru, %	79%	0%	100%	77%	0%
Vol Right, %	12%	0%	0%	23%	88%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	200	42	170	454
LT Vol	21	200	0	0	53
Through Vol	199	0	42	131	0
RT Vol	31	0	0	39	401
Lane Flow Rate	273	217	46	185	493
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.489	0.468	0.092	0.356	0.77
Departure Headway (Hd)	6.458	7.744	7.231	6.943	5.62
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	557	463	494	516	642
Service Time	4.528	5.512	4.999	5.021	3.675
HCM Lane V/C Ratio	0.49	0.469	0.093	0.359	0.768
HCM Control Delay	15.6	17.2	10.7	13.9	25.1
HCM Lane LOS	C	C	B	B	D
HCM 95th-tile Q	2.7	2.4	0.3	1.6	7.2

HCM 6th Signalized Intersection Summary
9: High St. & Main St

04/27/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	133	49	258	51	49	32	200	304	16	337	13
Future Volume (veh/h)	6	133	49	258	51	49	32	200	304	16	337	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	7	145	53	280	55	53	35	217	330	17	366	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	393	230	84	596	403	389	446	576	488	97	531	20
Arrive On Green	0.18	0.18	0.18	0.19	0.46	0.46	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1286	1307	478	1781	875	843	1003	1870	1585	32	1725	64
Grp Volume(v), veh/h	7	0	198	280	0	108	35	217	330	397	0	0
Grp Sat Flow(s),veh/h/ln	1286	0	1784	1781	0	1719	1003	1870	1585	1821	0	0
Q Serve(g_s), s	0.2	0.0	4.4	4.7	0.0	1.6	0.0	3.9	7.9	0.5	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	4.4	4.7	0.0	1.6	1.3	3.9	7.9	8.2	0.0	0.0
Prop In Lane	1.00		0.27	1.00		0.49	1.00		1.00	0.04		0.04
Lane Grp Cap(c), veh/h	393	0	314	596	0	792	446	576	488	647	0	0
V/C Ratio(X)	0.02	0.00	0.63	0.47	0.00	0.14	0.08	0.38	0.68	0.61	0.00	0.00
Avail Cap(c_a), veh/h	1089	0	1281	2728	0	3780	2228	3897	3303	3791	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.7	0.0	16.5	9.4	0.0	6.7	10.8	11.7	13.1	13.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.1	1.0	0.0	0.1	0.1	0.4	1.8	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.7	1.5	0.0	0.4	0.2	1.4	2.5	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	0.0	18.6	10.4	0.0	6.8	10.9	12.2	14.9	14.2	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		205			388			582			397	
Approach Delay, s/veh		18.5			9.4			13.6			14.2	
Approach LOS		B			A			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	24.9	18.3	12.3	12.6	18.3
Change Period (Y+Rc), s	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	95.0	90.0	60.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	3.6	10.2	6.7	6.4	9.9
Green Ext Time (p_c), s	1.2	3.1	1.9	1.2	3.1

Intersection Summary	
HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

HCM 6th TWSC
10: Central Ave. & Mill St

04/27/2021

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	376	221	247	171	16	145
Future Vol, veh/h	376	221	247	171	16	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	409	240	268	186	17	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	649	0	1251	529
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	722	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	937	-	190	550
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	937	-	129	550
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	328	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	415	-	-	937	-
HCM Lane V/C Ratio	0.422	-	-	0.287	-
HCM Control Delay (s)	19.9	-	-	10.4	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2	-	-	1.2	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Existing PM

Intersection	
Int Delay, s/veh	8.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	315	206	68	231	109
Future Vol, veh/h	31	315	206	68	231	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	342	224	74	251	118

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	881	261	0	0	298	0
Stage 1	261	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	317	778	-	-	1263	-
Stage 1	783	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	249	778	-	-	1263	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	422	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.7	0	5.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	654	1263	-
HCM Lane V/C Ratio	-	-	0.575	0.199	-
HCM Control Delay (s)	-	-	17.7	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.7	0.7	-

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	341	115	15	253	62
Future Vol, veh/h	15	4	143	72	4	3	205	341	115	15	253	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	371	125	16	275	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1223	1283	309	1223	1254	434	342	0	0	496	0	0
Stage 1	341	341	-	880	880	-	-	-	-	-	-	-
Stage 2	882	942	-	343	374	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	156	165	731	156	172	622	1217	-	-	1068	-	-
Stage 1	674	639	-	342	365	-	-	-	-	-	-	-
Stage 2	341	342	-	672	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	129	133	731	102	138	622	1217	-	-	1068	-	-
Mov Cap-2 Maneuver	129	133	-	102	138	-	-	-	-	-	-	-
Stage 1	551	629	-	279	298	-	-	-	-	-	-	-
Stage 2	273	279	-	518	609	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	112.2	2.7	0.4
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1217	-	-	130	731	103	622	1068	-	-
HCM Lane V/C Ratio	0.183	-	-	0.159	0.213	0.802	0.005	0.015	-	-
HCM Control Delay (s)	8.6	-	-	37.9	11.3	116.2	10.8	8.4	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.5	0.8	4.4	0	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	201	314	650	450	18
Future Vol, veh/h	15	201	314	650	450	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	218	341	707	489	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1888	499	509	0	-	0
Stage 1	499	-	-	-	-	-
Stage 2	1389	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	77	572	1056	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	572	1056	-	-	-
Mov Cap-2 Maneuver	157	-	-	-	-	-
Stage 1	413	-	-	-	-	-
Stage 2	231	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	3.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1056	-	157	572	-	-
HCM Lane V/C Ratio	0.323	-	0.104	0.382	-	-
HCM Control Delay (s)	10	-	30.6	15.1	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	1.4	-	0.3	1.8	-	-

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/27/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	387	2	55	4	3	1	104	686	7	0	420	220
Future Volume (veh/h)	387	2	55	4	3	1	104	686	7	0	420	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	421	2	60	4	3	1	113	746	8	0	457	239
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	603	3	594	366	266	82	395	963	10	216	795	674
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.05	0.52	0.52	0.00	0.43	0.43
Sat Flow, veh/h	1408	7	1583	826	708	219	1781	1847	20	1781	1870	1585
Grp Volume(v), veh/h	423	0	60	8	0	0	113	0	754	0	457	239
Grp Sat Flow(s),veh/h/ln	1415	0	1583	1753	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	25.4	0.0	2.4	0.0	0.0	0.0	3.3	0.0	31.3	0.0	18.0	9.9
Cycle Q Clear(g_c), s	25.7	0.0	2.4	0.3	0.0	0.0	3.3	0.0	31.3	0.0	18.0	9.9
Prop In Lane	1.00		1.00	0.50		0.12	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	605	0	594	714	0	0	395	0	973	216	795	674
V/C Ratio(X)	0.70	0.00	0.10	0.01	0.00	0.00	0.29	0.00	0.77	0.00	0.57	0.35
Avail Cap(c_a), veh/h	1830	0	1966	2083	0	0	870	0	1855	417	1471	1247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	19.6	18.9	0.0	0.0	15.2	0.0	18.6	0.0	21.1	18.8
Incr Delay (d2), s/veh	4.0	0.0	0.2	0.0	0.0	0.0	0.4	0.0	1.4	0.0	3.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	0.0	0.9	0.1	0.0	0.0	1.3	0.0	13.0	0.0	8.3	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	0.0	19.8	18.9	0.0	0.0	15.6	0.0	19.9	0.0	24.1	20.3
LnGrp LOS	C	A	B	B	A	A	B	A	B	A	C	C
Approach Vol, veh/h		483			8			867			696	
Approach Delay, s/veh		29.5			18.9			19.4			22.8	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.3	46.1		41.3	0.0	55.3		41.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0
Max Q Clear Time (g_c+I1), s	5.3	20.0		2.3	0.0	33.3		27.7
Green Ext Time (p_c), s	0.3	21.1		0.0	0.0	6.8		8.5

Intersection Summary		
HCM 6th Ctrl Delay		22.9
HCM 6th LOS		C

HCM 6th TWSC
5: Kahekili Hwy & Makaala Dr

04/27/2021

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	85	5	222	170	11	142
Future Vol, veh/h	85	5	222	170	11	142
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	5	241	185	12	154

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	512	334	0	0	426	0
Stage 1	334	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	522	708	-	-	1133	-
Stage 1	725	-	-	-	-	-
Stage 2	853	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	516	708	-	-	1133	-
Mov Cap-2 Maneuver	516	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	516	708	1133	-
HCM Lane V/C Ratio	-	-	0.179	0.008	0.011	-
HCM Control Delay (s)	-	-	13.5	10.1	8.2	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0	0	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	44	44	1	2	43	538	73	5	264	5
Future Vol, veh/h	5	1	44	44	1	2	43	538	73	5	264	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	48	48	1	2	47	585	79	5	287	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1020	1058	290	1043	1021	625	292	0	0	664	0	0
Stage 1	300	300	-	719	719	-	-	-	-	-	-	-
Stage 2	720	758	-	324	302	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	215	225	749	207	236	485	1270	-	-	925	-	-
Stage 1	709	666	-	420	433	-	-	-	-	-	-	-
Stage 2	419	415	-	688	664	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	203	210	749	183	221	485	1270	-	-	925	-	-
Mov Cap-2 Maneuver	203	210	-	183	221	-	-	-	-	-	-	-
Stage 1	667	662	-	395	407	-	-	-	-	-	-	-
Stage 2	391	391	-	639	660	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	31	0.5	0.2
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1270	-	-	567	189	925	-	-
HCM Lane V/C Ratio	0.037	-	-	0.096	0.27	0.006	-	-
HCM Control Delay (s)	7.9	0	-	12	31	8.9	0	-
HCM Lane LOS	A	A	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	1	0	-	-

Intersection	
Int Delay, s/veh	10.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	321	536	169	230	265
Future Vol, veh/h	36	321	536	169	230	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	349	583	184	250	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1463	675	0	0	767	0
Stage 1	675	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	142	454	-	-	847	-
Stage 1	506	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	100	454	-	-	847	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	506	-	-	-	-	-
Stage 2	316	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	37.5	0	5.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	100	454	847	-
HCM Lane V/C Ratio	-	-	0.391	0.769	0.295	-
HCM Control Delay (s)	-	-	62.5	34.7	11	-
HCM Lane LOS	-	-	F	D	B	-
HCM 95th %tile Q(veh)	-	-	1.6	6.6	1.2	-

Intersection	
Intersection Delay, s/veh	23.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	281	116	0	0	106	60	37	281	53	45	0	262
Future Vol, veh/h	281	116	0	0	106	60	37	281	53	45	0	262
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	305	126	0	0	115	65	40	305	58	49	0	285
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	22.5	15.4	29.7	20
HCM LOS	C	C	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	10%	100%	0%	0%	15%
Vol Thru, %	76%	0%	100%	64%	0%
Vol Right, %	14%	0%	0%	36%	85%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	371	281	116	166	307
LT Vol	37	281	0	0	45
Through Vol	281	0	116	106	0
RT Vol	53	0	0	60	262
Lane Flow Rate	403	305	126	180	334
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.774	0.681	0.264	0.382	0.619
Departure Headway (Hd)	6.906	8.031	7.545	7.613	6.673
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	528	449	477	471	541
Service Time	4.908	5.79	5.275	5.687	4.731
HCM Lane V/C Ratio	0.763	0.679	0.264	0.382	0.617
HCM Control Delay	29.7	26.4	13	15.4	20
HCM Lane LOS	D	D	B	C	C
HCM 95th-tile Q	7	5	1.1	1.8	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	117	63	342	120	25	49	310	265	48	284	29
Future Volume (veh/h)	15	117	63	342	120	25	49	310	265	48	284	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	127	31	372	130	6	53	337	93	52	309	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	212	52	631	807	37	435	616	522	127	449	42
Arrive On Green	0.15	0.15	0.15	0.22	0.46	0.46	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1253	1452	354	1781	1774	82	1040	1870	1585	120	1363	127
Grp Volume(v), veh/h	16	0	158	372	0	136	53	337	93	392	0	0
Grp Sat Flow(s),veh/h/ln	1253	0	1807	1781	0	1856	1040	1870	1585	1610	0	0
Q Serve(g_s), s	0.5	0.0	3.8	7.2	0.0	2.0	0.0	6.8	1.9	3.3	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	3.8	7.2	0.0	2.0	2.4	6.8	1.9	10.1	0.0	0.0
Prop In Lane	1.00		0.20	1.00		0.04	1.00		1.00	0.13		0.08
Lane Grp Cap(c), veh/h	338	0	263	631	0	844	435	616	522	618	0	0
V/C Ratio(X)	0.05	0.00	0.60	0.59	0.00	0.16	0.12	0.55	0.18	0.63	0.00	0.00
Avail Cap(c_a), veh/h	992	0	1207	2537	0	3759	2110	3628	3074	3259	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.1	0.0	18.6	10.7	0.0	7.4	11.2	12.7	11.1	13.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	2.2	0.9	0.0	0.1	0.1	0.8	0.2	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.6	2.4	0.0	0.7	0.4	2.6	0.6	3.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	20.7	11.5	0.0	7.5	11.3	13.5	11.2	14.7	0.0	0.0
LnGrp LOS	B	A	C	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		174			508			483			392	
Approach Delay, s/veh		20.4			10.5			12.8			14.7	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	26.1	20.3	14.3	11.8	20.3
Change Period (Y+Rc), s	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	94.0	90.0	60.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	4.0	12.1	9.2	5.8	8.8
Green Ext Time (p_c), s	0.9	3.2	1.2	1.0	3.0

Intersection Summary	
HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	302	104	246	310	51	143
Future Vol, veh/h	302	104	246	310	51	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	328	113	267	337	55	155

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	441	0	1256	385
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	871	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1119	-	189	663
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	410	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1119	-	133	663
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	289	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	34.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	1119	-
HCM Lane V/C Ratio	0.651	-	-	0.239	-
HCM Control Delay (s)	34.6	-	-	9.2	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	4.3	-	-	0.9	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year 2024 AM

Intersection	
Int Delay, s/veh	9.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	269	188	19	316	372
Future Vol, veh/h	36	269	188	19	316	372
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	292	204	21	343	404

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1305	215	0	0	225	0
Stage 1	215	-	-	-	-	-
Stage 2	1090	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	177	825	-	-	1344	-
Stage 1	821	-	-	-	-	-
Stage 2	322	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	825	-	-	1344	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	216	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27	0	3.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	485	1344	-
HCM Lane V/C Ratio	-	-	0.684	0.256	-
HCM Control Delay (s)	-	-	27	8.6	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	5.1	1	-

Intersection	
Int Delay, s/veh	11.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	228	60	5	311	20
Future Vol, veh/h	44	2	212	108	6	14	107	228	60	5	311	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	248	65	5	338	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	875	904	349	873	883	281	360	0	0	313	0	0
Stage 1	359	359	-	513	513	-	-	-	-	-	-	-
Stage 2	516	545	-	360	370	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	270	277	694	271	285	758	1199	-	-	1247	-	-
Stage 1	659	627	-	544	536	-	-	-	-	-	-	-
Stage 2	542	519	-	658	620	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	239	249	694	166	256	758	1199	-	-	1247	-	-
Mov Cap-2 Maneuver	239	249	-	166	256	-	-	-	-	-	-	-
Stage 1	595	624	-	491	484	-	-	-	-	-	-	-
Stage 2	473	469	-	436	618	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	62.9	2.3	0.1
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1199	-	-	239	694	169	758	1247	-	-
HCM Lane V/C Ratio	0.097	-	-	0.209	0.332	0.733	0.02	0.004	-	-
HCM Control Delay (s)	8.3	-	-	24	12.7	69.4	9.8	7.9	-	-
HCM Lane LOS	A	-	-	C	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	1.5	4.6	0.1	0	-	-

HCM 6th TWSC
3: Waiehu Beach Rd & Makaala Dr

04/19/2022

Intersection	
Int Delay, s/veh	18.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	417	99	356	594	13
Future Vol, veh/h	7	417	99	356	594	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	453	108	387	646	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1256	653	660	0	-	0
Stage 1	653	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	189	467	928	-	-	-
Stage 1	518	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	167	467	928	-	-	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	546	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.7	2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	928	-	303	467	-	-
HCM Lane V/C Ratio	0.116	-	0.025	0.971	-	-
HCM Control Delay (s)	9.4	-	17.2	64.5	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	12.2	-	-

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	2	41	12	5	3	110	412	3	2	798	406
Future Volume (veh/h)	127	2	41	12	5	3	110	412	3	2	798	406
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	138	2	45	13	5	3	120	448	3	2	867	441
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	2	183	147	55	29	137	1483	10	761	787	1207
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.06	0.80	0.80	0.02	0.76	0.76
Sat Flow, veh/h	1419	21	1578	1034	474	251	1781	1856	12	1781	1034	1585
Grp Volume(v), veh/h	140	0	45	21	0	0	120	0	451	2	867	441
Grp Sat Flow(s),veh/h/ln	1440	0	1578	1759	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	18.4	0.0	5.7	0.0	0.0	0.0	10.5	0.0	13.9	0.1	166.0	20.1
Cycle Q Clear(g_c), s	20.6	0.0	5.7	2.3	0.0	0.0	10.5	0.0	13.9	0.1	166.0	20.1
Prop In Lane	0.99		1.00	0.62		0.14	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	200	0	183	231	0	0	137	0	1493	761	787	1207
V/C Ratio(X)	0.70	0.00	0.25	0.09	0.00	0.00	0.87	0.00	0.30	0.00	1.10	0.37
Avail Cap(c_a), veh/h	811	0	869	893	0	0	286	0	1594	814	787	1207
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.1	0.0	87.7	86.2	0.0	0.0	89.9	0.0	5.8	5.3	26.0	8.6
Incr Delay (d2), s/veh	11.6	0.0	1.9	0.2	0.0	0.0	15.5	0.0	0.1	0.0	63.6	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	2.5	1.1	0.0	0.0	7.4	0.0	5.6	0.0	52.1	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	105.7	0.0	89.6	86.4	0.0	0.0	105.4	0.0	5.9	5.3	89.6	9.5
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	A
Approach Vol, veh/h		185			21			571			1310	
Approach Delay, s/veh		101.8			86.4			26.8			62.5	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.8	171.0		30.3	8.5	179.3		30.3
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0
Max Q Clear Time (g_c+I1), s	12.5	168.0		4.3	2.1	15.9		22.6
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	3.3		2.6

Intersection Summary	
HCM 6th Ctrl Delay	56.5
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	152	50	167	64	84	397
Future Vol, veh/h	152	50	167	64	84	397
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	54	182	70	91	432

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	831	217	0	0	252	0
Stage 1	217	-	-	-	-	-
Stage 2	614	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	340	823	-	-	1313	-
Stage 1	819	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	317	823	-	-	1313	-
Mov Cap-2 Maneuver	317	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	503	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.5	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	317	823	1313	-
HCM Lane V/C Ratio	-	-	0.521	0.066	0.07	-
HCM Control Delay (s)	-	-	28.1	9.7	7.9	-
HCM Lane LOS	-	-	D	A	A	-
HCM 95th %tile Q(veh)	-	-	2.8	0.2	0.2	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	42	60	0	7	36	311	29	5	798	7
Future Vol, veh/h	9	0	42	60	0	7	36	311	29	5	798	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	46	65	0	8	39	338	32	5	867	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1317	1329	871	1336	1317	354	875	0	0	370	0	0
Stage 1	881	881	-	432	432	-	-	-	-	-	-	-
Stage 2	436	448	-	904	885	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	134	155	350	130	157	690	771	-	-	1189	-	-
Stage 1	341	365	-	602	582	-	-	-	-	-	-	-
Stage 2	599	573	-	331	363	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	125	144	350	107	146	690	771	-	-	1189	-	-
Mov Cap-2 Maneuver	125	144	-	107	146	-	-	-	-	-	-	-
Stage 1	319	362	-	563	545	-	-	-	-	-	-	-
Stage 2	554	536	-	286	360	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	76.7	0.9	0
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	771	-	-	266	117	1189	-	-
HCM Lane V/C Ratio	0.051	-	-	0.208	0.622	0.005	-	-
HCM Control Delay (s)	9.9	0	-	22.1	76.7	8	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	3.1	0	-	-

Intersection	
Int Delay, s/veh	9.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	148	331	153	419	561
Future Vol, veh/h	33	148	331	153	419	561
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	161	360	166	455	610

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1963	443	0	0	526	0
Stage 1	443	-	-	-	-	-
Stage 2	1520	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	69	615	-	-	1041	-
Stage 1	647	-	-	-	-	-
Stage 2	199	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	39	615	-	-	1041	-
Mov Cap-2 Maneuver	39	-	-	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	112	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	60.8	0	4.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	39	615	1041	-
HCM Lane V/C Ratio	-	-	0.92	0.262	0.437	-
HCM Control Delay (s)	-	-	275.5	12.9	11.1	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	3.5	1	2.3	-

Intersection	
Intersection Delay, s/veh	37.3
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	220	50	0	0	146	40	18	208	35	58	0	483
Future Vol, veh/h	220	50	0	0	146	40	18	208	35	58	0	483
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	239	54	0	0	159	43	20	226	38	63	0	525
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	19.8	16.9	19.5	61.6
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	7%	100%	0%	0%	11%
Vol Thru, %	80%	0%	100%	78%	0%
Vol Right, %	13%	0%	0%	22%	89%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	261	220	50	186	541
LT Vol	18	220	0	0	58
Through Vol	208	0	50	146	0
RT Vol	35	0	0	40	483
Lane Flow Rate	284	239	54	202	588
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.57	0.562	0.12	0.438	0.999
Departure Headway (Hd)	7.227	8.465	7.949	7.8	6.113
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	496	426	450	461	594
Service Time	5.294	6.231	5.715	5.877	4.164
HCM Lane V/C Ratio	0.573	0.561	0.12	0.438	0.99
HCM Control Delay	19.5	21.6	11.8	16.9	61.6
HCM Lane LOS	C	C	B	C	F
HCM 95th-tile Q	3.5	3.4	0.4	2.2	14.8

HCM 6th Signalized Intersection Summary
9: High St. & Main St.

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	144	49	274	55	50	32	288	327	21	364	15
Future Volume (veh/h)	13	144	49	274	55	50	32	288	327	21	364	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	157	30	298	60	25	35	313	102	23	396	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	373	250	48	599	569	237	430	611	518	97	561	19
Arrive On Green	0.16	0.16	0.16	0.20	0.45	0.45	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1313	1526	292	1781	1254	522	976	1870	1585	43	1717	59
Grp Volume(v), veh/h	14	0	187	298	0	85	35	313	102	433	0	0
Grp Sat Flow(s),veh/h/ln	1313	0	1818	1781	0	1776	976	1870	1585	1820	0	0
Q Serve(g_s), s	0.4	0.0	4.4	5.4	0.0	1.3	0.0	6.2	2.1	1.4	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	4.4	5.4	0.0	1.3	1.5	6.2	2.1	9.4	0.0	0.0
Prop In Lane	1.00		0.16	1.00		0.29	1.00		1.00	0.05		0.03
Lane Grp Cap(c), veh/h	373	0	298	599	0	806	430	611	518	678	0	0
V/C Ratio(X)	0.04	0.00	0.63	0.50	0.00	0.11	0.08	0.51	0.20	0.64	0.00	0.00
Avail Cap(c_a), veh/h	1052	0	1238	2586	0	3667	2040	3697	3133	3603	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.1	0.0	17.8	10.1	0.0	7.1	10.8	12.4	11.0	13.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.2	1.1	0.0	0.1	0.1	0.7	0.2	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.8	1.8	0.0	0.4	0.2	2.2	0.6	3.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	0.0	19.9	11.2	0.0	7.2	10.9	13.1	11.2	14.6	0.0	0.0
LnGrp LOS	B	A	B	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		201			383			450			433	
Approach Delay, s/veh		19.7			10.3			12.5			14.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	25.7	19.9	13.2	12.5	19.9
Change Period (Y+Rc), s	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	94.0	90.0	60.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	3.3	11.4	7.4	6.4	8.2
Green Ext Time (p_c), s	0.9	3.5	2.0	1.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

HCM 6th TWSC
10: Central Ave. & Mill St

04/19/2022

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	376	221	247	171	16	145
Future Vol, veh/h	376	221	247	171	16	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	409	240	268	186	17	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	649	0	1251	529
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	722	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	937	-	190	550
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	937	-	129	550
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	328	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	415	-	-	937	-
HCM Lane V/C Ratio	0.422	-	-	0.287	-
HCM Control Delay (s)	19.9	-	-	10.4	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2	-	-	1.2	-

HCM 6th Signalized Intersection Summary
11: Main St. & Central Ave. 04/19/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	386	594	252	434	82
Future Volume (veh/h)	64	386	594	252	434	82
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	420	646	102	472	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	360	1187	1067	904	519	462
Arrive On Green	0.03	0.63	0.57	0.57	0.29	0.29
Sat Flow, veh/h	1781	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	70	420	646	102	472	22
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1781	1585
Q Serve(g_s), s	2.1	14.3	30.6	4.0	34.5	1.3
Cycle Q Clear(g_c), s	2.1	14.3	30.6	4.0	34.5	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	360	1187	1067	904	519	462
V/C Ratio(X)	0.19	0.35	0.61	0.11	0.91	0.05
Avail Cap(c_a), veh/h	365	1187	1067	904	858	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	11.6	19.0	13.3	46.1	34.4
Incr Delay (d2), s/veh	0.2	0.8	2.6	0.3	10.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	6.1	13.8	1.5	16.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.7	12.5	21.6	13.6	56.6	34.4
LnGrp LOS	B	B	C	B	E	C
Approach Vol, veh/h		490	748		494	
Approach Delay, s/veh		12.8	20.5		55.6	
Approach LOS		B	C		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	82.0		44.3		90.7
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	5.0	51.0		65.0		60.0
Max Q Clear Time (g_c+I1), s	4.1	32.6		36.5		16.3
Green Ext Time (p_c), s	0.0	7.3		2.9		5.1

Intersection Summary			
HCM 6th Ctrl Delay			28.3
HCM 6th LOS			C

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Base Year 2024 PM

Intersection	
Int Delay, s/veh	8.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	315	256	68	231	120
Future Vol, veh/h	31	315	256	68	231	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	342	278	74	251	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	947	315	0	0	352	0
Stage 1	315	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	290	725	-	-	1207	-
Stage 1	740	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	225	725	-	-	1207	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	740	-	-	-	-	-
Stage 2	411	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	5.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	605	1207	-
HCM Lane V/C Ratio	-	-	0.622	0.208	-
HCM Control Delay (s)	-	-	20.2	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	4.3	0.8	-

Intersection	
Int Delay, s/veh	11.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	360	115	15	267	62
Future Vol, veh/h	15	4	143	72	4	3	205	360	115	15	267	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	391	125	16	290	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1258	1318	324	1258	1289	454	357	0	0	516	0	0
Stage 1	356	356	-	900	900	-	-	-	-	-	-	-
Stage 2	902	962	-	358	389	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	148	157	717	148	164	606	1202	-	-	1050	-	-
Stage 1	661	629	-	333	357	-	-	-	-	-	-	-
Stage 2	332	334	-	660	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	122	126	717	96	132	606	1202	-	-	1050	-	-
Mov Cap-2 Maneuver	122	126	-	96	132	-	-	-	-	-	-	-
Stage 1	538	620	-	271	291	-	-	-	-	-	-	-
Stage 2	265	272	-	505	599	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	128	2.6	0.4
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1202	-	-	123	717	97	606	1050	-	-
HCM Lane V/C Ratio	0.185	-	-	0.168	0.217	0.852	0.005	0.016	-	-
HCM Control Delay (s)	8.7	-	-	40.1	11.4	132.6	11	8.5	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.6	0.8	4.7	0	0	-	-

HCM 6th TWSC
3: Waiehu Beach Rd & Makaala Dr

04/19/2022

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	201	314	688	485	18
Future Vol, veh/h	15	201	314	688	485	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	100	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	218	341	748	527	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1967	537	547	0	-	0
Stage 1	537	-	-	-	-	-
Stage 2	1430	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	69	544	1022	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	46	544	1022	-	-	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	390	-	-	-	-	-
Stage 2	221	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	3.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1022	-	148	544	-	-
HCM Lane V/C Ratio	0.334	-	0.11	0.402	-	-
HCM Control Delay (s)	10.3	-	32.3	16	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	1.5	-	0.4	1.9	-	-

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	387	2	55	4	3	1	104	723	7	0	447	227
Future Volume (veh/h)	387	2	55	4	3	1	104	723	7	0	447	227
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	421	2	60	4	3	1	113	786	8	0	486	247
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	2	588	361	263	82	384	979	10	197	818	693
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.05	0.53	0.53	0.00	0.44	0.44
Sat Flow, veh/h	1408	7	1583	829	707	219	1781	1848	19	1781	1870	1585
Grp Volume(v), veh/h	423	0	60	8	0	0	113	0	794	0	486	247
Grp Sat Flow(s),veh/h/ln	1415	0	1583	1756	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	26.9	0.0	2.5	0.0	0.0	0.0	3.4	0.0	35.3	0.0	20.1	10.5
Cycle Q Clear(g_c), s	27.2	0.0	2.5	0.3	0.0	0.0	3.4	0.0	35.3	0.0	20.1	10.5
Prop In Lane	1.00		1.00	0.50		0.12	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	596	0	588	706	0	0	384	0	989	197	818	693
V/C Ratio(X)	0.71	0.00	0.10	0.01	0.00	0.00	0.29	0.00	0.80	0.00	0.59	0.36
Avail Cap(c_a), veh/h	1741	0	1871	1985	0	0	833	0	1765	388	1400	1186
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	20.8	20.1	0.0	0.0	15.7	0.0	19.5	0.0	21.7	19.0
Incr Delay (d2), s/veh	4.3	0.0	0.2	0.0	0.0	0.0	0.4	0.0	1.6	0.0	3.2	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	0.0	1.0	0.1	0.0	0.0	1.4	0.0	14.8	0.0	9.3	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	21.0	20.1	0.0	0.0	16.2	0.0	21.1	0.0	24.9	20.5
LnGrp LOS	C	A	C	C	A	A	B	A	C	A	C	C
Approach Vol, veh/h		483			8			907			733	
Approach Delay, s/veh		31.4			20.1			20.5			23.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.4	49.4		42.7	0.0	58.8		42.7
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0
Max Q Clear Time (g_c+I1), s	5.4	22.1		2.3	0.0	37.3		29.2
Green Ext Time (p_c), s	0.3	22.3		0.0	0.0	7.4		8.5

Intersection Summary	
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	100	7	271	199	13	176
Future Vol, veh/h	100	7	271	199	13	176
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	8	295	216	14	191

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	622	403	0	0	511	0
Stage 1	403	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	450	647	-	-	1054	-
Stage 1	675	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	444	647	-	-	1054	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	806	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.4	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	444	647	1054	-
HCM Lane V/C Ratio	-	-	0.245	0.012	0.013	-
HCM Control Delay (s)	-	-	15.7	10.6	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1	0	0	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	49	48	1	2	48	616	81	5	313	5
Future Vol, veh/h	5	1	49	48	1	2	48	616	81	5	313	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	53	52	1	2	52	670	88	5	340	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1173	1215	343	1198	1173	714	345	0	0	758	0	0
Stage 1	353	353	-	818	818	-	-	-	-	-	-	-
Stage 2	820	862	-	380	355	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	169	181	700	162	192	431	1214	-	-	853	-	-
Stage 1	664	631	-	370	390	-	-	-	-	-	-	-
Stage 2	369	372	-	642	630	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	157	166	700	140	176	431	1214	-	-	853	-	-
Mov Cap-2 Maneuver	157	166	-	140	176	-	-	-	-	-	-	-
Stage 1	614	627	-	342	361	-	-	-	-	-	-	-
Stage 2	339	344	-	588	626	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13	44.9	0.5	0.1
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	510	144	853	-	-
HCM Lane V/C Ratio	0.043	-	-	0.117	0.385	0.006	-	-
HCM Control Delay (s)	8.1	0	-	13	44.9	9.2	0	-
HCM Lane LOS	A	A	-	B	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	1.6	0	-	-

Intersection	
Int Delay, s/veh	13.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	321	630	169	230	321
Future Vol, veh/h	36	321	630	169	230	321
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	349	685	184	250	349

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1626	777	0	0	869	0
Stage 1	777	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	112	397	-	-	775	-
Stage 1	453	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	76	397	-	-	775	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	284	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	56.8	0	4.9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	76	397	775	-
HCM Lane V/C Ratio	-	-	0.515	0.879	0.323	-
HCM Control Delay (s)	-	-	94.5	52.6	11.8	-
HCM Lane LOS	-	-	F	F	B	-
HCM 95th %tile Q(veh)	-	-	2.2	8.8	1.4	-

Intersection	
Intersection Delay, s/veh	45.3
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	357	144	0	0	116	62	29	298	60	49	0	314
Future Vol, veh/h	357	144	0	0	116	62	29	298	60	49	0	314
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	388	157	0	0	126	67	32	324	65	53	0	341
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	50.9	20.2	54.6	39.8
HCM LOS	F	C	F	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	7%	100%	0%	0%	13%
Vol Thru, %	77%	0%	100%	65%	0%
Vol Right, %	16%	0%	0%	35%	87%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	387	357	144	178	363
LT Vol	29	357	0	0	49
Through Vol	298	0	144	116	0
RT Vol	60	0	0	62	314
Lane Flow Rate	421	388	157	193	395
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.927	0.958	0.364	0.483	0.841
Departure Headway (Hd)	7.937	8.888	8.37	8.985	7.672
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	454	407	429	400	470
Service Time	5.999	6.647	6.128	7.067	5.735
HCM Lane V/C Ratio	0.927	0.953	0.366	0.482	0.84
HCM Control Delay	54.6	65	15.9	20.2	39.8
HCM Lane LOS	F	F	C	C	E
HCM 95th-tile Q	10.6	11	1.6	2.5	8.3

HCM 6th Signalized Intersection Summary
9: High St. & Main St.

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	127	63	386	129	26	49	377	285	55	314	32
Future Volume (veh/h)	20	127	63	386	129	26	49	377	285	55	314	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	138	45	420	140	16	53	410	151	60	341	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	308	203	66	609	751	86	368	699	592	113	461	41
Arrive On Green	0.15	0.15	0.15	0.24	0.46	0.46	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1231	1351	440	1781	1648	188	1009	1870	1585	116	1234	111
Grp Volume(v), veh/h	22	0	183	420	0	156	53	410	151	434	0	0
Grp Sat Flow(s),veh/h/ln	1231	0	1791	1781	0	1836	1009	1870	1585	1461	0	0
Q Serve(g_s), s	0.9	0.0	5.7	10.4	0.0	3.0	0.0	10.3	3.9	5.9	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	5.7	10.4	0.0	3.0	4.1	10.3	3.9	16.2	0.0	0.0
Prop In Lane	1.00		0.25	1.00		0.10	1.00		1.00	0.14		0.08
Lane Grp Cap(c), veh/h	308	0	269	609	0	837	368	699	592	616	0	0
V/C Ratio(X)	0.07	0.00	0.68	0.69	0.00	0.19	0.14	0.59	0.26	0.70	0.00	0.00
Avail Cap(c_a), veh/h	775	0	949	2015	0	2951	1543	2878	2439	2462	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.5	0.0	23.5	13.6	0.0	9.5	12.8	14.7	12.7	16.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	3.0	1.4	0.0	0.1	0.2	0.8	0.2	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	2.5	3.9	0.0	1.1	0.5	4.1	1.3	5.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	26.5	15.0	0.0	9.6	12.9	15.5	12.9	17.6	0.0	0.0
LnGrp LOS	C	A	C	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		205			576			614			434	
Approach Delay, s/veh		26.0			13.5			14.6			17.6	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	31.6	26.8	17.8	13.8	26.8
Change Period (Y+Rc), s	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	94.0	90.0	60.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	5.0	18.2	12.4	7.7	12.3
Green Ext Time (p_c), s	1.1	3.7	1.4	1.1	3.9

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

HCM 6th TWSC
10: Central Ave. & Mill St

04/19/2022

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	302	104	246	310	51	143
Future Vol, veh/h	302	104	246	310	51	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	328	113	267	337	55	155

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	441	0	1256	385
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	871	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1119	-	189	663
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	410	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1119	-	133	663
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	289	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	34.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	1119	-
HCM Lane V/C Ratio	0.651	-	-	0.239	-
HCM Control Delay (s)	34.6	-	-	9.2	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	4.3	-	-	0.9	-

HCM 6th Signalized Intersection Summary
11: Main St. & Central Ave. 04/19/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	578	604	310	470	130
Future Volume (veh/h)	89	578	604	310	470	130
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	97	628	657	136	511	77
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	344	1130	999	846	564	502
Arrive On Green	0.04	0.60	0.53	0.53	0.32	0.32
Sat Flow, veh/h	1781	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	97	628	657	136	511	77
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1781	1585
Q Serve(g_s), s	3.0	25.2	31.8	5.5	34.6	4.4
Cycle Q Clear(g_c), s	3.0	25.2	31.8	5.5	34.6	4.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	344	1130	999	846	564	502
V/C Ratio(X)	0.28	0.56	0.66	0.16	0.91	0.15
Avail Cap(c_a), veh/h	346	1130	999	846	834	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	14.9	21.1	15.0	41.3	30.9
Incr Delay (d2), s/veh	0.3	2.0	3.4	0.4	11.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	11.2	14.8	2.1	16.8	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.8	16.8	24.5	15.4	52.5	31.1
LnGrp LOS	B	B	C	B	D	C
Approach Vol, veh/h		725	793		588	
Approach Delay, s/veh		16.8	22.9		49.7	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	72.3		44.9		81.1
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	5.0	48.0		59.0		57.0
Max Q Clear Time (g_c+I1), s	5.0	33.8		36.6		27.2
Green Ext Time (p_c), s	0.0	6.7		3.3		8.3

Intersection Summary			
HCM 6th Ctrl Delay			28.3
HCM 6th LOS			C

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year 2024 AM

HCM 6th TWSC
1: Kahekili Hwy/Market St & Waiehu Beach Rd

04/19/2022

Intersection	
Int Delay, s/veh	10.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	269	193	41	316	378
Future Vol, veh/h	41	269	193	41	316	378
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	292	210	45	343	411

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1330	233	0	0	255	0
Stage 1	233	-	-	-	-	-
Stage 2	1097	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	171	806	-	-	1310	-
Stage 1	806	-	-	-	-	-
Stage 2	320	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	113	806	-	-	1310	-
Mov Cap-2 Maneuver	113	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	212	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.2	0	4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	445	1310	-
HCM Lane V/C Ratio	-	-	0.757	0.262	-
HCM Control Delay (s)	-	-	34.2	8.7	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	6.4	1.1	-

HCM 6th TWSC
2: Waiehu Beach Rd & Wailupe Dr./Lower Waiehu Beach Rd

04/19/2022

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	2	212	108	6	14	107	233	60	5	333	20
Future Vol, veh/h	44	2	212	108	6	14	107	233	60	5	333	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	2	230	117	7	15	116	253	65	5	362	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	904	933	373	902	912	286	384	0	0	318	0	0
Stage 1	383	383	-	518	518	-	-	-	-	-	-	-
Stage 2	521	550	-	384	394	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	258	266	673	259	274	753	1174	-	-	1242	-	-
Stage 1	640	612	-	541	533	-	-	-	-	-	-	-
Stage 2	539	516	-	639	605	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	228	239	673	156	246	753	1174	-	-	1242	-	-
Mov Cap-2 Maneuver	228	239	-	156	246	-	-	-	-	-	-	-
Stage 1	577	610	-	487	480	-	-	-	-	-	-	-
Stage 2	469	465	-	417	603	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	72.3	2.2	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	228	673	159	753	1242	-	-
HCM Lane V/C Ratio	0.099	-	-	0.219	0.342	0.779	0.02	0.004	-	-
HCM Control Delay (s)	8.4	-	-	25.2	13.1	80	9.9	7.9	-	-
HCM Lane LOS	A	-	-	D	B	F	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	1.5	5	0.1	0	-	-

HCM 6th TWSC
3: Waiehu Beach Rd & Makaala Dr

04/19/2022

Intersection	
Int Delay, s/veh	22.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	427	104	361	616	13
Future Vol, veh/h	7	427	104	361	616	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	-	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	464	113	392	670	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1295	677	684	0	-	0
Stage 1	677	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	179	~ 453	909	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	157	~ 453	909	-	-	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	442	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	78.3	2.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	909	-	292	453	-	-
HCM Lane V/C Ratio	0.124	-	0.026	1.025	-	-
HCM Control Delay (s)	9.5	-	17.7	79.3	-	-
HCM Lane LOS	A	-	C	F	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	13.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	2	41	12	5	3	110	419	3	2	819	417
Future Volume (veh/h)	129	2	41	12	5	3	110	419	3	2	819	417
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1034	1870
Adj Flow Rate, veh/h	140	2	45	13	5	3	120	455	3	2	890	453
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	2	185	148	56	30	137	1481	10	753	786	1205
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.06	0.80	0.80	0.02	0.76	0.76
Sat Flow, veh/h	1419	20	1578	1035	473	251	1781	1856	12	1781	1034	1585
Grp Volume(v), veh/h	142	0	45	21	0	0	120	0	458	2	890	453
Grp Sat Flow(s),veh/h/ln	1439	0	1578	1759	0	0	1781	0	1868	1781	1034	1585
Q Serve(g_s), s	18.7	0.0	5.7	0.0	0.0	0.0	10.5	0.0	14.3	0.1	166.0	21.0
Cycle Q Clear(g_c), s	21.0	0.0	5.7	2.3	0.0	0.0	10.5	0.0	14.3	0.1	166.0	21.0
Prop In Lane	0.99		1.00	0.62		0.14	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	202	0	185	233	0	0	137	0	1491	753	786	1205
V/C Ratio(X)	0.70	0.00	0.24	0.09	0.00	0.00	0.87	0.00	0.31	0.00	1.13	0.38
Avail Cap(c_a), veh/h	810	0	867	891	0	0	286	0	1591	806	786	1205
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	94.1	0.0	87.6	86.1	0.0	0.0	90.0	0.0	5.9	5.3	26.2	8.8
Incr Delay (d2), s/veh	11.6	0.0	1.8	0.2	0.0	0.0	15.5	0.0	0.1	0.0	75.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	2.5	1.1	0.0	0.0	7.4	0.0	5.7	0.0	54.7	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	105.7	0.0	89.4	86.2	0.0	0.0	105.5	0.0	6.0	5.3	101.6	9.7
LnGrp LOS	F	A	F	F	A	A	F	A	A	A	F	A
Approach Vol, veh/h		187			21			578			1345	
Approach Delay, s/veh		101.8			86.2			26.7			70.5	
Approach LOS		F			F			C			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.8	171.0		30.6	8.5	179.3		30.6
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	166.0		120.0	11.0	186.0		120.0
Max Q Clear Time (g_c+I1), s	12.5	168.0		4.3	2.1	16.3		23.0
Green Ext Time (p_c), s	0.3	0.0		0.1	0.0	3.3		2.7

Intersection Summary	
HCM 6th Ctrl Delay	61.5
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	152	55	170	64	94	405
Future Vol, veh/h	152	55	170	64	94	405
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	165	60	185	70	102	440

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	864	220	0	0	255	0
Stage 1	220	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	325	820	-	-	1310	-
Stage 1	817	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	300	820	-	-	1310	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	482	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.2	0	1.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	300	820	1310	-
HCM Lane V/C Ratio	-	-	0.551	0.073	0.078	-
HCM Control Delay (s)	-	-	30.8	9.7	8	-
HCM Lane LOS	-	-	D	A	A	-
HCM 95th %tile Q(veh)	-	-	3.1	0.2	0.3	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	42	60	0	7	36	314	29	5	806	7
Future Vol, veh/h	9	0	42	60	0	7	36	314	29	5	806	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	46	65	0	8	39	341	32	5	876	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1329	1341	880	1348	1329	357	884	0	0	373	0	0
Stage 1	890	890	-	435	435	-	-	-	-	-	-	-
Stage 2	439	451	-	913	894	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	132	152	346	128	155	687	765	-	-	1185	-	-
Stage 1	337	361	-	600	580	-	-	-	-	-	-	-
Stage 2	597	571	-	328	360	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	141	346	105	144	687	765	-	-	1185	-	-
Mov Cap-2 Maneuver	123	141	-	105	144	-	-	-	-	-	-	-
Stage 1	315	358	-	561	542	-	-	-	-	-	-	-
Stage 2	552	534	-	282	357	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	79.2	0.9	0
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	765	-	-	262	115	1185	-	-
HCM Lane V/C Ratio	0.051	-	-	0.212	0.633	0.005	-	-
HCM Control Delay (s)	10	0	-	22.4	79.2	8.1	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	3.2	0	-	-

Intersection	
Int Delay, s/veh	9.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	148	334	153	422	564
Future Vol, veh/h	33	148	334	153	422	564
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	161	363	166	459	613

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1977	446	0	0	529	0
Stage 1	446	-	-	-	-	-
Stage 2	1531	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	68	612	-	-	1038	-
Stage 1	645	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	38	612	-	-	1038	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	110	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	63.2	0	4.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	38	612	1038	-
HCM Lane V/C Ratio	-	-	0.944	0.263	0.442	-
HCM Control Delay (s)	-	-	288.1	13	11.2	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	3.5	1.1	2.3	-

Intersection	
Intersection Delay, s/veh	37.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	221	50	0	0	146	40	18	209	35	58	0	485
Future Vol, veh/h	221	50	0	0	146	40	18	209	35	58	0	485
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	240	54	0	0	159	43	20	227	38	63	0	527
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	19.7	16.8	19.6	63
HCM LOS	C	C	C	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	7%	100%	0%	0%	11%
Vol Thru, %	80%	0%	100%	78%	0%
Vol Right, %	13%	0%	0%	22%	89%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	262	221	50	186	543
LT Vol	18	221	0	0	58
Through Vol	209	0	50	146	0
RT Vol	35	0	0	40	485
Lane Flow Rate	285	240	54	202	590
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.573	0.559	0.119	0.434	1.005
Departure Headway (Hd)	7.248	8.541	8.024	7.89	6.128
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	498	425	449	459	596
Service Time	5.285	6.241	5.724	5.89	4.153
HCM Lane V/C Ratio	0.572	0.565	0.12	0.44	0.99
HCM Control Delay	19.6	21.5	11.8	16.8	63
HCM Lane LOS	C	C	B	C	F
HCM 95th-tile Q	3.5	3.3	0.4	2.2	15

HCM 6th Signalized Intersection Summary
9: High St. & Main St.

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	144	49	274	55	50	32	289	327	21	365	15
Future Volume (veh/h)	13	144	49	274	55	50	32	289	327	21	365	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	157	30	298	60	24	35	314	103	23	397	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	372	250	48	598	576	230	430	617	523	97	566	19
Arrive On Green	0.16	0.16	0.16	0.20	0.45	0.45	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1314	1526	292	1781	1271	508	975	1870	1585	43	1718	59
Grp Volume(v), veh/h	14	0	187	298	0	84	35	314	103	434	0	0
Grp Sat Flow(s),veh/h/ln	1314	0	1818	1781	0	1779	975	1870	1585	1820	0	0
Q Serve(g_s), s	0.4	0.0	4.4	5.5	0.0	1.2	0.0	6.2	2.1	1.3	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	4.4	5.5	0.0	1.2	1.5	6.2	2.1	9.5	0.0	0.0
Prop In Lane	1.00		0.16	1.00		0.29	1.00		1.00	0.05		0.03
Lane Grp Cap(c), veh/h	372	0	298	598	0	806	430	617	523	682	0	0
V/C Ratio(X)	0.04	0.00	0.63	0.50	0.00	0.10	0.08	0.51	0.20	0.64	0.00	0.00
Avail Cap(c_a), veh/h	1041	0	1223	2558	0	3630	2013	3655	3097	3562	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.3	0.0	17.9	10.2	0.0	7.2	10.9	12.4	11.1	13.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.2	1.1	0.0	0.1	0.1	0.7	0.2	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.9	1.9	0.0	0.4	0.2	2.3	0.7	3.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	0.0	20.1	11.3	0.0	7.3	10.9	13.1	11.3	14.6	0.0	0.0
LnGrp LOS	B	A	C	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		201			382			452			434	
Approach Delay, s/veh		19.8			10.4			12.5			14.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	25.9	20.2	13.3	12.6	20.2
Change Period (Y+Rc), s	5.0	5.0	4.0	5.0	5.0
Max Green Setting (Gmax), s	94.0	90.0	60.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	3.2	11.5	7.5	6.4	8.2
Green Ext Time (p_c), s	1.0	3.7	2.1	1.1	3.0

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

HCM 6th TWSC
10: Central Ave. & Mill St

04/19/2022

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	378	222	247	171	16	145
Future Vol, veh/h	378	222	247	171	16	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	241	268	186	17	158

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	652	0	1254	532
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	722	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	935	-	190	547
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	481	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	935	-	129	547
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	327	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	414	-	-	935	-
HCM Lane V/C Ratio	0.423	-	-	0.287	-
HCM Control Delay (s)	19.9	-	-	10.4	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	2.1	-	-	1.2	-

HCM 6th Signalized Intersection Summary
11: Main St. & Central Ave.

04/19/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	386	594	252	434	82
Future Volume (veh/h)	64	386	594	252	434	82
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	420	646	102	472	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	360	1187	1067	904	519	462
Arrive On Green	0.03	0.63	0.57	0.57	0.29	0.29
Sat Flow, veh/h	1781	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	70	420	646	102	472	22
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1781	1585
Q Serve(g_s), s	2.1	14.3	30.6	4.0	34.5	1.3
Cycle Q Clear(g_c), s	2.1	14.3	30.6	4.0	34.5	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	360	1187	1067	904	519	462
V/C Ratio(X)	0.19	0.35	0.61	0.11	0.91	0.05
Avail Cap(c_a), veh/h	365	1187	1067	904	858	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	11.6	19.0	13.3	46.1	34.4
Incr Delay (d2), s/veh	0.2	0.8	2.6	0.3	10.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	6.3	14.0	1.5	16.9	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.7	12.5	21.6	13.6	56.6	34.4
LnGrp LOS	B	B	C	B	E	C
Approach Vol, veh/h		490	748		494	
Approach Delay, s/veh		12.8	20.5		55.6	
Approach LOS		B	C		E	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	82.0		44.3		90.7
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	5.0	51.0		65.0		60.0
Max Q Clear Time (g_c+I1), s	4.1	32.6		36.5		16.3
Green Ext Time (p_c), s	0.0	7.5		2.9		5.4

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

HCM 6th TWSC
12: Kahekili Hwy & Project Dwy 1

04/19/2022

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	236	2	0	444
Future Vol, veh/h	0	9	236	2	0	444
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	257	2	0	483

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	257	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	782	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	782	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	782	-
HCM Lane V/C Ratio	-	-	0.013	-
HCM Control Delay (s)	-	-	9.7	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	9	228	3	11	432
Future Vol, veh/h	18	9	228	3	11	432
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	10	248	3	12	470

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	744	250	0	0	251	0
Stage 1	250	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	382	789	-	-	1314	-
Stage 1	792	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	379	789	-	-	1314	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	458	1314	-
HCM Lane V/C Ratio	-	-	0.064	0.009	-
HCM Control Delay (s)	-	-	13.4	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	222	3	0	450
Future Vol, veh/h	0	9	222	3	0	450
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	241	3	0	489

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	241	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	798	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	798	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	798	-
HCM Lane V/C Ratio	-	-	0.012	-
HCM Control Delay (s)	-	-	9.6	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

Future Year 2024 PM

Intersection	
Int Delay, s/veh	10.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	315	259	84	231	125
Future Vol, veh/h	47	315	259	84	231	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	342	282	91	251	136

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	966	328	0	0	373	0
Stage 1	328	-	-	-	-	-
Stage 2	638	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	282	713	-	-	1185	-
Stage 1	730	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	217	713	-	-	1185	-
Mov Cap-2 Maneuver	217	-	-	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	406	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.3	0	5.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	550	1185	-
HCM Lane V/C Ratio	-	-	0.715	0.212	-
HCM Control Delay (s)	-	-	26.3	8.9	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	5.8	0.8	-

Intersection	
Int Delay, s/veh	12.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	4	143	72	4	3	205	376	115	15	284	62
Future Vol, veh/h	15	4	143	72	4	3	205	376	115	15	284	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	0	-	-	100	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	4	155	78	4	3	223	409	125	16	309	67

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1295	1355	343	1295	1326	472	376	0	0	534	0	0
Stage 1	375	375	-	918	918	-	-	-	-	-	-	-
Stage 2	920	980	-	377	408	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	139	149	700	139	156	592	1182	-	-	1034	-	-
Stage 1	646	617	-	326	350	-	-	-	-	-	-	-
Stage 2	325	328	-	644	597	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	119	700	89	125	592	1182	-	-	1034	-	-
Mov Cap-2 Maneuver	114	119	-	89	125	-	-	-	-	-	-	-
Stage 1	524	608	-	264	284	-	-	-	-	-	-	-
Stage 2	258	266	-	490	588	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	150.9	2.6	0.4
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1182	-	-	115	700	90	592	1034	-	-
HCM Lane V/C Ratio	0.189	-	-	0.18	0.222	0.918	0.006	0.016	-	-
HCM Control Delay (s)	8.8	-	-	43	11.6	156.4	11.1	8.5	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	0.6	0.8	5.1	0	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	208	330	704	501	18
Future Vol, veh/h	15	208	330	704	501	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	-	160	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	226	359	765	545	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2038	555	565	0	-	0
Stage 1	555	-	-	-	-	-
Stage 2	1483	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	62	531	1007	-	-	-
Stage 1	575	-	-	-	-	-
Stage 2	208	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	40	531	1007	-	-	-
Mov Cap-2 Maneuver	138	-	-	-	-	-
Stage 1	370	-	-	-	-	-
Stage 2	208	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.9	3.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1007	-	138	531	-	-
HCM Lane V/C Ratio	0.356	-	0.118	0.426	-	-
HCM Control Delay (s)	10.5	-	34.6	16.7	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	1.6	-	0.4	2.1	-	-

HCM 6th Signalized Intersection Summary
4: Waiehu Beach Rd & Eha St

04/19/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	398	2	55	4	3	1	104	744	7	0	462	235
Future Volume (veh/h)	398	2	55	4	3	1	104	744	7	0	462	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	433	2	60	4	3	1	113	809	8	0	502	255
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	599	2	598	365	266	83	370	978	10	178	821	696
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.05	0.53	0.53	0.00	0.44	0.44
Sat Flow, veh/h	1408	7	1583	834	705	220	1781	1849	18	1781	1870	1585
Grp Volume(v), veh/h	435	0	60	8	0	0	113	0	817	0	502	255
Grp Sat Flow(s),veh/h/ln	1415	0	1583	1759	0	0	1781	0	1867	1781	1870	1585
Q Serve(g_s), s	29.2	0.0	2.6	0.0	0.0	0.0	3.5	0.0	39.2	0.0	22.0	11.5
Cycle Q Clear(g_c), s	29.5	0.0	2.6	0.3	0.0	0.0	3.5	0.0	39.2	0.0	22.0	11.5
Prop In Lane	1.00		1.00	0.50		0.12	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	601	0	598	714	0	0	370	0	988	178	821	696
V/C Ratio(X)	0.72	0.00	0.10	0.01	0.00	0.00	0.31	0.00	0.83	0.00	0.61	0.37
Avail Cap(c_a), veh/h	1653	0	1777	1891	0	0	793	0	1676	359	1329	1127
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	21.5	20.8	0.0	0.0	16.8	0.0	21.1	0.0	23.0	20.1
Incr Delay (d2), s/veh	4.5	0.0	0.2	0.0	0.0	0.0	0.5	0.0	1.8	0.0	3.4	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	0.0	1.0	0.1	0.0	0.0	1.4	0.0	16.6	0.0	10.2	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	0.0	21.7	20.8	0.0	0.0	17.2	0.0	22.9	0.0	26.4	21.5
LnGrp LOS	C	A	C	C	A	A	B	A	C	A	C	C
Approach Vol, veh/h		495			8			930			757	
Approach Delay, s/veh		32.8			20.8			22.2			24.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.6	51.9		45.4	0.0	61.6		45.4
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	31.0	76.0		120.0	11.0	96.0		120.0
Max Q Clear Time (g_c+I1), s	5.5	24.0		2.3	0.0	41.2		31.5
Green Ext Time (p_c), s	0.3	22.9		0.0	0.0	7.8		8.8

Intersection Summary		
HCM 6th Ctrl Delay		25.5
HCM 6th LOS		C

HCM 6th TWSC
5: Kahekili Hwy & Makaala Dr

04/19/2022

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	100	23	282	199	20	181
Future Vol, veh/h	100	23	282	199	20	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	80	0	-	-	90	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	25	307	216	22	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	656	415	0	0	523	0
Stage 1	415	-	-	-	-	-
Stage 2	241	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	430	637	-	-	1043	-
Stage 1	666	-	-	-	-	-
Stage 2	799	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	421	637	-	-	1043	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	782	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.5	0	0.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	421	637	1043	-
HCM Lane V/C Ratio	-	-	0.258	0.039	0.021	-
HCM Control Delay (s)	-	-	16.5	10.9	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	1	0.1	0.1	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	49	48	1	2	48	626	81	5	318	5
Future Vol, veh/h	5	1	49	48	1	2	48	626	81	5	318	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	1	53	52	1	2	52	680	88	5	346	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1189	1231	349	1214	1189	724	351	0	0	768	0	0
Stage 1	359	359	-	828	828	-	-	-	-	-	-	-
Stage 2	830	872	-	386	361	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	165	177	694	158	188	426	1208	-	-	846	-	-
Stage 1	659	627	-	365	386	-	-	-	-	-	-	-
Stage 2	364	368	-	637	626	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	153	162	694	136	173	426	1208	-	-	846	-	-
Mov Cap-2 Maneuver	153	162	-	136	173	-	-	-	-	-	-	-
Stage 1	609	623	-	337	357	-	-	-	-	-	-	-
Stage 2	334	340	-	583	622	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	46.6	0.5	0.1
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1208	-	-	502	140	846	-	-
HCM Lane V/C Ratio	0.043	-	-	0.119	0.396	0.006	-	-
HCM Control Delay (s)	8.1	0	-	13.1	46.6	9.3	0	-
HCM Lane LOS	A	A	-	B	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	1.7	0	-	-

Intersection	
Int Delay, s/veh	14

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	321	640	169	232	323
Future Vol, veh/h	36	321	640	169	232	323
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	349	696	184	252	351

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1643	788	0	0	880	0
Stage 1	788	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	110	391	-	-	768	-
Stage 1	448	-	-	-	-	-
Stage 2	417	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	74	391	-	-	768	-
Mov Cap-2 Maneuver	74	-	-	-	-	-
Stage 1	448	-	-	-	-	-
Stage 2	280	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	59.8	0	5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	74	391	768	-
HCM Lane V/C Ratio	-	-	0.529	0.892	0.328	-
HCM Control Delay (s)	-	-	98.7	55.4	12	-
HCM Lane LOS	-	-	F	F	B	-
HCM 95th %tile Q(veh)	-	-	2.2	9.1	1.4	-

Intersection	
Intersection Delay, s/veh	47.4
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	361	144	0	0	116	62	29	301	60	49	0	315
Future Vol, veh/h	361	144	0	0	116	62	29	301	60	49	0	315
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	392	157	0	0	126	67	32	327	65	53	0	342
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	53.8	20.5	57.4	41.1
HCM LOS	F	C	F	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	7%	100%	0%	0%	13%
Vol Thru, %	77%	0%	100%	65%	0%
Vol Right, %	15%	0%	0%	35%	87%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	390	361	144	178	364
LT Vol	29	361	0	0	49
Through Vol	301	0	144	116	0
RT Vol	60	0	0	62	315
Lane Flow Rate	424	392	157	193	396
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.94	0.974	0.366	0.487	0.849
Departure Headway (Hd)	7.986	8.932	8.414	9.06	7.729
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	454	408	427	397	467
Service Time	6.049	6.692	6.174	7.146	5.796
HCM Lane V/C Ratio	0.934	0.961	0.368	0.486	0.848
HCM Control Delay	57.4	68.9	16	20.5	41.1
HCM Lane LOS	F	F	C	C	E
HCM 95th-tile Q	11	11.5	1.7	2.6	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	127	63	386	129	26	49	379	285	55	314	32
Future Volume (veh/h)	20	127	63	386	129	26	49	379	285	55	314	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	138	33	420	140	14	53	412	131	60	341	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	204	49	605	772	77	357	695	589	111	456	40
Arrive On Green	0.14	0.14	0.14	0.24	0.46	0.46	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1233	1459	349	1781	1673	167	1009	1870	1585	115	1226	107
Grp Volume(v), veh/h	22	0	171	420	0	154	53	412	131	433	0	0
Grp Sat Flow(s),veh/h/ln	1233	0	1808	1781	0	1840	1009	1870	1585	1448	0	0
Q Serve(g_s), s	0.9	0.0	5.4	10.9	0.0	2.9	0.0	10.6	3.4	6.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	5.4	10.9	0.0	2.9	4.3	10.6	3.4	16.8	0.0	0.0
Prop In Lane	1.00		0.19	1.00		0.09	1.00		1.00	0.14		0.07
Lane Grp Cap(c), veh/h	293	0	253	605	0	849	357	695	589	607	0	0
V/C Ratio(X)	0.08	0.00	0.68	0.69	0.00	0.18	0.15	0.59	0.22	0.71	0.00	0.00
Avail Cap(c_a), veh/h	758	0	935	1935	0	2887	1498	2810	2381	2406	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.6	0.0	24.5	14.3	0.0	9.5	13.2	15.2	12.9	16.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	3.1	1.4	0.0	0.1	0.2	0.8	0.2	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	2.4	4.0	0.0	1.0	0.5	4.2	1.1	5.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	0.0	27.6	15.7	0.0	9.6	13.4	16.0	13.1	18.2	0.0	0.0
LnGrp LOS	C	A	C	B	A	A	B	B	B	B	A	A
Approach Vol, veh/h		193			574			596			433	
Approach Delay, s/veh		27.0			14.1			15.1			18.2	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	32.6	27.3	19.2	13.4	27.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	94.0	90.0	59.0	31.0	90.0
Max Q Clear Time (g_c+I1), s	4.9	18.8	12.9	7.4	12.6
Green Ext Time (p_c), s	1.0	3.4	1.4	1.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

HCM 6th TWSC
10: Central Ave. & Mill St

04/19/2022

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	303	104	246	310	51	143
Future Vol, veh/h	303	104	246	310	51	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	329	113	267	337	55	155

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	442	0	1257	386
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	871	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1118	-	189	662
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	410	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1118	-	133	662
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	289	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	34.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	1118	-
HCM Lane V/C Ratio	0.651	-	-	0.239	-
HCM Control Delay (s)	34.6	-	-	9.2	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	4.3	-	-	0.9	-

HCM 6th Signalized Intersection Summary
11: Main St. & Central Ave.

04/19/2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	578	605	310	470	130
Future Volume (veh/h)	89	578	605	310	470	130
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	97	628	658	132	511	77
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	343	1130	999	846	564	502
Arrive On Green	0.04	0.60	0.53	0.53	0.32	0.32
Sat Flow, veh/h	1781	1870	1870	1585	1781	1585
Grp Volume(v), veh/h	97	628	658	132	511	77
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1585	1781	1585
Q Serve(g_s), s	3.0	25.2	31.9	5.3	34.6	4.4
Cycle Q Clear(g_c), s	3.0	25.2	31.9	5.3	34.6	4.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	343	1130	999	846	564	502
V/C Ratio(X)	0.28	0.56	0.66	0.16	0.91	0.15
Avail Cap(c_a), veh/h	346	1130	999	846	834	742
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	14.9	21.1	14.9	41.3	30.9
Incr Delay (d2), s/veh	0.3	2.0	3.4	0.4	11.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	11.0	14.6	2.0	16.8	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.8	16.8	24.5	15.3	52.5	31.1
LnGrp LOS	B	B	C	B	D	C
Approach Vol, veh/h		725	790		588	
Approach Delay, s/veh		16.8	23.0		49.7	
Approach LOS		B	C		D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.8	72.3		44.9		81.1
Change Period (Y+Rc), s	4.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	5.0	48.0		59.0		57.0
Max Q Clear Time (g_c+I1), s	5.0	33.9		36.6		27.2
Green Ext Time (p_c), s	0.0	6.5		3.3		8.0

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	287	5	0	191
Future Vol, veh/h	0	7	287	5	0	191
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	312	5	0	208

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	312	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	728	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	728	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	728	-
HCM Lane V/C Ratio	-	-	0.01	-
HCM Control Delay (s)	-	-	10	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	7	286	11	20	170
Future Vol, veh/h	12	7	286	11	20	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	8	311	12	22	185

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	546	317	0	0	323	0
Stage 1	317	-	-	-	-	-
Stage 2	229	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	499	724	-	-	1237	-
Stage 1	738	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	490	724	-	-	1237	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	794	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	556	1237	-
HCM Lane V/C Ratio	-	-	0.037	0.018	-
HCM Control Delay (s)	-	-	11.7	8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	290	11	0	183
Future Vol, veh/h	0	7	290	11	0	183
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	315	12	0	199

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	315	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	725	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	725	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	725	-
HCM Lane V/C Ratio	-	-	0.01	-
HCM Control Delay (s)	-	-	10	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0	-

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX D

SIGNAL WARRANT ANALYSIS

Existing Kahekili Hwy/Waiehu Beach Rd
(WBLT Minor)

8-hr Warrant (v0.9)

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant	Minor 1 (EB)			Minor 1 (WB)		
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold	500	750	600	500	750	600
	1	1	1	Minor Threshold	150	75	120	150	75	120
		RT Reduction: 0%	RT Reduction: 100%							

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	Combination A	Combination B	Combination A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	9	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	19	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	35	0	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	4	0	5	0	0	0	192	53	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	2	0	8	0	0	0	258	60	0	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	9	0	7	0	0	0	344	72	0	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	3	0	15	0	0	0	467	95	0	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	1	0	15	0	0	0	613	153	0	1	-	1	-	-	-	1	0	1
6:15	0	12	8	66	34	0	7	0	15	0	0	0	789	223	0	1	1	1	-	-	-	2	1	2
6:30	0	25	3	107	51	0	4	0	35	0	0	0	884	286	0	1	1	1	-	-	-	3	2	3
6:45	0	37	2	109	60	0	5	0	71	0	0	0	886	328	0	1	1	1	-	-	-	4	3	4
7:00	0	43	5	130	97	0	10	0	76	0	0	0	812	304	0	1	1	1	-	-	-	1	4	1
7:15	0	57	5	53	100	0	9	0	76	0	0	0	650	273	0	1	-	1	-	-	-	2	0	2
7:30	0	32	4	61	91	0	10	0	71	0	0	0	539	238	0	1	-	-	-	-	-	3	0	3
7:45	0	26	4	63	41	0	6	0	46	0	0	0	473	191	0	-	-	-	-	-	-	4	0	4
8:00	0	27	7	50	29	0	4	0	51	0	0	0	428	184	0	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	20	0	30	0	0	0	392	168	0	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	8	0	26	0	0	0	385	166	0	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	7	0	38	0	0	0	347	169	0	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	1	0	38	0	0	0	346	159	0	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	5	0	43	0	0	0	342	166	0	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	5	0	32	0	0	0	333	168	0	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	5	0	30	0	0	0	322	168	0	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	8	0	38	0	0	0	310	192	0	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	4	0	46	0	0	0	334	187	0	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	7	0	30	0	0	0	336	187	0	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	8	0	51	0	0	0	371	204	0	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	5	0	36	0	0	0	395	193	0	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	4	0	46	0	0	0	385	202	0	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	8	0	46	0	0	0	398	201	0	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	4	0	44	0	0	0	390	205	0	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	6	0	44	0	0	0	391	215	0	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	8	0	41	0	0	0	399	222	0	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	10	0	48	0	0	0	407	225	0	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	7	0	51	0	0	0	426	239	0	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	9	0	48	0	0	0	447	241	0	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	3	0	49	0	0	0	550	255	0	1	-	-	-	-	-	1	0	0
13:30	0	32	7	49	31	0	4	0	68	0	0	0	620	266	0	1	-	1	-	-	-	2	0	1
13:45	0	35	9	45	33	0	8	0	52	0	0	0	660	256	0	1	-	1	-	-	-	3	0	2
14:00	0	43	6	93	56	0	3	0	68	0	0	0	688	263	0	1	-	1	-	-	-	4	0	3
14:15	0	36	7	88	50	0	9	0	54	0	0	0	652	272	0	1	-	1	-	-	-	1	0	4
14:30	0	34	18	64	43	0	4	0	58	0	0	0	593	282	0	1	-	-	-	-	-	2	0	0
14:45	0	36	19	59	36	0	6	0	61	0	0	0	571	317	0	1	-	-	-	-	-	3	0	0
15:00	0	47	11	60	44	0	11	0	69	0	0	0	573	321	0	1	-	-	-	-	-	4	0	0
15:15	0	30	9	56	27	0	7	0	66	0	0	0	555	319	0	1	-	-	-	-	-	1	0	0
15:30	0	27	21	62	27	0	7	0	90	0	0	0	615	333	0	1	-	1	-	-	-	2	0	1
15:45	0	37	17	63	35	0	5	0	66	0	0	0	612	332	0	1	-	1	-	-	-	3	0	2
16:00	0	50	13	55	26	0	9	0	69	0	0	0	594	344	0	1	-	-	-	-	-	4	0	3
16:15	0	57	26	62	37	0	8	0	79	0	0	0	611	364	0	1	-	1	-	-	-	1	0	4
16:30	0	44	10	49	31	0	10	0	86	0	0	0	565	355	0	1	-	-	-	-	-	2	0	0
16:45	0	47	17	59	11	0	3	0	80	0	0	0	558	329	0	1	-	-	-	-	-	3	0	0
17:00	0	39	25	65	32	0	8	0	90	0	0	0	544	323	0	1	-	-	-	-	-	4	0	0
17:15	0	30	19	61	26	0	4	0	74	0	0	0	509	288	0	1	-	-	-	-	-	1	0	0
17:30	0	31	17	52	27	0	4	0	66	0	0	0	478	268	0	-	-	-	-	-	-	2	0	0
17:45	0	42	11	36	31	0	13	0	64	0	0	0	446	267	0	-	-	-	-	-	-	3	0	0
18:00	0	26	21	47	32	0	6	0	57	0	0	0	399	262	0	-	-	-	-	-	-	4	0	0
18:15	0	30	17	40	18	0	2	0	56	0	0	0	354	254	0	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	3	0	66	0	0	0	319	247	0	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	6	0	66	0	0	0	296	222	0	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	7	0	48	0	0	0	272	195	0	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	2	0	49	0	0	0	191	140	0	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	5	0	39	0	0	0	121	89	0	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	2	0	43	0	0	0	49	45	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	7	1	4
Signal Warranted?	No		
Notes			

4-hr Warrant (v0.9)

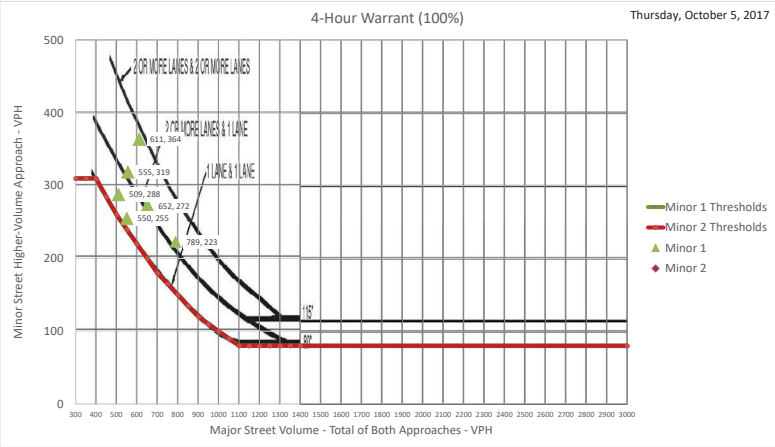
Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold
	1	1	1	
		RT Reduction: 0%	RT Reduction: 100%	

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	9	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	19	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	35	0			0	0	0	0
5:00	0	1	1	19	12	0	4	0	5	0	0	0	192	53	0			0	0	0	0
5:15	0	0	0	25	9	0	2	0	8	0	0	0	258	60	0			0	0	0	0
5:30	0	3	2	40	18	0	9	0	7	0	0	0	344	72	0			0	0	0	0
5:45	0	4	1	45	12	0	3	0	15	0	0	0	467	95	0			0	0	0	0
6:00	0	11	5	44	39	0	1	0	15	0	0	0	613	153	0			0	0	0	0
6:15	0	12	8	66	34	0	7	0	15	0	0	0	789	223	0	1		1	0	1	1
6:30	0	25	3	107	51	0	4	0	35	0	0	0	884	286	0	1		2	0	1	2
6:45	0	37	2	109	60	0	5	0	71	0	0	0	886	328	0	1		3	0	1	3
7:00	0	43	5	130	97	0	10	0	76	0	0	0	812	304	0	1		4	0	1	4
7:15	0	57	5	53	100	0	9	0	76	0	0	0	650	273	0	1		1	0	1	1
7:30	0	32	4	61	91	0	10	0	71	0	0	0	539	238	0			2	0	0	2
7:45	0	26	4	63	41	0	6	0	46	0	0	0	473	191	0			3	0	0	3
8:00	0	27	7	50	29	0	4	0	51	0	0	0	428	184	0			4	0	0	4
8:15	0	21	8	43	32	0	20	0	30	0	0	0	392	168	0			0	0	0	0
8:30	0	32	11	58	21	0	8	0	26	0	0	0	385	166	0			0	0	0	0
8:45	0	13	6	50	20	0	7	0	38	0	0	0	347	169	0			0	0	0	0
9:00	0	14	3	42	18	0	1	0	38	0	0	0	346	159	0			0	0	0	0
9:15	0	22	3	45	27	0	5	0	43	0	0	0	342	166	0			0	0	0	0
9:30	0	13	4	49	18	0	5	0	32	0	0	0	333	168	0			0	0	0	0
9:45	0	17	6	49	16	0	5	0	30	0	0	0	322	168	0			0	0	0	0
10:00	0	5	6	46	16	0	8	0	38	0	0	0	310	192	0			0	0	0	0
10:15	0	21	10	37	20	0	4	0	46	0	0	0	334	187	0			0	0	0	0
10:30	0	16	4	36	17	0	7	0	30	0	0	0	336	187	0			0	0	0	0
10:45	0	15	11	28	22	0	8	0	51	0	0	0	371	204	0			0	0	0	0
11:00	0	27	9	29	32	0	5	0	36	0	0	0	395	193	0			0	0	0	0
11:15	0	19	8	45	18	0	4	0	46	0	0	0	385	202	0			0	0	0	0
11:30	0	32	7	44	25	0	8	0	46	0	0	0	398	201	0			0	0	0	0
11:45	0	16	9	45	30	0	4	0	44	0	0	0	390	205	0			0	0	0	0
12:00	0	9	8	55	15	0	6	0	44	0	0	0	391	215	0			0	0	0	0
12:15	0	24	7	41	31	0	8	0	41	0	0	0	399	222	0			0	0	0	0
12:30	0	10	7	54	29	0	10	0	48	0	0	0	407	225	0			0	0	0	0
12:45	0	25	9	40	27	0	7	0	51	0	0	0	426	239	0			0	0	0	0
13:00	0	9	8	46	32	0	9	0	48	0	0	0	447	241	0			0	0	0	0
13:15	0	20	20	50	21	0	3	0	49	0	0	0	550	255	0	1		1	0	1	1
13:30	0	32	7	49	31	0	4	0	68	0	0	0	620	266	0	1		2	0	1	2
13:45	0	35	9	45	33	0	8	0	52	0	0	0	660	256	0	1		3	0	1	3
14:00	0	43	6	93	56	0	3	0	68	0	0	0	688	263	0	1		4	0	1	4
14:15	0	36	7	88	50	0	9	0	54	0	0	0	652	272	0	1		1	0	1	1
14:30	0	34	18	64	43	0	4	0	58	0	0	0	593	282	0	1		2	0	1	2
14:45	0	36	19	59	36	0	6	0	61	0	0	0	571	317	0	1		3	0	1	3
15:00	0	47	11	60	44	0	11	0	69	0	0	0	573	321	0	1		4	0	1	4
15:15	0	30	9	56	27	0	7	0	66	0	0	0	555	319	0	1		1	0	1	1
15:30	0	27	21	62	27	0	7	0	90	0	0	0	615	333	0	1		2	0	1	2
15:45	0	37	17	63	35	0	5	0	66	0	0	0	612	332	0	1		3	0	1	3
16:00	0	50	13	55	26	0	9	0	69	0	0	0	594	344	0	1		4	0	1	4
16:15	0	57	26	62	37	0	8	0	79	0	0	0	611	364	0	1		1	0	1	1
16:30	0	44	10	49	31	0	10	0	86	0	0	0	565	355	0	1		2	0	1	2
16:45	0	47	17	59	11	0	3	0	80	0	0	0	558	329	0	1		3	0	1	3
17:00	0	39	25	65	32	0	8	0	90	0	0	0	544	323	0	1		4	0	1	4
17:15	0	30	19	61	26	0	4	0	74	0	0	0	509	288	0	1		1	0	1	1
17:30	0	31	17	52	27	0	4	0	66	0	0	0	478	268	0			2	0	0	2
17:45	0	42	11	36	31	0	13	0	64	0	0	0	446	267	0			3	0	0	3
18:00	0	26	21	47	32	0	6	0	57	0	0	0	399	262	0			4	0	0	4
18:15	0	30	17	40	18	0	2	0	56	0	0	0	354	254	0			0	0	0	0
18:30	0	41	7	34	13	0	3	0	66	0	0	0	319	247	0			0	0	0	0
18:45	0	19	4	37	13	0	6	0	66	0	0	0	296	222	0			0	0	0	0
19:00	0	24	11	30	16	0	7	0	48	0	0	0	272	195	0			0	0	0	0
19:15	0	24	8	21	17	0	2	0	49	0	0	0	191	140	0			0	0	0	0
19:30	0	15	14	27	16	0	5	0	39	0	0	0	121	89	0			0	0	0	0
19:45	0	10	8	18	13	0	2	0	43	0	0	0	49	45	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	7
Signal Warranted?	Yes



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX D

SIGNAL WARRANT ANALYSIS

Existing Kahekili Hwy/Waiehu Beach Rd
(WBLT & WBRT Minor)

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Thursday, October 5, 2017

Condition A - Minimum volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant	Minor 1 (EB)			Minor 1 (WB)			Combination
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold	500	750	600	500	750	600	
	1	1	1	Minor Threshold	150	75	120	150	75	120	
		RT Reduction: 100%	RT Reduction: 100%								

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	EB A	EB B	EB A+B	WB A	WB B	WB A+B	Comb. A	Comb. B	Comb. A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	4	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	6	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	15	0	-	-	-	-	-	-	0	0	0
5:00	0	1	1	19	12	0	4	0	0	0	0	0	192	18	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25	9	0	2	0	0	0	0	0	258	15	0	-	-	-	-	-	-	0	0	0
5:30	0	3	2	40	18	0	9	0	0	0	0	0	344	20	0	-	-	-	-	-	-	0	0	0
5:45	0	4	1	45	12	0	3	0	0	0	0	0	467	15	0	-	-	-	-	-	-	0	0	0
6:00	0	11	5	44	39	0	1	0	0	0	0	0	613	17	0	-	-	-	-	-	-	0	0	0
6:15	0	12	8	66	34	0	7	0	0	0	0	0	789	26	0	-	-	-	-	-	-	0	0	0
6:30	0	25	3	107	51	0	4	0	0	0	0	0	884	28	0	-	-	-	-	-	-	0	0	0
6:45	0	37	2	109	60	0	5	0	0	0	0	0	886	34	0	-	-	-	-	-	-	0	0	0
7:00	0	43	5	130	97	0	10	0	0	0	0	0	812	35	0	-	-	-	-	-	-	0	0	0
7:15	0	57	5	53	100	0	9	0	0	0	0	0	650	29	0	-	-	-	-	-	-	0	0	0
7:30	0	32	4	61	91	0	10	0	0	0	0	0	539	40	0	-	-	-	-	-	-	0	0	0
7:45	0	26	4	63	41	0	6	0	0	0	0	0	473	38	0	-	-	-	-	-	-	0	0	0
8:00	0	27	7	50	29	0	4	0	0	0	0	0	428	39	0	-	-	-	-	-	-	0	0	0
8:15	0	21	8	43	32	0	20	0	0	0	0	0	392	36	0	-	-	-	-	-	-	0	0	0
8:30	0	32	11	58	21	0	8	0	0	0	0	0	385	21	0	-	-	-	-	-	-	0	0	0
8:45	0	13	6	50	20	0	7	0	0	0	0	0	347	18	0	-	-	-	-	-	-	0	0	0
9:00	0	14	3	42	18	0	1	0	0	0	0	0	346	16	0	-	-	-	-	-	-	0	0	0
9:15	0	22	3	45	27	0	5	0	0	0	0	0	342	23	0	-	-	-	-	-	-	0	0	0
9:30	0	13	4	49	18	0	5	0	0	0	0	0	333	22	0	-	-	-	-	-	-	0	0	0
9:45	0	17	6	49	16	0	5	0	0	0	0	0	322	24	0	-	-	-	-	-	-	0	0	0
10:00	0	5	6	46	16	0	8	0	0	0	0	0	310	27	0	-	-	-	-	-	-	0	0	0
10:15	0	21	10	37	20	0	4	0	0	0	0	0	334	24	0	-	-	-	-	-	-	0	0	0
10:30	0	16	4	36	17	0	7	0	0	0	0	0	336	24	0	-	-	-	-	-	-	0	0	0
10:45	0	15	11	28	22	0	8	0	0	0	0	0	371	25	0	-	-	-	-	-	-	0	0	0
11:00	0	27	9	29	32	0	5	0	0	0	0	0	395	21	0	-	-	-	-	-	-	0	0	0
11:15	0	19	8	45	18	0	4	0	0	0	0	0	385	22	0	-	-	-	-	-	-	0	0	0
11:30	0	32	7	44	25	0	8	0	0	0	0	0	398	26	0	-	-	-	-	-	-	0	0	0
11:45	0	16	9	45	30	0	4	0	0	0	0	0	390	28	0	-	-	-	-	-	-	0	0	0
12:00	0	9	8	55	15	0	6	0	0	0	0	0	391	31	0	-	-	-	-	-	-	0	0	0
12:15	0	24	7	41	31	0	8	0	0	0	0	0	399	34	0	-	-	-	-	-	-	0	0	0
12:30	0	10	7	54	29	0	10	0	0	0	0	0	407	29	0	-	-	-	-	-	-	0	0	0
12:45	0	25	9	40	27	0	7	0	0	0	0	0	426	23	0	-	-	-	-	-	-	0	0	0
13:00	0	9	8	46	32	0	9	0	0	0	0	0	447	24	0	-	-	-	-	-	-	0	0	0
13:15	0	20	20	50	21	0	3	0	0	0	0	0	550	18	0	-	-	-	-	-	-	0	0	0
13:30	0	32	7	49	31	0	4	0	0	0	0	0	620	24	0	-	-	-	-	-	-	0	0	0
13:45	0	35	9	45	33	0	8	0	0	0	0	0	660	24	0	-	-	-	-	-	-	0	0	0
14:00	0	43	6	93	56	0	3	0	0	0	0	0	688	22	0	-	-	-	-	-	-	0	0	0
14:15	0	36	7	88	50	0	9	0	0	0	0	0	652	30	0	-	-	-	-	-	-	0	0	0
14:30	0	34	18	64	43	0	4	0	0	0	0	0	593	28	0	-	-	-	-	-	-	0	0	0
14:45	0	36	19	59	36	0	6	0	0	0	0	0	571	31	0	-	-	-	-	-	-	0	0	0
15:00	0	47	11	60	44	0	11	0	0	0	0	0	573	30	0	-	-	-	-	-	-	0	0	0
15:15	0	30	9	56	27	0	7	0	0	0	0	0	555	28	0	-	-	-	-	-	-	0	0	0
15:30	0	27	21	62	27	0	7	0	0	0	0	0	615	29	0	-	-	-	-	-	-	0	0	0
15:45	0	37	17	63	35	0	5	0	0	0	0	0	612	32	0	-	-	-	-	-	-	0	0	0
16:00	0	50	13	55	26	0	9	0	0	0	0	0	594	30	0	-	-	-	-	-	-	0	0	0
16:15	0	57	26	62	37	0	8	0	0	0	0	0	611	29	0	-	-	-	-	-	-	0	0	0
16:30	0	44	10	49	31	0	10	0	0	0	0	0	565	25	0	-	-	-	-	-	-	0	0	0
16:45	0	47	17	59	11	0	3	0	0	0	0	0	558	19	0	-	-	-	-	-	-	0	0	0
17:00	0	39	25	65	32	0	8	0	0	0	0	0	544	29	0	-	-	-	-	-	-	0	0	0
17:15	0	30	19	61	26	0	4	0	0	0	0	0	509	27	0	-	-	-	-	-	-	0	0	0
17:30	0	31	17	52	27	0	4	0	0	0	0	0	478	25	0	-	-	-	-	-	-	0	0	0
17:45	0	42	11	36	31	0	13	0	0	0	0	0	446	24	0	-	-	-	-	-	-	0	0	0
18:00	0	26	21	47	32	0	6	0	0	0	0	0	399	17	0	-	-	-	-	-	-	0	0	0
18:15	0	30	17	40	18	0	2	0	0	0	0	0	354	18	0	-	-	-	-	-	-	0	0	0
18:30	0	41	7	34	13	0	3	0	0	0	0	0	319	18	0	-	-	-	-	-	-	0	0	0
18:45	0	19	4	37	13	0	6	0	0	0	0	0	296	20	0	-	-	-	-	-	-	0	0	0
19:00	0	24	11	30	16	0	7	0	0	0	0	0	272	16	0	-	-	-	-	-	-	0	0	0
19:15	0	24	8	21	17	0	2	0	0	0	0	0	191	9	0	-	-	-	-	-	-	0	0	0
19:30	0	15	14	27	16	0	5	0	0	0	0	0	121	7	0	-	-	-	-	-	-	0	0	0
19:45	0	10	8	18	13	0	2	0	0	0	0	0	49	2	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	0	0	0
Signal Warranted?	No		
Notes			

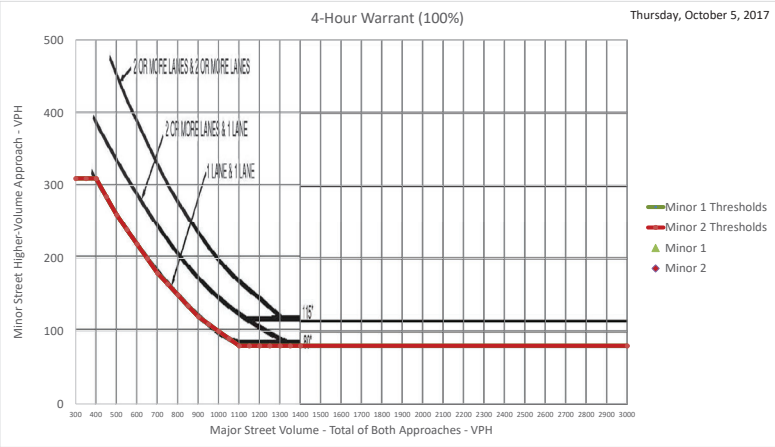
Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold
	1	1	1	
		RT Reduction: 100%	RT Reduction: 100%	

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	33	4	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	67	6	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	130	15	0			0	0	0	0
5:00	0	1	1	19	12	0	4	0	0	0	0	0	192	18	0			0	0	0	0
5:15	0	0	0	25	9	0	2	0	0	0	0	0	258	15	0			0	0	0	0
5:30	0	3	2	40	18	0	9	0	0	0	0	0	344	20	0			0	0	0	0
5:45	0	4	1	45	12	0	3	0	0	0	0	0	467	15	0			0	0	0	0
6:00	0	11	5	44	39	0	1	0	0	0	0	0	613	17	0			0	0	0	0
6:15	0	12	8	66	34	0	7	0	0	0	0	0	789	26	0			0	0	0	0
6:30	0	25	3	107	51	0	4	0	0	0	0	0	884	28	0			0	0	0	0
6:45	0	37	2	109	60	0	5	0	0	0	0	0	886	34	0			0	0	0	0
7:00	0	43	5	130	97	0	10	0	0	0	0	0	812	35	0			0	0	0	0
7:15	0	57	5	53	100	0	9	0	0	0	0	0	650	29	0			0	0	0	0
7:30	0	32	4	61	91	0	10	0	0	0	0	0	539	40	0			0	0	0	0
7:45	0	26	4	63	41	0	6	0	0	0	0	0	473	38	0			0	0	0	0
8:00	0	27	7	50	29	0	4	0	0	0	0	0	428	39	0			0	0	0	0
8:15	0	21	8	43	32	0	20	0	0	0	0	0	392	36	0			0	0	0	0
8:30	0	32	11	58	21	0	8	0	0	0	0	0	385	21	0			0	0	0	0
8:45	0	13	6	50	20	0	7	0	0	0	0	0	347	18	0			0	0	0	0
9:00	0	14	3	42	18	0	1	0	0	0	0	0	346	16	0			0	0	0	0
9:15	0	22	3	45	27	0	5	0	0	0	0	0	342	23	0			0	0	0	0
9:30	0	13	4	49	18	0	5	0	0	0	0	0	333	22	0			0	0	0	0
9:45	0	17	6	49	16	0	5	0	0	0	0	0	322	24	0			0	0	0	0
10:00	0	5	6	46	16	0	8	0	0	0	0	0	310	27	0			0	0	0	0
10:15	0	21	10	37	20	0	4	0	0	0	0	0	334	24	0			0	0	0	0
10:30	0	16	4	36	17	0	7	0	0	0	0	0	336	24	0			0	0	0	0
10:45	0	15	11	28	22	0	8	0	0	0	0	0	371	25	0			0	0	0	0
11:00	0	27	9	29	32	0	5	0	0	0	0	0	395	21	0			0	0	0	0
11:15	0	19	8	45	18	0	4	0	0	0	0	0	385	22	0			0	0	0	0
11:30	0	32	7	44	25	0	8	0	0	0	0	0	398	26	0			0	0	0	0
11:45	0	16	9	45	30	0	4	0	0	0	0	0	390	28	0			0	0	0	0
12:00	0	9	8	55	15	0	6	0	0	0	0	0	391	31	0			0	0	0	0
12:15	0	24	7	41	31	0	8	0	0	0	0	0	399	34	0			0	0	0	0
12:30	0	10	7	54	29	0	10	0	0	0	0	0	407	29	0			0	0	0	0
12:45	0	25	9	40	27	0	7	0	0	0	0	0	426	23	0			0	0	0	0
13:00	0	9	8	46	32	0	9	0	0	0	0	0	447	24	0			0	0	0	0
13:15	0	20	20	50	21	0	3	0	0	0	0	0	550	18	0			0	0	0	0
13:30	0	32	7	49	31	0	4	0	0	0	0	0	620	24	0			0	0	0	0
13:45	0	35	9	45	33	0	8	0	0	0	0	0	660	24	0			0	0	0	0
14:00	0	43	6	93	56	0	3	0	0	0	0	0	688	22	0			0	0	0	0
14:15	0	36	7	88	50	0	9	0	0	0	0	0	652	30	0			0	0	0	0
14:30	0	34	18	64	43	0	4	0	0	0	0	0	593	28	0			0	0	0	0
14:45	0	36	19	59	36	0	6	0	0	0	0	0	571	31	0			0	0	0	0
15:00	0	47	11	60	44	0	11	0	0	0	0	0	573	30	0			0	0	0	0
15:15	0	30	9	56	27	0	7	0	0	0	0	0	555	28	0			0	0	0	0
15:30	0	27	21	62	27	0	7	0	0	0	0	0	615	29	0			0	0	0	0
15:45	0	37	17	63	35	0	5	0	0	0	0	0	612	32	0			0	0	0	0
16:00	0	50	13	55	26	0	9	0	0	0	0	0	594	30	0			0	0	0	0
16:15	0	57	26	62	37	0	8	0	0	0	0	0	611	29	0			0	0	0	0
16:30	0	44	10	49	31	0	10	0	0	0	0	0	565	25	0			0	0	0	0
16:45	0	47	17	59	11	0	3	0	0	0	0	0	558	19	0			0	0	0	0
17:00	0	39	25	65	32	0	8	0	0	0	0	0	544	29	0			0	0	0	0
17:15	0	30	19	61	26	0	4	0	0	0	0	0	509	27	0			0	0	0	0
17:30	0	31	17	52	27	0	4	0	0	0	0	0	478	25	0			0	0	0	0
17:45	0	42	11	36	31	0	13	0	0	0	0	0	446	24	0			0	0	0	0
18:00	0	26	21	47	32	0	6	0	0	0	0	0	399	17	0			0	0	0	0
18:15	0	30	17	40	18	0	2	0	0	0	0	0	354	18	0			0	0	0	0
18:30	0	41	7	34	13	0	3	0	0	0	0	0	319	18	0			0	0	0	0
18:45	0	19	4	37	13	0	6	0	0	0	0	0	296	20	0			0	0	0	0
19:00	0	24	11	30	16	0	7	0	0	0	0	0	272	16	0			0	0	0	0
19:15	0	24	8	21	17	0	2	0	0	0	0	0	191	9	0			0	0	0	0
19:30	0	15	14	27	16	0	5	0	0	0	0	0	121	7	0			0	0	0	0
19:45	0	10	8	18	13	0	2	0	0	0	0	0	49	2	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX D

SIGNAL WARRANT ANALYSIS

FY 2024 Kahekili Hwy/Waiehu Beach Rd
(SBLT Minor)

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Thursday, October 5, 2017

Condition A - Minimum volume

Number of lines for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant	Minor 1 (EB)			Minor 1 (WB)			Combination
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold	500	750	600	500	750	600	
	1	1	1	Minor Threshold	150	75	120	150	75	120	
		RT Reduction: 0%	RT Reduction: 100%								

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	A	B	A+B	A	B	A+B	A	B	A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	2.580808081	19.5067	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	2.580808081	45.1733	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	9.050505051	86.24	0	-	-	-	-	-	-	0	0	0
5:00	0	1.3081	1.2727	0	0	0	19.507	0	0	0	0	0	15.55555556	132.44	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	0	0	0	25.667	0	0	0	0	0	33.72727273	158.107	0	-	-	-	-	-	-	0	0	0
5:30	0	3.9242	2.5455	0	0	0	41.067	0	0	0	0	0	59.60606061	200.2	0	-	-	-	-	-	-	0	0	0
5:45	0	5.2323	1.2727	0	0	0	46.2	0	0	0	0	0	89.65656566	268.987	0	-	-	-	-	-	-	0	0	0
6:00	0	14.389	6.3636	0	0	0	45.173	0	0	0	0	0	130.530953	320.362	0	-	-	-	-	-	-	0	0	0
6:15	0	15.697	10.182	0	0	0	67.76	0	0	0	0	0	171.6974366	391.562	0	-	-	-	-	-	-	0	0	0
6:30	0	32.702	3.8182	0	0	0	109.85	0	0	0	0	0	223.7258233	371.247	0	-	-	-	-	-	-	0	0	0
6:45	0	42.254	5.125	0	0	0	97.575	0	0	0	0	0	234	316	0	-	-	-	-	-	-	0	0	0
7:00	0	49.107	12.813	0	0	0	116.37	0	0	0	0	0	225.7215722	283.105	0	-	-	-	-	-	-	0	0	0
7:15	0	65.095	12.813	0	0	0	47.445	0	0	0	0	0	208.0298361	218.064	0	-	-	-	-	-	-	0	0	0
7:30	0	36.544	10.25	0	0	0	54.606	0	0	0	0	0	167.7741767	214.766	0	-	-	-	-	-	-	0	0	0
7:45	0	34.01	5.0909	0	0	0	64.68	0	0	0	0	0	176.8383838	219.707	0	-	-	-	-	-	-	0	0	0
8:00	0	35.318	8.9091	0	0	0	51.333	0	0	0	0	0	162.3787879	206.36	0	-	-	-	-	-	-	0	0	0
8:15	0	27.47	10.182	0	0	0	44.147	0	0	0	0	0	140.2828283	198.147	0	-	-	-	-	-	-	0	0	0
8:30	0	41.859	14	0	0	0	59.547	0	0	0	0	0	*135.2272727*	200.2	0	-	-	-	-	-	-	0	0	0
8:45	0	17.005	7.6364	0	0	0	51.333	0	0	0	0	0	101.4646465	190.96	0	-	-	-	-	-	-	0	0	0
9:00	0	18.313	3.8182	0	0	0	43.12	0	0	0	0	0	106.6969697	189.933	0	-	-	-	-	-	-	0	0	0
9:15	0	28.778	3.8182	0	0	0	46.2	0	0	0	0	0	98.74242424	194.04	0	-	-	-	-	-	-	0	0	0
9:30	0	17.005	5.0909	0	0	0	50.307	0	0	0	0	0	106.3434343	185.827	0	-	-	-	-	-	-	0	0	0
9:45	0	22.237	7.6364	0	0	0	50.307	0	0	0	0	0	110.2676768	172.48	0	-	-	-	-	-	-	0	0	0
10:00	0	6.5404	7.6364	0	0	0	47.227	0	0	0	0	0	114.0151515	150.92	0	-	-	-	-	-	-	0	0	0
10:15	0	27.47	12.727	0	0	0	37.987	0	0	0	0	0	146.6111111	133.467	0	-	-	-	-	-	-	0	0	0
10:30	0	20.929	5.0909	0	0	0	36.96	0	0	0	0	0	141.4494949	141.68	0	-	-	-	-	-	-	0	0	0
10:45	0	19.621	14	0	0	0	28.747	0	0	0	0	0	166.1969697	149.893	0	-	-	-	-	-	-	0	0	0
11:00	0	35.318	11.455	0	0	0	29.773	0	0	0	0	0	164.959596	167.347	0	-	-	-	-	-	-	0	0	0
11:15	0	24.854	10.182	0	0	0	46.2	0	0	0	0	0	140.1414141	194.04	0	-	-	-	-	-	-	0	0	0
11:30	0	41.859	8.9091	0	0	0	45.173	0	0	0	0	0	145.4090909	189.933	0	-	-	-	-	-	-	0	0	0
11:45	0	20.929	11.455	0	0	0	46.2	0	0	0	0	0	116.6313131	200.2	0	-	-	-	-	-	-	0	0	0
12:00	0	11.773	10.182	0	0	0	56.467	0	0	0	0	0	128.4040404	195.067	0	-	-	-	-	-	-	0	0	0
12:15	0	31.394	8.9091	0	0	0	42.093	0	0	0	0	0	128.4040404	185.827	0	-	-	-	-	-	-	0	0	0
12:30	0	13.081	8.9091	0	0	0	55.44	0	0	0	0	0	139.7171717	195.067	0	-	-	-	-	-	-	0	0	0
12:45	0	32.702	11.455	0	0	0	41.067	0	0	0	0	0	168.4949495	189.933	0	-	-	-	-	-	-	0	0	0
13:00	0	11.773	10.182	0	0	0	47.227	0	0	0	0	0	181.5757576	195.067	0	-	-	-	-	-	-	0	0	0
13:15	0	26.162	25.455	0	0	0	51.333	0	0	0	0	0	223.5050505	243.32	0	-	-	-	-	-	-	0	0	0
13:30	0	41.859	8.9091	0	0	0	50.307	0	0	0	0	0	227.8888889	282.333	0	-	-	-	-	-	-	0	0	0
13:45	0	45.783	11.455	0	0	0	46.2	0	0	0	0	0	244.5050505	297.733	0	-	-	-	-	-	-	0	0	0
14:00	0	56.247	7.6364	0	0	0	95.48	0	0	0	0	0	258.540404	312.107	0	-	-	-	-	-	-	0	0	0
14:15	0	47.091	8.9091	0	0	0	90.347	0	0	0	0	0	270.1363636	278.227	0	-	-	-	-	-	-	0	0	0
14:30	0	44.475	22.909	0	0	0	65.707	0	0	0	0	0	264.8333333	245.373	0	-	-	-	-	-	-	0	0	0
14:45	0	47.091	24.182	0	0	0	60.573	0	0	0	0	0	259.4949495	243.32	0	-	-	-	-	-	-	0	0	0
15:00	0	61.48	14	0	0	0	61.6	0	0	0	0	0	258.2575758	247.427	0	-	-	-	-	-	-	0	0	0
15:15	0	39.242	11.455	0	0	0	57.493	0	0	0	0	0	264.7272727	242.293	0	-	-	-	-	-	-	0	0	0
15:30	0	35.318	26.727	0	0	0	63.653	0	0	0	0	0	321.6818182	248.453	0	-	-	-	-	-	-	0	0	0
15:45	0	48.399	21.636	0	0	0	64.68	0	0	0	0	0	329.9191919	235.107	0	-	-	-	-	-	-	0	0	0
16:00	0	65.404	16.545	0	0	0	56.467	0	0	0	0	0	343	231	0	-	-	-	-	-	-	0	0	0
16:15	0	74.561	33.091	0	0	0	63.653	0	0	0	0	0	343.8838384	241.267	0	-	-	-	-	-	-	0	0	0
16:30	0	57.556	12.727	0	0	0	50.307	0	0	0	0	0	299.6565657	240.24	0	-	-	-	-	-	-	0	0	0
16:45	0	61.48	21.636	0	0	0	60.573	0	0	0	0	0	291.5606061	243.32	0	-	-	-	-	-	-	0	0	0
17:00	0	51.015	31.818	0	0	0	66.733	0	0	0	0	0	277.3838384	219.707	0	-	-	-	-	-	-	0	0	0
17:15	0	39.242	24.182	0	0	0	62.627	0	0	0	0	0	255.2878788	201.227	0	-	-	-	-	-	-	0	0	0
17:30	0	40.551	21.636	0	0	0	53.387	0	0	0	0	0	252.7424242	179.667	0	-	-	-	-	-	-	0	0	0
17:45	0	54.939	14	0	0	0	36.96	0	0	0	0	0	253.0959596	161.187	0	-	-	-	-	-	-	0	0	0
18:00	0	34.01	26.727	0	0	0	48.253	0	0	0	0	0	214.1010101	162.213	0	-	-	-	-	-	-	0	0	0
18:15	0	39.242	21.636	0	0	0	41.067	0	0	0	0	0	198.7575758	144.76	0	-	-	-	-	-	-	0	0	0
18:30	0	53.631	8.9091	0	0	0	34.907	0	0	0	0	0	179.4545455	125.253	0	-	-	-	-	-	-	0	0	0
18:45	0	24.854	5.0909	0	0	0	37.987	0	0	0	0	0	154.3535354	118.067	0	-	-	-	-	-	-	0	0	0
19:00	0	31.394	14	0	0	0	30.8	0	0	0	0	0	147.6717172	98.56	0	-	-	-	-	-	-	0	0	0
19:15	0	31.394	10.182	0	0	0	21.56	0	0	0	0	0	102.2777778	67.76	0	-	-	-	-	-	-	0	0	0
19:30	0	19.621	17.818	0	0	0	27.72	0	0	0	0	0	60.7020202	46.2	0	-	-	-	-	-	-	0	0	0
19:45	0	13.081	10.182	0	0	0	18.48	0	0	0	0	0	23.26262626	18.48	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	nted to e	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	0	0	0
Signal Warranted?	No		
Notes			

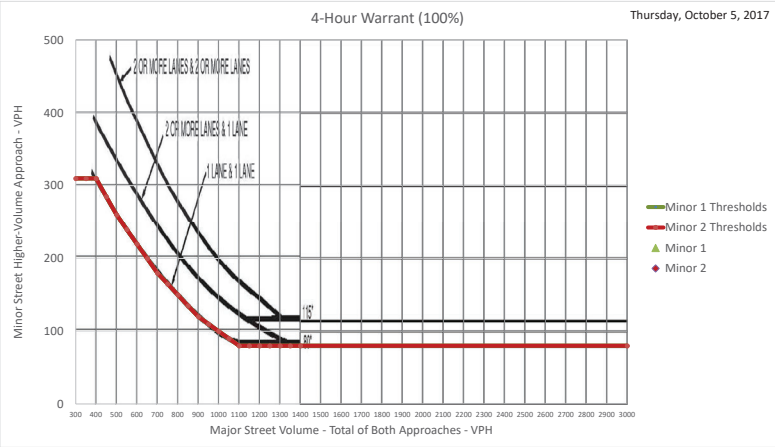
Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Thursday, October 5, 2017

	Kahekili Hwy	aiehu Beach Ro	0	100 % Warrant
	Major Lanes	Minor 1 Lanes	Minor 2 Lanes	Major Threshold
	1	1	1	
		RT Reduction: 0%	RT Reduction: 100%	

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	2.580808081	19.5067	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	2.580808081	45.1733	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	9.050505051	86.24	0			0	0	0	0
5:00	0	1.3081	1.2727	0	0	0	19.507	0	0	0	0	0	15.55555556	132.44	0			0	0	0	0
5:15	0	0	0	0	0	0	25.667	0	0	0	0	0	33.72727273	158.107	0			0	0	0	0
5:30	0	3.9242	2.5455	0	0	0	41.067	0	0	0	0	0	59.60606061	200.2	0			0	0	0	0
5:45	0	5.2323	1.2727	0	0	0	46.2	0	0	0	0	0	89.65656566	268.987	0			0	0	0	0
6:00	0	14.389	6.3636	0	0	0	45.173	0	0	0	0	0	130.530953	320.362	0	1		1	0	1	1
6:15	0	15.697	10.182	0	0	0	67.76	0	0	0	0	0	171.6974366	391.562	0	1		2	0	1	2
6:30	0	32.702	3.8182	0	0	0	109.85	0	0	0	0	0	223.7258233	371.247	0	1		3	0	1	3
6:45	0	42.254	5.125	0	0	0	97.575	0	0	0	0	0	234	316	0	1		4	0	1	4
7:00	0	49.107	12.813	0	0	0	116.37	0	0	0	0	0	225.7215722	283.105	0			0	0	0	0
7:15	0	65.095	12.813	0	0	0	47.445	0	0	0	0	0	208.0298361	218.064	0			0	0	0	0
7:30	0	36.544	10.25	0	0	0	54.606	0	0	0	0	0	167.7741767	214.766	0			0	0	0	0
7:45	0	34.01	5.0909	0	0	0	64.68	0	0	0	0	0	176.8383838	219.707	0			0	0	0	0
8:00	0	35.318	8.9091	0	0	0	51.333	0	0	0	0	0	162.3787879	206.36	0			0	0	0	0
8:15	0	27.47	10.182	0	0	0	44.147	0	0	0	0	0	140.2828283	198.147	0			0	0	0	0
8:30	0	41.859	14	0	0	0	59.547	0	0	0	0	0	*135.2272727*	200.2	0			0	0	0	0
8:45	0	17.005	7.6364	0	0	0	51.333	0	0	0	0	0	101.4646465	190.96	0			0	0	0	0
9:00	0	18.313	3.8182	0	0	0	43.12	0	0	0	0	0	106.6969697	189.933	0			0	0	0	0
9:15	0	28.778	3.8182	0	0	0	46.2	0	0	0	0	0	98.74242424	194.04	0			0	0	0	0
9:30	0	17.005	5.0909	0	0	0	50.307	0	0	0	0	0	106.3434343	185.827	0			0	0	0	0
9:45	0	22.237	7.6364	0	0	0	50.307	0	0	0	0	0	110.2676768	172.48	0			0	0	0	0
10:00	0	6.5404	7.6364	0	0	0	47.227	0	0	0	0	0	114.0151515	150.92	0			0	0	0	0
10:15	0	27.47	12.727	0	0	0	37.987	0	0	0	0	0	146.6111111	133.467	0			0	0	0	0
10:30	0	20.929	5.0909	0	0	0	36.96	0	0	0	0	0	141.4494949	141.68	0			0	0	0	0
10:45	0	19.621	14	0	0	0	28.747	0	0	0	0	0	166.1969697	149.893	0			0	0	0	0
11:00	0	35.318	11.455	0	0	0	29.773	0	0	0	0	0	164.959596	167.347	0			0	0	0	0
11:15	0	24.854	10.182	0	0	0	46.2	0	0	0	0	0	140.1414141	194.04	0			0	0	0	0
11:30	0	41.859	8.9091	0	0	0	45.173	0	0	0	0	0	145.4090909	189.933	0			0	0	0	0
11:45	0	20.929	11.455	0	0	0	46.2	0	0	0	0	0	116.6313131	200.2	0			0	0	0	0
12:00	0	11.773	10.182	0	0	0	56.467	0	0	0	0	0	128.4040404	195.067	0			0	0	0	0
12:15	0	31.394	8.9091	0	0	0	42.093	0	0	0	0	0	128.4040404	185.827	0			0	0	0	0
12:30	0	13.081	8.9091	0	0	0	55.44	0	0	0	0	0	139.7171717	195.067	0			0	0	0	0
12:45	0	32.702	11.455	0	0	0	41.067	0	0	0	0	0	168.4949495	189.933	0			0	0	0	0
13:00	0	11.773	10.182	0	0	0	47.227	0	0	0	0	0	181.5757576	195.067	0			0	0	0	0
13:15	0	26.162	25.455	0	0	0	51.333	0	0	0	0	0	223.5050505	243.32	0			0	0	0	0
13:30	0	41.859	8.9091	0	0	0	50.307	0	0	0	0	0	227.8888889	282.333	0			0	0	0	0
13:45	0	45.783	11.455	0	0	0	46.2	0	0	0	0	0	244.5050505	297.733	0			0	0	0	0
14:00	0	56.247	7.6364	0	0	0	95.48	0	0	0	0	0	258.540404	312.107	0	1		1	0	1	1
14:15	0	47.091	8.9091	0	0	0	90.347	0	0	0	0	0	270.1363636	278.227	0			2	0	0	2
14:30	0	44.475	22.909	0	0	0	65.707	0	0	0	0	0	264.8333333	245.373	0			3	0	0	3
14:45	0	47.091	24.182	0	0	0	60.573	0	0	0	0	0	259.4949495	243.32	0			4	0	0	4
15:00	0	61.48	14	0	0	0	61.6	0	0	0	0	0	258.2575758	247.427	0			0	0	0	0
15:15	0	39.242	11.455	0	0	0	57.493	0	0	0	0	0	264.7272727	242.293	0			0	0	0	0
15:30	0	35.318	26.727	0	0	0	63.653	0	0	0	0	0	321.6818182	248.453	0			0	0	0	0
15:45	0	48.399	21.636	0	0	0	64.68	0	0	0	0	0	329.9191919	235.107	0			0	0	0	0
16:00	0	65.404	16.545	0	0	0	56.467	0	0	0	0	0	343	231	0			0	0	0	0
16:15	0	74.561	33.091	0	0	0	63.653	0	0	0	0	0	343.8838384	241.267	0			0	0	0	0
16:30	0	57.556	12.727	0	0	0	50.307	0	0	0	0	0	299.6565657	240.24	0			0	0	0	0
16:45	0	61.48	21.636	0	0	0	60.573	0	0	0	0	0	291.5606061	243.32	0			0	0	0	0
17:00	0	51.015	31.818	0	0	0	66.733	0	0	0	0	0	277.3838384	219.707	0			0	0	0	0
17:15	0	39.242	24.182	0	0	0	62.627	0	0	0	0	0	255.2878788	201.227	0			0	0	0	0
17:30	0	40.551	21.636	0	0	0	53.387	0	0	0	0	0	252.7424242	179.667	0			0	0	0	0
17:45	0	54.939	14	0	0	0	36.96	0	0	0	0	0	253.0959596	161.187	0			0	0	0	0
18:00	0	34.01	26.727	0	0	0	48.253	0	0	0	0	0	214.1010101	162.213	0			0	0	0	0
18:15	0	39.242	21.636	0	0	0	41.067	0	0	0	0	0	198.7575758	144.76	0			0	0	0	0
18:30	0	53.631	8.9091	0	0	0	34.907	0	0	0	0	0	179.4545455	125.253	0			0	0	0	0
18:45	0	24.854	5.0909	0	0	0	37.987	0	0	0	0	0	154.3535354	118.067	0			0	0	0	0
19:00	0	31.394	14	0	0	0	30.8	0	0	0	0	0	147.6717172	98.56	0			0	0	0	0
19:15	0	31.394	10.182	0	0	0	21.56	0	0	0	0	0	102.2777778	67.76	0			0	0	0	0
19:30	0	19.621	17.818	0	0	0	27.72	0	0	0	0	0	60.7020202	46.2	0			0	0	0	0
19:45	0	13.081	10.182	0	0	0	18.48	0	0	0	0	0	23.26262626	18.48	0			0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:15	0	0	0	0	0	0	nted to e	0	0	0	0	0	0	0	0			0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	2
Signal Warranted?	No



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX D

SIGNAL WARRANT ANALYSIS

FY 2024 Kahekili Hwy/Waiehu Beach Rd
(WBLT Minor)

8-hr Warrant (v0.9)

Weekday Kahekili Hwy/Waiehu Beach Road 8-Hour Signal Warra

Wednesday, August 19, 2020

Condition A - Minimum volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	500	400	350	280	150	120	105	84
2+	1	600	480	420	336	150	120	105	84
2+	2+	600	480	420	336	200	160	140	112
1	2+	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vechicles per hour on higher-volume minor-street approach (one direction only)			
Major	Minor	100% *	80%	70% **	56%	100% *	80%	70% **	56%
1	1	750	600	525	420	75	60	53	42
2+	1	900	720	630	504	75	60	53	42
2+	2+	900	720	630	504	100	80	70	56
1	2+	750	600	525	420	100	80	70	56

Kahekili Hwy | aiehu Beach Ro | 0 | **100 % Warrant**

Major Lanes: 2 | Minor 1 Lanes: 1 (RT Reduction: 0%) | Minor 2 Lanes: 1 (RT Reduction: 100%)

	Minor 1 (EB)			Minor 1 (WB)		
Major Threshold	600	900	720	600	900	720
Minor Threshold	150	75	120	150	75	120

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	EB A	EB B	EB A+B	WB A	WB B	WB A+B	Combination A	Combination B	Combination A+B
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	36.37318903	6.26667	0	-	-	-	-	-	-	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	72.75414141	9.4	0	-	-	-	-	-	-	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	141.7190765	23.5	0	-	-	-	-	-	-	0	0	0
5:00	0	1.3081	1.2727	19.507	14.286	0	6.2667	0	0	0	0	0	208.7098413	28.2	0	-	-	-	-	-	-	0	0	0
5:15	0	0	0	25.667	10.714	0	3.1333	0	0	0	0	0	284.6910823	23.5	0	-	-	-	-	-	-	0	0	0
5:30	0	3.9242	2.5455	41.067	21.429	0	14.1	0	0	0	0	0	382.4251082	31.3333	0	-	-	-	-	-	-	0	0	0
5:45	0	5.2323	1.2727	46.2	14.286	0	4.7	0	0	0	0	0	520.5479942	23.5	0	-	-	-	-	-	-	0	0	0
6:00	0	14.389	6.3636	45.173	46.429	0	1.5667	0	0	0	0	0	663.6841519	24.8294	0	-	-	-	-	-	-	0	0	0
6:15	0	15.697	10.182	67.76	40.476	0	10.967	0	0	0	0	0	834.9847374	35.3216	0	-	-	-	-	-	-	0	0	0
6:30	0	32.702	3.8182	109.85	60.714	0	6.2667	0	0	0	0	0	934.8423825	35.2078	0	-	-	-	-	-	-	0	0	0
6:45	0	42.254	5.125	97.575	65.172	0	6.0294	0	0	0	0	0	928	41	0	-	-	-	-	-	-	0	0	0
7:00	0	49.107	12.813	116.37	105.36	0	12.059	0	0	0	0	0	870.4636114	44.3706	0	-	-	-	-	-	-	0	0	0
7:15	0	65.095	12.813	47.445	108.62	0	10.853	0	0	0	0	0	716.8930115	38.5784	0	-	-	-	-	-	-	0	0	0
7:30	0	36.544	10.25	54.606	98.845	0	12.059	0	0	0	0	0	602.813808	57.4922	0	-	-	-	-	-	-	0	0	0
7:45	0	34.01	5.0909	64.68	48.81	0	9.4	0	0	0	0	0	542.9736219	57.9667	0	-	-	-	-	-	-	0	0	0
8:00	0	35.318	8.9091	51.333	34.524	0	6.2667	0	0	0	0	0	490.1673593	59.5333	0	-	-	-	-	-	-	0	0	0
8:15	0	27.47	10.182	44.147	38.095	0	29.767	0	0	0	0	0	446.7628283	54.8333	0	-	-	-	-	-	-	0	0	0
8:30	0	41.859	14	59.547	25	0	12.533	0	0	0	0	0	*437.8082251*	32.9	0	-	-	-	-	-	-	0	0	0
8:45	0	17.005	7.6364	51.333	23.81	0	10.967	0	0	0	0	0	391.2341703	28.2	0	-	-	-	-	-	-	0	0	0
9:00	0	18.313	3.8182	43.12	21.429	0	1.5667	0	0	0	0	0	390.6779221	25.0667	0	-	-	-	-	-	-	0	0	0
9:15	0	28.778	3.8182	46.2	32.143	0	7.8333	0	0	0	0	0	384.4490909	36.0333	0	-	-	-	-	-	-	0	0	0
9:30	0	17.005	5.0909	50.307	21.429	0	7.8333	0	0	0	0	0	375.5034343	34.4667	0	-	-	-	-	-	-	0	0	0
9:45	0	22.237	7.6364	50.307	19.048	0	7.8333	0	0	0	0	0	364.8905339	37.6	0	-	-	-	-	-	-	0	0	0
10:00	0	6.5404	7.6364	47.227	19.048	0	12.533	0	0	0	0	0	354.2208658	42.3	0	-	-	-	-	-	-	0	0	0
10:15	0	27.47	12.727	37.987	23.81	0	6.2667	0	0	0	0	0	388.4111111	37.6	0	-	-	-	-	-	-	0	0	0
10:30	0	20.929	5.0909	36.96	20.238	0	10.967	0	0	0	0	0	389.0818759	37.6	0	-	-	-	-	-	-	0	0	0
10:45	0	19.621	14	28.747	26.19	0	12.533	0	0	0	0	0	431.5664935	39.1667	0	-	-	-	-	-	-	0	0	0
11:00	0	35.318	11.455	29.773	38.095	0	7.8333	0	0	0	0	0	457.3062626	32.9	0	-	-	-	-	-	-	0	0	0
11:15	0	24.854	10.182	46.2	21.429	0	6.2667	0	0	0	0	0	438.9433189	34.4667	0	-	-	-	-	-	-	0	0	0
11:30	0	41.859	8.9091	45.173	29.762	0	12.533	0	0	0	0	0	455.5805195	40.7333	0	-	-	-	-	-	-	0	0	0
11:45	0	20.929	11.455	46.2	35.714	0	6.2667	0	0	0	0	0	441.8313131	43.8667	0	-	-	-	-	-	-	0	0	0
12:00	0	11.773	10.182	56.467	17.857	0	9.4	0	0	0	0	0	444.8992785	48.5667	0	-	-	-	-	-	-	0	0	0
12:15	0	31.394	8.9091	42.093	36.905	0	12.533	0	0	0	0	0	455.8973737	53.2667	0	-	-	-	-	-	-	0	0	0
12:30	0	13.081	8.9091	55.44	34.524	0	15.667	0	0	0	0	0	464.5457431	45.4333	0	-	-	-	-	-	-	0	0	0
12:45	0	32.702	11.455	41.067	32.143	0	10.967	0	0	0	0	0	490.57114	36.0333	0	-	-	-	-	-	-	0	0	0
13:00	0	11.773	10.182	47.227	38.095	0	14.1	0	0	0	0	0	515.9281385	37.6	0	-	-	-	-	-	-	0	0	0
13:15	0	26.162	25.455	51.333	25	0	4.7	0	0	0	0	0	634.6821934	28.2	0	-	-	-	-	-	-	0	0	0
13:30	0	41.859	8.9091	50.307	36.905	0	6.2667	0	0	0	0	0	712.6031746	37.6	0	-	-	-	-	-	-	0	0	0
13:45	0	45.783	11.455	46.2	39.286	0	12.533	0	0	0	0	0	758.9050505	37.6	0	-	-	-	-	-	-	0	0	0
14:00	0	56.247	7.6364	95.48	66.667	0	4.7	0	0	0	0	0	790.8851659	34.4667	0	-	-	-	-	-	-	0	0	0
14:15	0	47.091	8.9091	90.347	59.524	0	14.1	0	0	0	0	0	754.3154113	47	0	-	-	-	-	-	-	0	0	0
14:30	0	44.475	22.909	65.707	51.19	0	6.2667	0	0	0	0	0	688.7780952	43.8667	0	-	-	-	-	-	-	0	0	0
14:45	0	47.091	24.182	60.573	42.857	0	9.4	0	0	0	0	0	662.338759	48.5667	0	-	-	-	-	-	-	0	0	0
15:00	0	61.48	14	61.6	52.381	0	17.233	0	0	0	0	0	664.0175758	47	0	-	-	-	-	-	-	0	0	0
15:15	0	39.242	11.455	57.493	32.143	0	10.967	0	0	0	0	0	643.925368	43.8667	0	-	-	-	-	-	-	0	0	0
15:30	0	35.318	26.727	63.653	32.143	0	10.967	0	0	0	0	0	718.9446753	45.4333	0	-	-	-	-	-	-	0	0	0
15:45	0	48.399	21.636	64.68	41.667	0	7.8333	0	0	0	0	0	718.5972872	50.1333	0	-	-	-	-	-	-	0	0	0
16:00	0	65.404	16.545	56.467	30.952	0	14.1	0	0	0	0	0	699	47	0	-	-	-	-	-	-	0	0	0
16:15	0	74.561	33.091	63.653	44.048	0	12.533	0	0	0	0	0	717.2933622	45.4333	0	-	-	-	-	-	-	0	0	0
16:30	0	57.556	12.727	50.307	36.905	0	15.667	0	0	0	0	0	658.9441847	39.1667	0	-	-	-	-	-	-	0	0	0
16:45	0	61.48	21.636	60.573	13.095	0	4.7	0	0	0	0	0	649.1663203	29.7667	0	-	-	-	-	-	-	0	0	0
17:00	0	51.015	31.818	66.733	38.095	0	12.533	0	0	0	0	0	635.1857431	45.4333	0	-	-	-	-	-	-	0	0	0
17:15	0	39.242	24.182	62.627	30.952	0	6.2667	0	0	0	0	0	594.6097835	42.3	0	-	-	-	-	-	-	0	0	0
17:30	0	40.551	21.636	53.387	32.143	0	6.2667	0	0	0	0	0	560.9805195	39.1667	0	-	-	-	-	-	-	0	0	0
17:45	0	54.939	14	36.96	36.905	0	20.367	0	0	0	0	0	526.1873882	37.6	0	-	-	-	-	-	-	0	0	0
18:00	0	34.01	26.727	48.253	38.095	0	9.4	0	0	0	0	0	466.7905339	26.6333	0	-	-	-	-	-	-	0	0	0
18:15	0	39.242	21.636	41.067	21.429	0	3.1333	0	0	0	0	0	414.9461472	28.2	0	-	-	-	-	-	-	0	0	0
18:30	0	53.631	8.9091	34.907	15.476	0	4.7	0	0	0	0	0	374.945974	28.2	0	-	-	-	-	-	-	0	0	0
18:45	0	24.854	5.0909	37.987	15.476	0	9.4	0	0	0	0	0	346.2297258	31.3333	0	-	-	-	-	-	-	0	0	0
19:00	0	31.394	14	30.8	19.048	0	10.967	0	0	0	0	0	320.041241	25.0667	0	-	-	-	-	-	-	0	0	0
19:15	0	31.394	10.182	21.56	20.238	0	3.1333	0	0	0	0	0	224.7996825	14.1	0	-	-	-	-	-	-	0	0	0
19:30	0	19.621	17.818	27.72	19.048	0	7.8333	0	0	0	0	0	141.4258297	10.9667	0	-	-	-	-	-	-	0	0	0
19:45	0	13.081	10.182	18.48	15.476	0	3.1333	0	0	0	0	0	57.21881674	3.13333	0	-	-	-	-	-	-	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0

	A	B	A+B
Hours where condition met:	0	0	0
Signal Warranted?	No		
Notes			

4-hr Warrant (v0.9)

Weekday Kahekili Hwy/Waiehu Beach Road 4-Hour Signal Warrant

Wednesday, August 19, 2020

Kahekili Hwy | aiehu Beach Ro | 0 | **100 % Warrant**

Major Lanes: 2 | Minor 1 Lanes: 1 (RT Reduction: 0%) | Minor 2 Lanes: 1 (RT Reduction: 100%) | Major Threshold

Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Major Combined Hourly	Minor 1 Hourly	Minor 2 Hourly	Minor 1 Warrant Met	Minor 2 Warrant Met	Minor 1 Warrant Hour	Minor 2 Warrant Hour	Combo Warrant met	Combo Hour
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
1:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
2:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
4:15	0	0	0	0	0	0	0	0	0	0	0	0	36.37318903	6.26667	0			0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	72.75414141	9.4	0			0	0	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0	141.7190765	23.5	0			0	0	0	0
5:00	0	1.3081	1.2727	19.507	14.286	0	6.2667	0	0	0	0	0	208.7098413	28.2	0			0	0	0	0
5:15	0	0	0	25.667	10.714	0	3.1333	0	0	0	0	0	284.6910823	23.5	0			0	0	0	0
5:30	0	3.9242	2.5455	41.067	21.429	0	14.1	0	0	0	0	0	382.4251082	31.3333	0			0	0	0	0
5:45	0	5.2323	1.2727	46.2	14.286	0	4.7	0	0	0	0	0	520.5479942	23.5	0			0	0	0	0
6:00	0	14.389	6.3636	45.173	46.429	0	1.5667	0	0	0	0	0	663.6841519	24.8294	0			0	0	0	0
6:15	0	15.697	10.182	67.76	40.476	0	10.967	0	0	0	0	0	834.9847374	35.3216	0			0	0	0	0
6:30	0	32.702	3.8182	109.85	60.714	0	6.2667	0	0	0	0	0	934.8423825	35.2078	0			0	0	0	0
6:45	0	42.254	5.125	97.575	65.172	0	6.0294	0	0	0	0	0	928	41	0			0	0	0	0
7:00	0	49.107	12.813	116.37	105.36	0	12.059	0	0	0	0	0	870.4636114	44.3706	0			0	0	0	0
7:15	0	65.095	12.813	47.445	108.62	0	10.853	0	0	0	0	0	716.8930115	38.5784	0			0	0	0	0
7:30	0	36.544	10.25	54.606	98.845	0	12.059	0	0	0	0	0	602.813808	57.4922	0			0	0	0	0
7:45	0	34.01	5.0909	64.68	48.81	0	9.4	0	0	0	0	0	542.9736219	57.9667	0			0	0	0	0
8:00	0	35.318	8.9091	51.333	34.524	0	6.2667	0	0	0	0	0	490.1673593	59.5333	0			0	0	0	0
8:15	0	27.47	10.182	44.147	38.095	0	29.767	0	0	0	0	0	446.7628283	54.8333	0			0	0	0	0
8:30	0	41.859	14	59.547	25	0	12.533	0	0	0	0	0	*437.8082251*	32.9	0			0	0	0	0
8:45	0	17.005	7.6364	51.333	23.81	0	10.967	0	0	0	0	0	391.2341703	28.2	0			0	0	0	0
9:00	0	18.313	3.8182	43.12	21.429	0	1.5667	0	0	0	0	0	390.6779221	25.0667	0			0	0	0	0
9:15	0	28.778	3.8182	46.2	32.143	0	7.8333	0	0	0	0	0	384.4490909	36.0333	0			0	0	0	0
9:30	0	17.005	5.0909	50.307	21.429	0	7.8333	0	0	0	0	0	375.5034343	34.4667	0			0	0	0	0
9:45	0	22.237	7.6364	50.307	19.048	0	7.8333	0	0	0	0	0	364.8905339	37.6	0			0	0	0	0
10:00	0	6.5404	7.6364	47.227	19.048	0	12.533	0	0	0	0	0	354.2208658	42.3	0			0	0	0	0
10:15	0	27.47	12.727	37.987	23.81	0	6.2667	0	0	0	0	0	388.4111111	37.6	0			0	0	0	0
10:30	0	20.929	5.0909	36.96	20.238	0	10.967	0	0	0	0	0	389.0818759	37.6	0			0	0	0	0
10:45	0	19.621	14	28.747	26.19	0	12.533	0	0	0	0	0	431.5664935	39.1667	0			0	0	0	0
11:00	0	35.318	11.455	29.773	38.095	0	7.8333	0	0	0	0	0	457.3062626	32.9	0			0	0	0	0
11:15	0	24.854	10.182	46.2	21.429	0	6.2667	0	0	0	0	0	438.9433189	34.4667	0			0	0	0	0
11:30	0	41.859	8.9091	45.173	29.762	0	12.533	0	0	0	0	0	455.5805195	40.7333	0			0	0	0	0
11:45	0	20.929	11.455	46.2	35.714	0	6.2667	0	0	0	0	0	441.8313131	43.8667	0			0	0	0	0
12:00	0	11.773	10.182	56.467	17.857	0	9.4	0	0	0	0	0	444.8992785	48.5667	0			0	0	0	0
12:15	0	31.394	8.9091	42.093	36.905	0	12.533	0	0	0	0	0	455.8973737	53.2667	0			0	0	0	0
12:30	0	13.081	8.9091	55.44	34.524	0	15.667	0	0	0	0	0	464.5457431	45.4333	0			0	0	0	0
12:45	0	32.702	11.455	41.067	32.143	0	10.967	0	0	0	0	0	490.57114	36.0333	0			0	0	0	0
13:00	0	11.773	10.182	47.227	38.095	0	14.1	0	0	0	0	0	515.9281385	37.6	0			0	0	0	0
13:15	0	26.162	25.455	51.333	25	0	4.7	0	0	0	0	0	634.6821934	28.2	0			0	0	0	0
13:30	0	41.859	8.9091	50.307	36.905	0	6.2667	0	0	0	0	0	712.6031746	37.6	0			0	0	0	0
13:45	0	45.783	11.455	46.2	39.286	0	12.533	0	0	0	0	0	758.9050505	37.6	0			0	0	0	0
14:00	0	56.247	7.6364	95.48	66.667	0	4.7	0	0	0	0	0	790.8851659	34.4667	0			0	0	0	0
14:15	0	47.091	8.9091	90.347	59.524	0	14.1	0	0	0	0	0	754.3154113	47	0			0	0	0	0
14:30	0	44.475	22.909	65.707	51.19	0	6.2667	0	0	0	0	0	688.7780952	43.8667	0			0	0	0	0
14:45	0	47.091	24.182	60.573	42.857	0	9.4	0	0	0	0	0	662.338759	48.5667	0			0	0	0	0
15:00	0	61.48	14	61.6	52.381	0	17.233	0	0	0	0	0	664.0175758	47	0			0	0	0	0
15:15	0	39.242	11.455	57.493	32.143	0	10.967	0	0	0	0	0	643.925368	43.8667	0			0	0	0	0
15:30	0	35.318	26.727	63.653	32.143	0	10.967	0	0	0	0	0	718.9446753	45.4333	0			0	0	0	0
15:45	0	48.399	21.636	64.68	41.667	0	7.8333	0	0	0	0	0	718.5972872	50.1333	0			0	0	0	0
16:00	0	65.404	16.545	56.467	30.952	0	14.1	0	0	0	0	0	699	47	0			0	0	0	0
16:15	0	74.561	33.091	63.653	44.048	0	12.533	0	0	0	0	0	717.2933622	45.4333	0			0	0	0	0
16:30	0	57.556	12.727	50.307	36.905	0	15.667	0	0	0	0	0	658.9441847	39.1667	0			0	0	0	0
16:45	0	61.48	21.636	60.573	13.095	0	4.7	0	0	0	0	0	649.1663203	29.7667	0			0	0	0	0
17:00	0	51.015	31.818	66.733	38.095	0	12.533	0	0	0	0	0	635.1857431	45.4333	0			0	0	0	0
17:15	0	39.242	24.182	62.627	30.952	0	6.2667	0	0	0	0	0	594.6097835	42.3	0			0	0	0	0
17:30	0	40.551	21.636	53.387	32.143	0	6.2667	0	0	0	0	0	560.9805195	39.1667	0			0	0	0	0
17:45	0	54.939	14	36.96	36.905	0	20.367	0	0	0	0	0	526.1873882	37.6	0			0	0	0	0
18:00	0	34.01	26.727	48.253	38.095	0	9.4	0	0	0	0	0	466.7905339	26.6333	0			0	0	0	0
18:15	0	39.242	21.636	41.067	21.429	0	3.1333	0	0	0	0	0	414.9461472	28.2	0			0	0	0	0
18:30	0	53.631	8.9091	34.907	15.476	0	4.7	0	0	0	0	0	374.945974	28.2	0			0	0	0	0
18:45	0	24.854	5.0909	37.987	15.476	0	9.4	0	0	0	0	0	346.2297258	31.3333	0			0	0	0	0
19:00	0	31.394	14	30.8	19.048	0	10.967	0	0	0	0	0	320.041241	25.0667	0			0	0	0	0
19:15	0	31.394	10.182	21.56	20.238	0	3.1333	0	0	0	0	0	224.7996825	14.1	0			0	0	0	0
19:30	0	19.621	17.818	27.72	19.048	0	7.8333	0	0	0	0	0	141.4258297	10.9667	0			0	0	0	0
19:45	0	13.081	10.182	18.48	15.476	0	3.1333	0	0	0	0	0	57.21881674	3.13333	0			0	0	0	0
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20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
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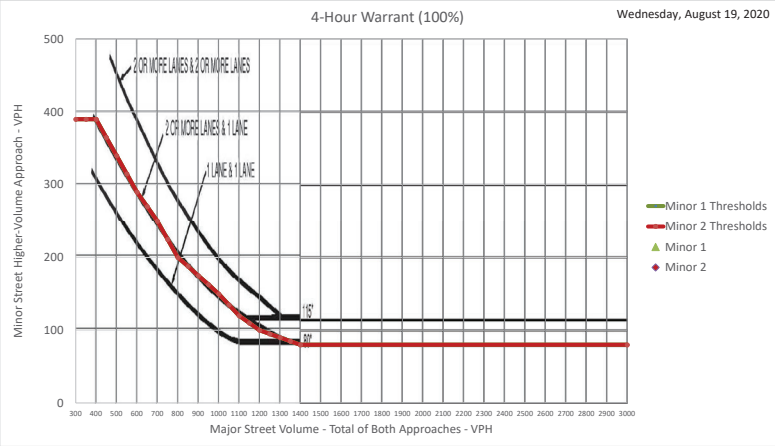
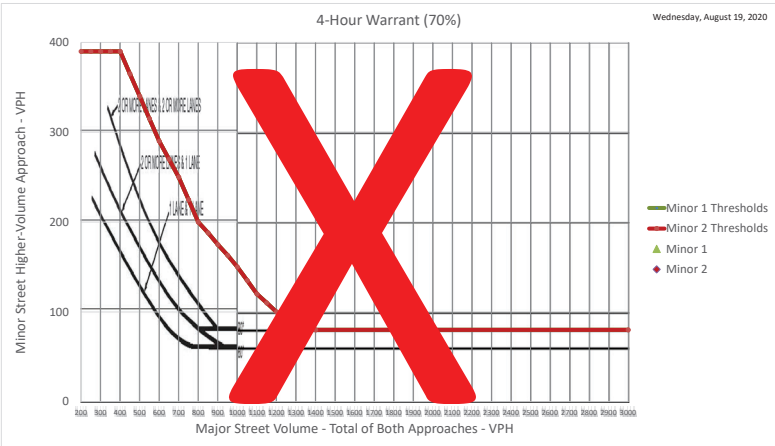
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0

Hours Where Condition Met:	0
Signal Warranted?	No


4-Hour Warrant (100%)
Wednesday, August 19, 2020
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
115*
80*
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2


4-Hour Warrant (70%)
Wednesday, August 19, 2020
2 OR MORE LANES & 2 OR MORE LANES
2 OR MORE LANES & 1 LANE
1 LANE & 1 LANE
Minor Street Higher-Volume Approach - VPH
Major Street Volume - Total of Both Approaches - VPH
Minor 1 Thresholds
Minor 2 Thresholds
Minor 1
Minor 2

LETTER FROM STATE DEPARTMENT OF TRANSPORTATION REGARDING FAIR SHARE CONTRIBUTION FOR TRAFFIC IMPACTS

APPENDIX

J-1

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROSS M. HIGASHI
EDUARDO P. MANGLALLAN
PATRICK H. MCCAIN
EDWIN H. SNIFFEN

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

IN REPLY REFER TO:
HWY-PS 2.7153

February 7, 2022

VIA EMAIL: moe.mohanna@housingpartners.com

Mr. Mohannad H. Mohanna
President
Highridge Costa Development Company
330 West Victoria Street
Gardena, California 90248

Dear Mr. Mohanna:

Subject: Draft Environmental Assessment (EA)
Hale Mahaolu Ke Kahua Affordable Housing Community Project
Waiehu, Maui, Hawaii
Tax Map Key No. (2) 3-3-001:106

The State of Hawaii Department of Transportation (HDOT) understands that Waiehu Housing, LP (Applicant) proposes developing a 120-unit affordable rental housing community, including a clubhouse and non-profit building in Waiehu, Maui.

The HDOT reviewed and provided comments on the Draft EA and Traffic Impact Analysis Report (TIAR) via a comment letter dated October 19, 2021 (STP 8.3276). Austin, Tsutsumi & Associates, Inc. (ATA) responded to these comments via email dated November 19, 2021. Based on ATA's responses, we find the conclusions and recommendations of the TIAR acceptable, provided that the Applicant perform the following task:

1. The Applicant shall provide a one-time subsidy of $104.00 toward the first month's rent to the first tenant occupying each of the 120 units. The one-time $104.00 subsidy shall not apply to subsequent rental payments beyond the first month of occupancy or to future tenants who may occupy the units thereafter.

The one-time subsidy, as described above, is proposed by the HDOT as an appropriate means to promote housing affordability, which is a high state priority, in lieu of the Applicant's de minimis fair share of traffic improvements requirements for the Project. This one-time subsidy requirement shall be included in the Applicant's Workforce Housing Agreement with the County of Maui, a copy of which shall be provided to the HDOT upon execution.

If you have any questions, please contact Jeyan Thirugnanam, Systems Planning Engineer, Highways Division, Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PS 2021-167.

Sincerely,

JADE T. BUTAY
Director of Transportation

Attachment: ATA Response to HDOT Comment Matrix

STATE LAND USE COMMISSION – DISTRICT BOUNDARY INTERPRETATION

APPENDIX

K

DAVID Y. IGE
Governor

MIKE McCARTNEY
DIRECTOR

DANIEL E. ORODENKER
Executive Officer

LAND USE COMMISSION
Department of Business, Economic Development & Tourism
State of Hawai`i

June 24, 2021

Harrison Herzberg
Project Analyst
Highridge Costa Housing Partners
330 West Victoria Street
Gardena, CA 90248-3527

Dear Mr. Herzberg,

Subject: BOUNDARY INTERPRETATION No. 21-02
Tax Map Key No.: 3-3-001: 106,
Paukukalo, Waiehu, Wailuku, Maui, Hawaii

Pursuant to your letter dated February 23, 2021, requesting a boundary interpretation for the subject parcel and your survey map, dated June 09, 2021.

The State Land Use (SLU) Urban / Agricultural District Boundaries are based on the Commission's records, your survey map, and the official maps currently on file at our office. We especially reviewed the current SLU District Boundaries Map M-5, Wailuku Quadrangle, dated December 20, 1974.

Enclosed for your reference is your survey map entitled, "*NSPS / ALTA Land Title Survey, Lot 1-C of the Paukukalo, Large Lot Subdivision (Subdivision No. 3.1744)"* with the certified location of the SLU Agricultural / Conservation District Boundaries. Should you require clarification or further assistance, please feel free to call Fred Talon at 808.587.3822.

Sincerely,

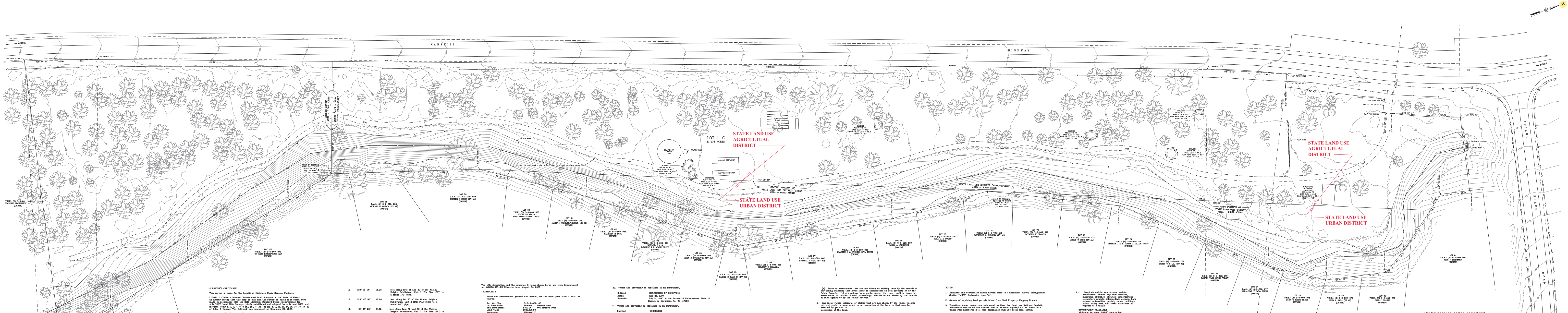
DANIEL E. ORODENKER
Executive Officer

Enclosures

c Michele Chouteau McClean, Director, Department of Planning, County of Maui, (w/enclosures)
John Rapacz, Administrator, Zoning Administration & Enforcement Division, County of Maui (w/enclosures)
Dawn Matney, Real Property Tax Supervisor, County of Maui (w/enclosures)
Bill Medeiros, GIS Coordinator, County of Maui (w/enclosures)

235 SOUTH BERETANIA STREET ❁ SUITE 406 ❁ HONOLULU, HAWAI`I 96813 ❁ TEL (808) 587-3822 ❁ Fax (808) 587-3827 ❁ EMAIL: luc@dbedt.hawaii.gov

Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804



LEGEND

(symbol)	PALM TREE
(symbol)	DECIDUOUS TREE
(line)	CHAIN LINK FENCE
(line)	TOP BANK
(line)	BOTTOM BANK
(line)	GUARD RAIL

SURVEYOR'S CERTIFICATE

This survey is made for the benefit of Highridge Costa Housing Partners.

I Kevin J. Clarke a licensed Professional Land Surveyor in the State of Hawaii, do hereby certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 5, 6 (a), (b), 7 (a), (b) (1), 8, 9, 11, 13, 14, 16, 17, 18, 19, 20 of Table A thereof. The fieldwork was completed on November 24, 2020.

I further certify the aforesaid parties, their successors and assigns, as of the date set forth above, that a survey was done by or under my direct supervision of a tract of land described as follows:

All of that certain parcel of land being Lot 1-C of the Paukukalo Large-Lot Subdivision, being a portion of Grant 3343 to Claus Spreckels, and a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, situate at Paukukalo, Waiehu, Wailuku, Maui, Hawaii, thus bounded and described:

Beginning at a found 3/4" pipe at the Southeast corner of this parcel, also being the Southwest corner of Lot 1-B of the Paukukalo Large-Lot Subdivision, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being:

11,352.04 ft. North
887.43 ft. West

and running by azimuths measured clockwise from true South:

1. 102° 44' 00" 413.27 feet along Lot 1-B, Paukukalo Large-Lot Subdivision to a found 1/2" pipe;

Along an arc of a curve to the right, concave South Easterly with a radius of 1800.00 feet, the chord azimuth and distance being:

2. 198° 44' 43" 110.24 feet along Kahekili Highway to a set mag nail;
3. 200° 30' 00" 1,664.46 feet along same to a set mag nail;

Along an arc of a curve to the right, concave Southeasterly with a radius of 1050.91 feet. the chord azimuth and distance being:

4. 203° 46' 15" 119.92 feet along same to a found 1/2" pipe;
5. 297° 02' 30" 18.97 feet along same to a found 1/2" pipe;
6. 207° 02' 30" 150.00 feet along same to a set 1/2" pipe;
7. 297° 02' 30" 20.00 feet along same to a found 3/4" pipe;
8. 207° 02' 30" 12.11 feet along same to a found 3/4" pipe;

Along an arc of a curve to the left, concave Northwesterly with a radius of 776.20 feet, the chord azimuth and distance being:

9. 203° 11' 30" 104.24 feet along same to a set 1/2" pipe.
10. 282° 46' 30" 111.07 feet along Waiehu Beach Road to a found 1/2" pipe.
11. 12° 46' 30" 43.44 feet along Lot 81 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
12. 323° 18' 20" 98.02 feet along Lots 81 and 80 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
13. 328° 43' 10" 45.20 feet along Lot 80 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
14. 12° 45' 20" 91.70 feet along Lots 80 and 79 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
15. 33° 40' 40" 91.23 feet along Lots 78 and 77 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 3/4" pipe;
16. 42° 17' 20" 236.59 feet along Lots 77, 76, 75 and 74 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
17. 26° 18' 00" 201.19 feet along Lots 74, 73, 72 and 71 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
18. 3° 52' 00" 146.66 feet along Lots 71, 70, and 69 of the Waiehu Heights Subdivision, Unit II (File Plan 1537) to a found 1/2" pipe;
19. 9° 44' 50" 237.36 feet along Lots 69, 68, 67 and 66 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
20. 36° 18' 00" 236.38 feet along Lots 65, 64, 63 and 62 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
21. 34° 22' 20" 168.26 feet along Lots 61, 60, and 59 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) to a found 1/2" pipe;
22. 18° 13' 30" 222.62 feet along Lots 59 and 58 of the Waiehu Heights Subdivision, Unit II (File Plan 1567) and Lot 157 of the Waiehu Heights Subdivision (File Plan 1482) to a found 1/2" pipe;
23. 347° 51' 40" 73.62 feet along Lot 157 of the Waiehu Heights Subdivision (File Plan 1482) to a found 1/2" pipe;
24. 349° 07' 40" 176.08 feet along same to a found 1/2" pipe;
25. 348° 11' 30" 135.68 feet along Lot 157 of the Waiehu Heights Subdivision (File Plan 1482) and Lot 92 of Waiehu Heights Subdivision, Unit III (file Plan 1567) the to a found 1/2" pipe;
26. 353° 25' 30" 88.66 feet along Lots 92 and 93 of Waiehu Heights Subdivision, Unit III (file Plan 1715) the to the point of beginning and containing an area of 11.476 acres more or less;

The title description and the schedule B items shown heron are from Commitment no: 6841001997-DD Effective date: August 24, 2020

SCHEDULE B

1. Taxes and assessments, general and special, for the fiscal year 2020 - 2021, as follows:

Tax Map Key	2-3-3-001-106	
1st Installment	$200.00	Marked Paid
2nd Installment	$200.00	NOT Marked Paid
Land Value	$688,600.00	
Exemption	$688,600.00	

2. Attention is invited to the fact that the premises covered herein may be subject to possible rollback or retroactive property taxes due to possible loss of tax credit or exemption status.
3. Mineral and water rights of any nature in favor of the State of Hawaii.
4. Any and all existing roadways, trails, easements, rights of way, flumes and Kuleana & irrigation ditches.
5. Rights of native tenants, as reserved in Royal Patent Grant Number 3343.
6. Terms and provisions as contained in an instrument,
7.

Entitled DEED
Dated June 23, 1924
Recorded August 2, 1924 in the Bureau of Conveyances, State of Hawaii, in Book 740, Page 134

Said Deed was amended by the following instruments(s):

Dated:	RECORDED:	BOOK:	PAGE:
May 31, 1937	May 31, 1937	1371	227
September 14, 1954	September 17, 1954	2868	284

8. Terms and provisions as contained in an instrument,

Entitled SUBDIVISION AGREEMENT (THREE LOTS OR LESS)
Dated July 7, 1980
Recorded July 24, 1980 in the Bureau of Conveyances, State of Hawaii, in Book 14879, Page 656

9. Terms and provisions as contained in an instrument,

Entitled SUBDIVISION AGREEMENT (LARGE LOTS)
Dated July 7, 1980
Recorded August 20, 1980 in the Bureau of Conveyances, State of Hawaii, in

10. An easement affecting that portion of said land and for the purposes stated herein and incidental purposes as provided in the following

Instrument EASEMENT
Granted To MAUI ELECTRIC COMPANY, LIMITED, a Hawaii corporation, and HAWAIIAN TELEPHONE COMPANY, a Hawaii corporation, now known as HAWAIIAN TELCOM, INC.
For Electrical and utility purposes
Dated January 5, 1987
Recorded February 7, 1987 in the Bureau of Conveyances, State of Hawaii, in Book 20331, Page 23

10. Terms and provisions as contained in an instrument,

Entitled DECLARATION OF CONDITIONS
Dated July 25, 1990
Recorded July 31, 1990 in the Bureau of Conveyances, State of Hawaii, as Document No. 90-117006

11. Terms and provisions as contained in an instrument,

Entitled AGREEMENT
Dated July 26, 1990
Recorded July 31, 1990 in the Bureau of Conveyances, State of Hawaii, as Document No. 90-117008

12. Terms and provisions as contained in an instrument,

Entitled AGREEMENT FOR THE DEFERRAL OF SUBDIVISION REQUIREMENTS
Dated October 26, 1990
Recorded November 2, 1990 in the Bureau of Conveyances, State of Hawaii, as Document No. 90-171098

13. Terms and provisions as contained in an instrument,

Entitled UNILATERAL AGREEMENT AND DECLARATION FOR CONDITIONAL ZONING
Dated August 29, 1991
Recorded September 12, 1991 in the Bureau of Conveyances, State of Hawaii, as Document No. 91-124295

14. Restriction of Vehicle Access Rights along portions of Waiehu Beach Road and Kahekili Highway, as shown on the survey map dated November 8, 2005, last revised March 5, 2007, approved by the Director of Public Works and Environmental Management for the County of Maui on March 15, 2007, as Subdivision File No. 3.1744.

15. Terms and provisions as contained in an instrument,

Entitled HOLD-HARMLESS AGREEMENT
Dated May 31, 2011
Recorded April 2, 2012 in the Office of the Assistant Registrar of the Land Court, State of Hawaii, as Document No. A-44750770

16. Terms and provisions as contained in an instrument,

Entitled MEMORANDUM OF OPTION TO LEASE AGREEMENT (Affordable Housing Project)
Executed By MAUI ECONOMIC OPPORTUNITY, INC., a Hawaii nonprofit corporation ("Optionor"), and HIGHRIDGE COSTA DEVELOPMENT COMPANY, LLC, a Delaware limited liability company ("Optionee")
Dated February 7, 2020
Recorded March 13, 2020 in the Bureau of Conveyances, State of Hawaii, as Document No. A-73770800

Term of Option Agreement: 48 calender months from February 7, 2020

17. Any unrecorded and subsisting leases.

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material unless such lien is shown by the Public Records at Date of Policy.
7. The requirement that this Company be provided with a suitable Owner's Declaration (form ORT 174). The Company reserves the right to make additional exceptions and/or requirements upon review of the Owner's Declaration.
8. Satisfactory evidence furnished to this Company:

a) as to the due formation and continued existence of MAUI ECONOMIC OPPORTUNITY, INC. as a legal entity under the laws of Hawaii; and

b) documents from its board of directors authorizing this transaction and specifying the officers to execute on behalf of the corporation.

------------------ Informational Notes--------------------

A. NOTE: According to the public records, there have been no deeds conveying the property described in this report recorded within a period of 36 months prior to the date hereof except as follows: NONE

B. There is hereby omitted from any covenants, conditions, restrictions, reservations, agreements, obligations, easements and other provisions, any covenants or restrictions, if any, based upon race, color, religion, sex, including gender identity or expression, sexual orientation, handicap, disability, age, marital status, familial status, national origin, ancestry, source of income, etc., as set forth in applicable state or federal law, unless and only to the extent that said covenant or restriction is permitted by applicable law. Lawful restrictions under state or federal law on the age of occupants in senior housing or housing for older persons shall not be construed as restrictions based on familial status.

C. We find no open Mortgage of record. Please verify by inquiry of Escrow Personnel and/or Agents whether or not we have overlooked something and advise the Title Department accordingly prior to closing.

D. Short Term Rate ("STR") does not apply.

NOTES:

1. Azimuths and coordinates shown hereon refer to Government Survey Triangulation Station "LUKE", designated thus "△".
2. Owners of adjoining land parcels taken from Real Property Mapping Branch.
3. Elevations shown hereon are referenced to Mean Sea Level per National Geodetic Benchmark located on the Eastern side of Kahekili Highway 104 Ft. North of a utility Pole numbered 2-11 with designation SOH 094 Local Tidal Datum.
4. Topographic information shown heron is based on an actual ground survey performed by CLSE Inc. between the dates of November 10, 2020 and November 24, 2020.
5. The subject parcel lies within an area designated as Zone "X" as shown on the Flood Insurance Rate Map, Community Panel Number 15000300383 E, last revised September 19, 2012. Zone "X" = "Areas determined to be outside the 0.2% annual chance floodplain."
6. The subject parcel is County of Maui Zoned Interim and Agricultural, as shown on the Department Of Planning County Of Maui, Maui Island Digital Zoning Map 2, Page B2, Ordinance 5006 (Bill 81), effective November 13, 2019.
7. Interim zoning setback requirements:

7.a. One single-family dwelling per six thousand square feet of land:

DEVELOPMENT STANDARDS
Minimum lot area 6,000 square feet
Minimum lot width 60 feet
Maximum height 30 feet
Minimum yard setback (Up to and including 15 feet in height):
Front 15 feet
Side 6 feet
Rear 6 feet
(More than 15 feet in height):
Front 15 feet
Side 10 feet
Rear 10 feet

There may be the usual necessary accessory buildings and accessory dwellings, as defined in section 19.04.040 of this title, in connection with any such dwelling.

7.b. Duplex dwellings:

DEVELOPMENT STANDARDS
Minimum lot area 12,000 square feet
Minimum lot width 60 feet
Maximum building height 30 feet
Minimum yard setback (Up to and including 15 feet in height):
Front 15 feet
Side 6 feet
Rear 6 feet
(More than 15 feet in height):
Front 15 feet
Side 10 feet
Rear 10 feet

7.c. Hospitals and/or sanitariums, and/or convalescent homes, day care facilities, museums, churches, libraries, kindergartens, elementary schools, intermediate schools, high schools, universities, publicly owned buildings, public utility uses, and tower structures in support of a utility:

DEVELOPMENT STANDARDS
Minimum lot area 20,000 square feet
Minimum lot width 100 feet
Maximum building height 30 feet
Maximum tower height 50 feet
Minimum yard setback Front 20 feet
Side 20 feet
Rear 20 feet Tower structures in support of a utility shall be set back from the property line at a distance at least equal to the overall height of the tower

7.d. The construction of new, or the expansion of existing parks, playgrounds, community centers, or public/quasi-public facilities, owned or operated by private or governmental agencies, and tower structures in support of a utility; provided that the utility services the new or expanded park, playground, community center or public/quasi-public facility:

DEVELOPMENT STANDARDS
Minimum lot area No minimum
Minimum lot width No minimum
Maximum building/tower height 50 feet on the islands of Maui and Lanai. On the island of Molokai, building height shall be limited to 35 feet, and tower height shall be limited to 50 feet.
Minimum yard setback Front 15 feet
Side 10 feet
Rear 15 feet Tower structures in support of a utility shall be set back from the property line at a distance at least equal to the overall height of the tower

8. Agricultural Zoning District minimum yard setbacks:

8.a. front yards, twenty-five feet

8.b. side and rear yards, fifteen feet

9. State Land Use designation shown heron as per Hawaii State Land Use Commission.
10. The survey correctly shows the location of all buildings, structures and other improvements situated on the premises.
11. The property abuts and has physical access to Kahekili Highway which is a paved State roadway and abuts Waiehu Beach Road which is a paved County roadway.
12. The subject parcel has no apparent of visible potential encroachments.

UTILITY COMPANIES PROVIDING SERVICE IN VICINITY:

1. COUNTY OF MAUI DEPARTMENT OF WATER SUPPLY - (808) 270-7816
2. COUNTY OF MAUI WASTEWATER RECLAMATION DIVISION - (808) 270-7417
3. MAUI ELECTRIC COMPANY - (808) 871-9777

LAND USE COMMISSION
STATE OF HAWAII

2021 JUNE 06 AM 11: 50

BOUNDARY INTERPRETATION
No. 21-02

The boundary as located, named and delineated is hereby certified as the actual Land Use District Boundary adopted by the State Land Use Commission, Honolulu, Hawaii

June 24, 2021 by [signature]
Date Executive Officer

NSPS / ALTA LAND TITLE SURVEY

LOT 1-C OF THE PAUKUKALO LARGE LOT SUBDIVISION
(SUBDIVISION NO. 3.1744)

Being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo

SITUATED AT PAUKUKALO, WAIEHU, WAILUKU, MAUI, HAWAII

Prepared for:
Highridge Costa Housing Partners
330 W Victoria St.
Gardena, CA 90248

Scale: 1 Inch = 20 Feet
Date: February 5, 2021
Revised: May 29, 2021

KEVIN J. CLARKE LICENSED PROFESSIONAL LAND SURVEYOR No. 17011-LS HAWAII, U.S.A.

This plat was prepared from a survey on the ground performed by me or under my supervision.
EXP. 4/22
KEVIN J. CLARKE
Licensed Professional Land Surveyor Certificate No. 17011-LS

TMK: (2) 3-3-001: 106

36" X 120" = 30 SQ. FT.

0 20 40 Feet

DWG No. 0559-ALTA JOB No. 20-0559

AGRICULTURAL STATE LAND DISTRICT AREA

Being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo,
and a portion of Grant 3343 to Claus Spreckels
being also a portion of Lot 1-C of the Paukukalo Large Lot Subdivision
Subdivision File No. 3.1744

at
Waiehu, Wailuku, Maui, Hawaii

Beginning at the Southeast corner of this parcel, also being the Northeast corner of Lot 1-B, being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, and a portion of Grant 3343 to Claus Spreckels, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 11,352.04 feet North, 887.43 feet West and running by azimuths measured clockwise from true South:

1.	10° 44'	413.27 feet	along Lot 1-B, being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, and a portion of Grant 3343 to Claus Spreckels;
			thence along Kahekili Highway, on a curve to the right, with a radius of 1800.00 feet, the chord azimuth and distance being
2.	198° 44' 43"	110.24 feet;	
3.	200° 30'	1664.46 feet	along the same;
			thence along the same, on a curve to the right, with a radius of 1050.91 feet, the chord azimuth and distance being
4.	203° 46' 15"	119.92 feet;	
5.	297° 02' 30"	18.97 feet	along the same;
6.	207° 02' 30"	150.00 feet	along the same;
7.	297° 02' 30"	20.00 feet	along the same;

8.	207° 02' 30"	12.11 feet	along the same;
			thence along the same, on a curve to the left, with a radius of 776.20 feet, the chord azimuth and distance being
9.	203° 11' 30"	104.24 feet;	
10.	282° 46' 30"	111.07 feet	along Waiehu Beach Road;
11.	12° 46' 30"	43.44 feet	along Lots 81 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
12.	323° 18' 20"	28.89 feet	along the same;
13.	22° 28' 45"	1427.95 feet	over 1-C of the Paukukalo Large Lot Subdivision, being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, and a portion of Grant 3343 to Claus Spreckels;
14.	18° 13' 30"	222.62 feet	along Lots 59, 58, and 57 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo and Lot 157 of Waiehu Heights Subdivision (File Plan No. 1482), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
15.	347° 51' 40"	73.62	along Lot 157 of Waiehu Heights Subdivision (File Plan No. 1482), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
16.	349° 07' 40"	176.08 feet	along the same;
17.	348° 11' 30"	135.68 feet	along Lot 157 of Waiehu Heights Subdivision (File Plan No. 1482), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo and Lot 92 Waiehu Heights Subdivision III (File Plan No. 1715)

being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;

18.	353° 25' 30"	88.66 feet	along Lot 93 Waiehu Heights Subdivision III (File Plan No. 1715) being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo to the point of beginning and containing an area of 9.798 acres;

KEVIN JOSEPH CLARKE
LICENSED PROFESSIONAL LAND SURVEYOR
No. 17011
HAWAII U.S.A.

Kevin J. Clarke
Licensed Professional Land Surveyor
Certificate No. 17011-LS
Exp. 04/2022

05/29/2021

TOPO Ke Kahua (SLU Ag)
File 20-0559

FIRST PORTION OF
URBAN STATE LAND DISTRICT AREA

Being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo
being also a portion of Lot 1-C of the Paukukalo Large Lot Subdivision
Subdivision File No. 3.1744

at
Waiehu, Wailuku, Maui, Hawaii

Beginning at the South corner of this parcel, also being the Westerly corner of Lot 71 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 12,733.92 feet North, 612.82 feet West and running by azimuths measured clockwise from true South:

1.	202° 28' 45"	665.36 feet	over Lot 1-C of the Paukukalo Large Lot Subdivision (Subdivision File No. 3.1744), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
2.	323° 18' 20"	69.13 feet	along Lots 81 and 80 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
3.	328° 43' 10"	45.20 feet	along Lot 80 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
4.	12° 45' 20"	91.70 feet	along Lots 80 and 79 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
5.	33° 40' 40"	91.23 feet	along Lots 78 and 77 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
6.	42° 17' 20"	236.59 feet	along Lots 77, 76, 75, and 74 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion

of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo to the point of beginning and containing an area of 0.801 acres.

KEVIN JOSEPH CLARKE
LICENSED PROFESSIONAL LAND SURVEYOR No. 17011
HAWAII U.S.A.

Kevin J. Clarke
Licensed Professional Land Surveyor
Certificate No. 17011-LS
Exp. 04/2022 05/29/2021

TOPO Ke Kahua (SLU Urban 1)
File 20-0559

SECOND PORTION OF
URBAN STATE LAND DISTRICT AREA

Being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo
being also a portion of Lot 1-C of the Paukukalo Large Lot Subdivision
Subdivision File No. 3.1744

at
Waiehu, Wailuku, Maui, Hawaii

Beginning at the North corner of this parcel, also being the Westerly corner of Lot 71 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo, the coordinates of said point of beginning referred to Government Survey Triangulation Station "LUKE" being 12,733.92 feet North, 612.82 feet West and running by azimuths measured clockwise from true South:

1.	3° 52'	146.66 feet	along Lots 71, 70, and 69 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
2.	9° 44' 50"	237.36 feet	along Lots 69,68, 67, 66, and 65 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
3.	38° 18'	236.38 feet	along Lots 65, 64, 63, 62, and 61 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
4.	34° 22' 20"	168.26 feet	along Lots 61, 60, and 59 of the Waiehu Heights Subdivision Unit II (File Plan No. 1567), being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo;
5.	202° 28' 45"	762.59 feet	over Lot 1-C of the Paukukalo Large Lot Subdivision, being a portion of Land Commission Award 8559-B, Apana 20 to William C. Lunalilo to the point of beginning and containing an area of 0.877 acres.

KEVIN JOSEPH CLARKE
LICENSED PROFESSIONAL LAND SURVEYOR No. 17011
HAWAII U.S.A.

Kevin J. Clarke
Licensed Professional Land Surveyor
Certificate No. 17011-LS
Exp. 04/2022

05/29/2021

TOPO Ke Kahua (SLU Urban 2)
File 20-0559

HAWAI‘I STATE PLAN – ASSESSMENT OF PROJECT APPLICABILITY TO GOALS, OBJECTIVES, AND POLICIES

APPENDIX

L-1

APPENDIX "L-1"

HAWAI'I STATE PLAN
ASSESSMENT OF PROJECT APPLICABILITY
TO GOALS, OBJECTIVES, AND POLICIES

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
HRS 226-1: Findings and Purpose **HRS 226-2: Definitions** **HRS 226-3: Overall Theme**			
HRS 226-4: State Goals. In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self determination, it shall be the goal of the State to achieve: (1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations. (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people. (3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.			
Analysis: **The proposed project provides affordable housing opportunities for Maui County families in an area that is close to the government, business, and commercial centers of Wailuku and Kahului.**			
Chapter 226-5 Objective and Policies for Population			
Objective: It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.	✓		
Policies:			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.	✓		
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.		✓	
(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.		✓	
(4) Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.			✓
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			✓
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			✓
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.		✓	

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Analysis: **The proposed project directly supports the objectives and policies for population as it will be implemented on vacant lands located within an Urban Growth Boundary as established by the Maui Island Plan, in a developed area in Waiehu, in close proximity to existing services government, business, commercial destinations and employment opportunities in Wailuku and Kahului.**			
Chapter 226-6 Objectives and policies for the economy – – in general			
Objectives: Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.		✓	
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.			✓
Policies:			
(1) Promote and encourage entrepreneurship within Hawaii by residents and nonresidents of the State.			✓
(2) Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			✓
(3) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.			✓
(4) Transform and maintain Hawaii as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			✓
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawaii.			✓
(6) Seek broader outlets for new or expanded Hawaii business investments.			✓
(7) Expand existing markets and penetrate new markets for Hawaii's products and services.			✓
(8) Assure that the basic economic needs of Hawaii's people are maintained in the event of disruptions in overseas transportation.			✓
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.		✓	
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawaii's small scale producers, manufacturers, and distributors.			✓
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.			✓
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawaii.			✓
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			✓
(15) Maintain acceptable working conditions and standards for Hawaii's workers.			✓
(16) Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and nondiscrimination measures.			✓
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(18) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy, particularly with respect to emerging industries in science and technology.			✓
(19) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			✓
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new or innovative potential growth industries in particular.			✓
(21) Foster a business climate in Hawaii--including attitudes, tax and regulatory policies, and financial and technical assistance programs-- that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			✓
Analysis: **The proposed action indirectly supports the general objectives and policies for the economy by supporting construction activity which contributes to increased employment opportunities, job choices, and living standards. Businesses positively affected by the proposed project are those which support construction such as building contractors and building trades, material suppliers, equipment rental companies, and landscape companies.**			
Chapter 226-7 Objectives and policies for the economy – – agriculture.			
Objectives: Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
(1) Viability of Hawaii's sugar and pineapple industries.			✓
(2) Growth and development of diversified agriculture throughout the State.			✓
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.			✓
Policies:			
(1) Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.			✓
(2) Encourage agriculture by making the best use of natural resources.			✓
(3) Provide the governor and the legislature with information and options needed for prudent decision-making for the development of agriculture.			✓
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			✓
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
(6) Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.			✓
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawaii's food producers and consumers in the State, nation, and world.			✓
(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.			✓
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			✓
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			✓
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.			✓
(12) In addition to the State's priority on food, expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			✓
(13) Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency, including the increased purchase and use of Hawaii-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			✓
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			✓
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			✓
(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			✓
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko i'a, māla, and irrigated lo'i, and growth of traditional Hawaiian crops, such as kalo, 'uala, and 'ulu.			✓
(18) Increase and develop small-scale farms.			✓
Analysis: **The proposed project will be situated in Waiehu on largely vacant land adjacent to a residential subdivision. As mentioned previously, MEO formerly operated the Ke Kahua Farm project on the property, where volunteers planted taro and other crops when it had operating funding for the project. When the funding was exhausted, MEO tried to maintain the property with volunteers which was unsuccessful due to the lack of supervised oversight. Additionally, the property was vandalized numerous times and over time all of the equipment was stolen, including the well pump, hoses, engine and the generator. It was at this time MEO decided to look for alternative uses of the property, which would benefit the community and the low-income families the nonprofit serves. As such, the state's goals with respect to the economy and the role of agriculture are not applicable to the project.**			
Chapter 226-8 Objective and policies for the economy – – visitor industry.			
Objective: Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Policies:			
(1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.			✓
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.			✓
(3) Improve the quality of existing visitor destination areas by utilizing Hawaii's strengths in science and technology.			✓
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			✓
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.			✓
(6) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.			✓
(7) Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.			✓
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.			✓
Analysis: **The proposed action is not directly or indirectly applicable to the objective and policies for the visitor industry. The proposed action has no implications for enhancement or growth of the visitor industry.**			
Chapter 226-9 Objective and policies for the economy – – federal expenditures.			
Objective: Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy.			✓
Policies:			
(1) Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment;			✓
(2) Promote Hawaii's supportive role in national defense, in a manner consistent with Hawaii's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawaii's economy;			✓
(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment;			✓
(4) Increase opportunities for entry and advancement of Hawaii's people into federal government service;			✓
(5) Promote federal use of local commodities, services, and facilities available in Hawaii;			✓
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii; and			✓
(7) Pursue the return of federally controlled lands in Hawaii that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
State, and the counties.			
Analysis: **The proposed action is not reliant on federal funding, and does not directly or indirectly advance the objective and policies for strengthening or increasing federal expenditures for the betterment of Hawai'i's economy.**			
Chapter 226-10 Objective and policies for the economy – – potential growth and innovative activities.			
Objective: Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaii's economic base.			✓
Policies:			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors;			✓
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaii through the export of services or products or substitution of imported services or products;			✓
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements;			✓
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity;			✓
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus;			✓
(6) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people;			✓
(7) Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts;			✓
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste;			✓
(9) Promote Hawaii's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State;			✓
(10) Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawaii's social, economic, physical, and environmental objectives;			✓
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research;			✓
(12) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii;			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
(13) Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawaii;			✓
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives;			✓
(15) Increase research and development of businesses and services in the telecommunications and information industries;			✓
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation; and			✓
(17) Recognize and promote health care and health care information technology as growth industries.			✓
Analysis: **As a affordable housing project, the proposed action does not directly or indirectly affect the development and expansion of innovative activities to increase and diversify Hawai'i's economic base.**			
Chapter 226-10.5 Objectives and policies for the economy – – information industry.			
Objective: Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawaii as a leader in broadband and wireless communications and applications in the Pacific Region.			✓
Policies:			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawaii and between Hawaii and the world, and make high speed communication available to all residents and businesses in Hawaii;			✓
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth and innovation in Hawaii's economy;			✓
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii;			✓
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawaii, using technology to communicate with their headquarters, offices, or customers located out-of-state;			✓
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			✓
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people;			✓
(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry;			✓
(8) Foster a recognition of the contribution of the information industry to Hawaii's economy; and			✓
(9) Assist in the promotion of Hawaii as a broker, creator, and processor of information in the Pacific.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Analysis: **The proposed action does not directly or indirectly affect Hawai'i's capacity to be a leader in the broadband and wireless communications industries, nor does it affect these innovative industries in advancing Hawai'i's economic position in the Pacific.**			
Chapter 226-11 Objectives and policies for the physical environment – – land based, shoreline, and marine resources.			
Objectives: Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.		✓	
(2) Effective protection of Hawaii's unique and fragile environmental resources.		✓	
Policies:			
(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.		✓	
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.		✓	
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.		✓	
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.			✓
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			✓
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.		✓	
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			✓
(8) Pursue compatible relationships among activities, facilities, and natural resources.			✓
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			✓
Analysis: **The proposed project will utilize Best Management Practices (BMPs) to ensure that natural resources such as steep slopes and the coastal environment are not impacted by construction activities. The use of BMPs also ensures compatibility between land-based and water-based functions, resources, and ecological systems. No work will be carried out on the existing steep slope on the subject property. The flora/fauna survey conducted as part of the environmental review process represents an effort to protect any rare and endangered plant and animal species, and their habitats native to Hawai'i that may be present in the vicinity of the proposed action. No rare or endangered plant or animal species were found in the project area.**			
Chapter 226-12 Objective and policies for the physical environment – – scenic, natural beauty, and historic resources.			
Objective: Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.	✓		
Policies:			

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(1) Promote the preservation and restoration of significant natural and historic resources.		✓	
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			✓
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	✓		
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.			✓
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.	✓		
Analysis: **The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas. The proposed project will be developed in the vicinity of residential subdivisions. All buildings will be 1- and 2-stories in height. Landscape on the property will be carefully considered to provide aesthetic viewplanes. Archaeological investigations identified no historic properties on the site. Nevertheless, an archaeological monitoring will be conducted during construction in accordance with the approved Archaeological Monitoring Plan (AMP). Landscaping proposed in connection with the project is intended to enhance the project's visual relationship with its immediate surrounding environs.**			
Chapter 226-13 Objectives and policies for the physical environment – – land, air, and water quality.			
Objectives: Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives.			
(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.	✓		
(2) Greater public awareness and appreciation of Hawaii's environmental resources.		✓	
Policies:			
(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.			✓
(2) Promote the proper management of Hawaii's land and water resources.		✓	
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.			✓
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.		✓	
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	✓		
(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.			✓
(7) Encourage urban developments in close proximity to existing services and facilities.	✓		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.			✓
Analysis: **The proposed project will be implemented on vacant land adjacent to the Waiehu Heights residential subdivision, in proximity to existing infrastructure and services. Maintaining land, air, and water quality are directly and indirectly advanced by the proposed action. Construction BMPs will be used to manage and control erosion control during grading**			

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operations to minimize downstream water quality impacts. Work on the project is not anticipated to be affected by natural hazards, and the highest standards of design and construction practices will be employed for the proposed project.			
Chapter 226-14 Objective and policies for facility systems – – in general.			
Objective: Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.		✓	
Policies:			
(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.		✓	
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.		✓	
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.		✓	
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			✓
Analysis: **The proposed action is indirectly applicable to the general objective and policies for facility systems. As an affordable, multi-family residential housing project, the proposed action can be serviced by existing infrastructure systems.**			
Chapter 226-15 Objectives and policies for facility systems – – solid and liquid waste.			
Objectives: Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.		✓	
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.		✓	
Policies:			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.		✓	
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			✓
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			✓
Analysis: **The proposed project indirectly supports the objectives and goals for solid and liquid waste facility systems as it will connect to the County wastewater system. Coordination will be undertaken with the County Department of Environmental Management (DEM) as it relates to connection to the County's wastewater system. Furthermore, construction waste will be disposed at the County's Central Maui Landfill or appropriate construction recycling centers.**			
Chapter 226-16 Objective and policies for facility systems – – water.			
Objective: Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.		✓	

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Policies:			
(1) Coordinate development of land use activities with existing and potential water supply.		✓	
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			✓
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			✓
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.			✓
(5) Support water supply services to areas experiencing critical water problems.			✓
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			✓
Analysis: **The proposed project indirectly supports the objective and polices for water facility systems enhancement as it is located in an area that is serviced by existing County water infrastructure. Coordination will be undertaken with the County Department of Water Supply (DWS) regarding connection to the County's water system which has given priority to affordable housing projects. Upon completion of the proposed project, adverse impacts to water services and facilities in the region are not anticipated.**			
Chapter 226-17 Objectives and policies for facility systems – – transportation.			
Objectives: Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.		✓	
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.			✓
Policies:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;			✓
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;			✓
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			✓
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			✓
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			✓
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;		✓	
(7) Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			✓
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			✓

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(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			✓
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;			✓
(11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;			✓
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and			✓
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.		✓	
Analysis: **The proposed project indirectly supports the objectives and policies of transportation facility systems as it is located in proximity to existing public bus routes and in an area designated for planned urban growth.**			
Chapter 226-18 Objectives and policies for facility systems – – energy.			
Objectives: Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			✓
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation.		✓	
(3) Greater diversification of energy generation in the face of threats to Hawaii's energy supplies and systems;		✓	
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			✓
(5) Utility models that make the social and financial interests of Hawaii's utility customers a priority.			✓
(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably prices, and dependable energy services to accommodate demand.			✓
Policies:			
(1) Support research and development as well as promote the use of renewable energy sources;		✓	
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			✓
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			✓
(4) Promote all cost-effective conservation of power and fuel supplies through measures, including:			
(A) Development of cost-effective demand-side management programs;			✓

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(B) Education;			✓
(C) Adoption of energy-efficient practices and technologies; and			✓
(D) Increasing energy efficiency and decreasing energy use in public infrastructure		✓	
(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies; and			✓
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			✓
(7) Promote alternate fuels and transportation energy efficiency;			✓
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			✓
(9) Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives;			✓
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			✓
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			✓
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii.			✓
Analysis: **The proposed project will utilize energy efficient fixtures and appliances. Should funding be available, photovoltaic solar panels will be installed to reduce the development's dependence on fossil-fuel based energy.**			
Chapter 226-18.5 Objectives and policies for facility systems – – telecommunications.			
Objectives:			
(a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people. (b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.			✓
Policies:			
(1) Facilitate research and development of telecommunications systems and resources;			✓
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			✓
(3) Promote efficient management and use of existing telecommunications systems and services; and			✓
(4) Facilitate the development of education and training of telecommunications personnel.			✓

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Analysis: **The proposed action does not directly or indirectly affect telecommunications systems dependability, efficiency, and cost parameters. In particular, the project does not promote research and development of telecommunications systems and resources and does not advance efficient management and use of existing telecommunications systems and services.**			
Chapter 226-19 Objectives and policies for socio-cultural advancement – – housing.			
Objectives: Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
(1) Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawaii's population.	✓		
(2) The orderly development of residential areas sensitive to community needs and other land uses.	✓		
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii's people.	✓		
Policies:			
(1) Effectively accommodate the housing needs of Hawaii's people.	✓		
(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.	✓		
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	✓		
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			✓
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.	✓		
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.	✓		
(7) Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.			✓
(8) Promote research and development of methods to reduce the cost of housing construction in Hawaii.			✓
Analysis: **The proposed project is directly applicable to the objectives and policies related to housing as it provides needed additional affordable housing in Waiehu. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services in Central Maui.**			
Chapter 226-20 Objectives and policies for socio-cultural advancement – – health.			
Objectives: Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:			
(1) Fulfillment of basic individual health needs of the general public.			✓

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(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.			✓
(3) Elimination of health disparities by identifying and addressing social determinants of health.			✓
Policies:			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			✓
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			✓
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			✓
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			✓
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			✓
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			✓
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			✓
Analysis: **The proposed action does not directly or indirectly affect the objectives and policies for health. The proposed action does not affect individual health needs, sanitation and health conditions, and health disparities.**			
Chapter 226-21 Objectives and policies for Socio-cultural advancement – – education.			
Objective: Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.		✓	
Policies:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			✓
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.		✓	
(3) Provide appropriate educational opportunities for groups with special needs.			✓
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			✓

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(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.			✓
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			✓
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			✓
(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.			✓
(9) Support research programs and activities that enhance the education programs of the State.			✓
Analysis: **Through the payment of impact fees, the proposed project indirectly supports the objectives and policies for education by supporting the provision of adequate and accessible educational services and facilities in Central Maui.**			
Chapter 226-22 Objective and policies for socio-cultural advancement – – social services.			
Objective: Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.		✓	
Policies:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.		✓	
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			✓
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawaii's communities.			✓
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			✓
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			✓
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			✓
Analysis: **The objective and policies for improving public and private social services are indirectly supported by the proposed action through the provision of affordable housing opportunities.**			
Chapter 226-23 Objective and policies for socio-cultural advancement – – leisure.			
Objective: Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.		✓	
Policies:			

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(1) Foster and preserve Hawaii's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			✓
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.		✓	
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			✓
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			✓
(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.			✓
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			✓
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawaii's people.			✓
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			✓
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawaii's population to participate in the creative arts.			✓
(10) Assure adequate access to significant natural and cultural resources in public ownership.			✓
Analysis: **As a residential project, the proposed action indirectly advances the objective and policies for leisure. The proposed project includes a community building for social gathering and community activity space for residents.**			
Chapter 226-24 Objective and policies for socio-cultural advancement – – individual rights and personal well-being.			
Objective: Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.			✓
Policies:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			✓
(2) Uphold and protect the national and state constitutional rights of every individual.			✓
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			✓
(4) Ensure equal opportunities for individual participation in society.			✓
Analysis: **The proposed residential project does not directly or indirectly affect the objective and policies related to individual rights and personal well-being.**			
Chapter 226-25 Objective and policies for socio-cultural advancement – – culture.			
Objective: Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.		✓	

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Policies:			
(1) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.		✓	
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.			✓
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.			✓
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors.			✓
Analysis: **A Cultural Impact Assessment (CIA) was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. Although no ongoing cultural practices were identified within the project area, the proposed action indirectly advances the objective and policies related to culture.**			
Chapter 226-26 Objectives and policies for socio-cultural advancement – – public safety.			
Objective: Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			✓
(1) Assurance of public safety and adequate protection of life and property for all people.			✓
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.			✓
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.			✓
Policies (Public Safety):			
(1) Ensure that public safety programs are effective and responsive to community needs.			✓
(2) Encourage increased community awareness and participation in public safety programs.			✓
Policies (Public Safety-Criminal Justice):			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			✓
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			✓
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			✓
Policies (Public Safety – Emergency Management):			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			✓
(2) Enhance the coordination between emergency management programs throughout the State.			✓

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Analysis: **The proposed project does not directly or indirectly affect the objectives and policies for public safety. In particular, the project does not address protection of life and property parameters, organizational readiness and capacity, and community responsibility for peoples' welfare and safety.**			
Chapter 226-27 Objectives and policies for socio-cultural advancement – – government.			
Objectives: Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:		✓	
(1) Efficient, effective, and responsive government services at all levels in the State.		✓	
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			✓
Policies:			
(1) Provide for necessary public goods and services not assumed by the private sector.			✓
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.		✓	
(3) Minimize the size of government to that necessary to be effective.			✓
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawaii.			✓
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			✓
(6) Provide for a balanced fiscal budget.			✓
(7) Improve the fiscal budgeting and management system of the State.			✓
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			✓
Analysis: **The proposed project has indirect applicability to the objectives and policies for government. In particular, the project will comply with regulatory requirements which advance transparency in the flow of project-related information to the public. Such requirements include the Chapter 343, HRS environmental review process.**			

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Chapter 226-101: Purpose. The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
Chapter 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.			
Chapter 226-103: Economic priority guidelines.			
(a) Priority guidelines to stimulate economic growth and encourage business expansion and			

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development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.			✓
(A) Encourage investments which:			
(i) Reflect long term commitments to the State;			✓
(ii) Rely on economic linkages within the local economy;			✓
(iii) Diversify the economy;			✓
(iv) Reinvest in the local economy;		✓	
(v) Are sensitive to community needs and priorities; and		✓	
(vi) Demonstrate a commitment to provide management opportunities to Hawaii residents; and			✓
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			
(i) Present or former residents acting as entrepreneurs or principals;			✓
(ii) Academic support from an institution of higher education in Hawaii;			✓
(iii) Investment interest from Hawaii residents;			✓
(iv) Resources unique to Hawaii that are required for innovative activity; and			✓
(v) Complementary or supportive industries or government programs or projects.			✓
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			✓
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			✓
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			✓
(5) Streamline the processes for building and development permit and review, and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety and welfare would not be adversely affected.			✓
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.			✓
(7) Continue to seek legislation to protect Hawaii from transportation interruptions between Hawaii and the continental United States.			✓
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			
(A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.			✓
(B) A clean industry that would have minimal adverse effects on Hawaii's environment.			✓
(C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs at all levels of employment.			✓
(D) An industry that would provide reasonable income and steady employment.			✓
(9) Support and encourage, through educational and technical assistance programs			✓

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and other means, expanded opportunities for employee ownership and participation in Hawaii business.			
(10) Enhance the quality of Hawaii's labor force and develop and maintain career opportunities for Hawaii's people through the following actions:			
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			✓
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			✓
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			✓
(D) Promote career opportunities in all industries for Hawaii's people by encouraging firms doing business in the State to hire residents.			✓
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on- the-job training opportunities.			✓
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			✓
(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 Hawaii's residents and visitors.			✓
(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.			✓
(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.			✓
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.			✓
(5) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.			✓
(6) Support and coordinate tourism promotion abroad to enhance Hawaii's share of existing and potential visitor markets.			✓
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			✓
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			✓
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			✓
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			✓
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.			✓
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			✓
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			✓

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(2) Assist in providing adequate, reasonably priced water for agricultural activities.			✓
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			✓
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			✓
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaii's agricultural community.			✓
(6) Seek favorable freight rates for Hawaii's agricultural products from interisland and overseas transportation operators.			✓
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			✓
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			✓
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			✓
(10) Support the continuation of land currently in use for diversified agriculture.			✓
(11) Encourage residents and visitors to support Hawaii's farmers by purchasing locally grown food and food products.			✓
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			✓
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.			✓
(3) Increase the support for research and development of economically feasible alternative water sources.			✓
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			✓
(f) Priority guidelines for energy use and development:			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.		✓	
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			✓
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			✓
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.			✓
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawaii.			✓
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			✓
(3) Encourage the development of small businesses in the information field such as software development; the development of new information systems, peripherals, and applications; data conversion and data entry services; and home or cottage services such as computer programming, secretarial, and accounting services.			✓

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(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			✓
(5) Encourage research activities, including legal research in the information and telecommunications fields.			✓
(6) Support promotional activities to market Hawaii's information industry services.			✓
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			✓
Analysis: **The proposed action indirectly supports the economic priority guidelines by supporting construction activity which contributes to increased employment opportunities, job choices, and living standards. Pending funding availability, the project will include solar energy systems for the development, thereby advancing measures to lessen dependence on fossil fuel based energy.**			
Chapter 226-104: Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.			✓
(2) Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.			✓
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.			✓
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.		✓	
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.		✓	
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			✓
(7) Support the development of high technology parks on the neighbor islands.			✓
(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	✓		
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			✓
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.			✓
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.		✓	
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.			✓
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			✓

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(7) Pursue rehabilitation of appropriate urban areas.			✓
(8) Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.			✓
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	✓		
(10) Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			✓
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			✓
(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	✓		
(13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.			✓
Analysis: **The proposed project supports population growth and land resources priority guidelines as it will be developed on vacant land, in Waiehu. In addition, the project will be implemented adjacent to a developed area in Central Maui, in proximity to existing infrastructure and services.**			
Chapter 226-105: Crime and criminal justice.			
Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			✓
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			✓
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			✓
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			✓
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			✓
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			✓
Analysis: **The proposed action does not directly or indirectly affect the priority guidelines for crime and criminal justice.**			
Chapter 226-106: Affordable housing.			
Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			✓
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			✓
(3) Improve information and analysis relative to land availability and suitability for housing.			✓

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(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate-income households, gap-group households, and residents with special needs.	✓		
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawaii's people for the purchase of initial owner-occupied housing.			✓
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.	✓		
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			✓
(8) Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.			✓
Analysis: **The proposed project directly affects the priority guidelines for affordable housing as it will provide 120 units of affordable housing for those earning 60 percent or less of the Area Median Income. The proposed project will be developed on vacant land, in an area that is close to the government, business, and commercial centers of Wailuku and Kahului.**			
Chapter 226-107: Quality education.			
Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			✓
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			✓
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			✓
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities;			✓
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			
(A) The electronic exchange of information;			✓
(B) Statewide electronic mail; and			✓
(C) Access to the Internet.			✓
(6) Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			✓
(7) Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific;			✓
(8) Develop resources and programs for early childhood education;			✓
(9) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			✓
(10) Strengthen and expand educational programs and services for students with special needs.			✓
Analysis: **The proposed action does not directly or indirectly affect the priority guidelines for education.**			
CHAPTER 226-108: Sustainability			
Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;			✓
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;			✓

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(3) Promoting a diversified and dynamic economy;			✓
(4) Encouraging respect for the host culture;			✓
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;	✓		
(6) Considering the principles of the ahupuaa system; and			✓
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaii.			✓
Analysis: **The proposed action supports smart growth principles and is being developed within the County's Urban Growth Boundary (UGB). Sustainability measures, such as energy efficient and water conserving fixtures, will be incorporated into the project design.**			
CHAPTER 226-109: Climate change adaptation			
Priority guidelines and principles to promote climate change adaptation shall include:			
(1) Ensure that Hawaii's people are educated, informed, and aware of the impacts climate change may have on their communities;			✓
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			✓
(3) Invest in continued monitoring and research of Hawaii's climate and the impacts of climate change on the State;			✓
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			✓
(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;		✓	
(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;			✓
(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;			✓
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			✓
(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			✓
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.		✓	
Analysis: The proposed Project indirectly supports the climate change priority guidelines as it will be implemented in an area that is outside of natural landscape features such as flood zones as well as the 3.2-foot projected sea level rise exposure area in order to avoid impacts related to climate change.			

COUNTYWIDE POLICY PLAN – ASSESSMENT OF PROJECT APPLICABILITY TO GOALS, OBJECTIVES, AND POLICIES

APPENDIX

L-2

APPENDIX "L-2"

COUNTYWIDE POLICY PLAN
ASSESSMENT OF PROJECT APPLICABILITY
TO GOALS, OBJECTIVES, AND POLICIES

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
A. PROTECT THE NATURAL ENVIRONMENT			
Goal: Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.		✓	
Objective:			
(1) Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.		✓	
Policies:			
(a) Perpetuate native Hawaiian biodiversity by preventing the introduction of invasive species, containing or eliminating existing noxious pests, and protecting critical habitat areas.			✓
(b) Preserve and reestablish indigenous and endemic species' habitats and their connectivity.			✓
(c) Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.			✓
(d) Protect baseline stream flows for perennial streams, and support policies that ensure adequate stream flow to support Native Hawaiian aquatic species, traditional kalo cultivation, and self-sustaining ahupua'a.			✓
(e) Protect undeveloped beaches, dunes, and coastal ecosystems, and restore natural shoreline processes.			✓
(f) Protect the natural state and integrity of unique terrain, valued natural environments, and geological features.			✓
(g) Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.		✓	
(h) Expand coordination with the State and nonprofit agencies and their volunteers to reduce invasive species, replant indigenous species, and identify critical habitat.			✓
Implementing Actions:			
(a) Develop island-wide networks of greenways, watercourses, and habitat corridors.			✓
Analysis: **The proposed project indirectly improves the opportunity for Maui County families to experience, live, and thrive in the natural beauty of our island home. This land will be managed and maintained for years to come while also providing much needed affordable housing. The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas. The proposed buildings will blend into the surrounding urban landscape.**			
Objective:			
(2) Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.		✓	
Policies:			
(a) Protect and restore nearshore reef environments and water quality.			✓
(b) Protect marine resources and valued wildlife.			✓
(c) Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.		✓	
(d) Utilize land-conservation tools to ensure the permanence of valued open spaces.			✓
(e) Mitigate the negative effects of upland uses on coastal wetlands, marine life, and coral reefs.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(f) Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.			✓
(g) Regulate the use and maintenance of stormwater-treatment systems that incorporate the use of native vegetation and mimic natural systems.			✓
(h) Advocate for stronger regulation of fishing, boating, cruise ship, and ecotourism activities.			✓
(i) Restore watersheds and aquifer-recharge areas to healthy and productive status, and increase public knowledge about the importance of watershed stewardship, water conservation, and groundwater protection.			✓
Implementing Actions:			
(a) Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution.			✓
Analysis: **The proposed project will utilize BMPs to ensure that natural resources such as the coastal environment is not impacted by construction activities. The use of BMPs also ensures compatibility between land-based and water-based functions, resources, and ecological systems. The flora/fauna survey conducted as part of the environmental review process represents an effort to appropriately identify any important biological resource considerations for the project.**			
Objective:			
(3) Improve the stewardship of the natural environment.		✓	
Policies:			
(a) Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.			✓
(b) Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.			✓
(c) Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.		✓	
(d) Improve efforts to mitigate and plan for the impact of natural disasters, human influenced emergencies, and global warming.			✓
(e) Regulate access to sensitive ecological sites and landscapes.			✓
(f) Reduce air, noise, light, land, and water pollution, and reduce Maui County's contribution to global climate change.		✓	
(g) Plan and prepare for and educate visitors and residents about the possible effects of global warming.			✓
(h) Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.			✓
(i) Educate the construction and landscape industries and property owners about the use of best management practices to prevent erosion and nonpoint source pollution.			✓
(j) Support the acquisition of resources with scenic, environmental, and recreational value, and encumber their use.			✓
(k) Improve enforcement activities relating to the natural environment.			✓
(l) For each shoreline community, identify and prioritize beach-conservation objectives, and develop action plans for their implementation.			✓
Implementing Actions:			✓
(a) Document, record, and monitor existing conditions, populations, and locations of flora and fauna communities.			✓
(b) Implement Federal and State policies that require a reduction of greenhouse-gas emissions.			✓
(c) Establish a baseline inventory of available natural resources and their respective carrying capacities.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Analysis: **The proposed project indirectly meets the objective of improving the stewardship of the natural environment. The project will employ BMPs to prevent impacts from construction, including temporary erosion control, stormwater management and dust control. In addition, the EA thoroughly evaluated the proposed action's potential impacts on the environment, and where applicable, advances mitigative measures aimed at avoiding or reducing impacts.**			
Objective:			
(4) Educate residents and visitors about responsible stewardship practices and the interconnectedness of the natural environment and people.			✓
Policies:			
(a) Expand education about native flora, fauna, and ecosystems.			✓
(b) Align priorities to recognize that the health of the natural environment and the health of people are inextricably linked.			✓
(c) Promote programs and incentives that decrease greenhouse-gas emissions and improve environmental stewardship.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the objective of educating residents and visitors about responsible stewardship practices and the interconnectedness of the natural environment and people.**			
B. PRESERVE LOCAL CULTURES AND TRADITIONS			
Goal: Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents" multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island heritage.		✓	
Objective:			
(1) Perpetuate the Hawaiian culture as a vital force in the lives of residents.		✓	
Policies:			
(a) Protect and preserve access to mountain, ocean, and island resources for traditional Hawaiian cultural practices.			✓
(b) Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices, and establish mandates for the special protection of these lands in perpetuity.		✓	
(c) Promote the use of ahupuaʻa and moku management practices.			✓
(d) Encourage the use of traditional Hawaiian architecture and craftsmanship.			✓
(e) Promote the use of the Hawaiian language.			✓
(f) Recognize and preserve the unique natural and cultural characteristics of each ahupuaʻa or district.			✓
(g) Encourage schools to promote broader incorporation of Hawaiian and other local cultures' history and values lessons into curriculum.			✓
(h) Ensure the protection of Native Hawaiian rights.			✓
(i) Promote, encourage, and require the correct use of traditional place names, particularly in government documents, signage, and the tourism industry.			✓
Implementing Actions:			
(a) Establish alternative land use and overlay zoning designations that recognize and preserve the unique natural and cultural characteristics of each ahupuaʻa or district.			✓
(b) Develop requirements for all County applicants to perpetuate and use proper traditional place names in all applications submitted.			✓
Analysis: **The proposed community will be developed in an area away from culturally sensitive areas. A CIA was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. In this context, the proposed action advances the objective and policies related to preserving local cultures and traditions.**			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Objective:			
(2) Emphasize respect for our island lifestyle and our unique local cultures, family, and natural environment.		✓	
Policies:			
(a) Acknowledge the Hawaiian culture as the host culture, and foster respect and humility among residents and visitors toward the Hawaiian people and their practices.			✓
(b) Perpetuate a respect for diversity, and recognize the historic blending of cultures and ethnicities.			✓
(c) Encourage the perpetuation of each culture's unique cuisine, attire, dance, music, and folklore, and other unique island traditions and recreational activities.			✓
(d) Recognize the interconnectedness between the natural environment and the cultural heritage of the islands.		✓	
(e) Protect and prioritize funding for recreational activities that support local cultural practices, such as surfing, fishing, and outrigger-canoe paddling.			✓
Analysis: **The project indirectly supports this objective and policy as the CIA acknowledges the relationship between the natural environment and cultural resources found in the project vicinity.**			
Objective:			
(3) Preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.			✓
Policies:			
(a) Foster teaching opportunities for cultural practitioners to share their knowledge and skills.			✓
(b) Support the development of cultural centers.			✓
(c) Broaden opportunities for public art and the display of local artwork.			✓
(d) Foster the Aloha Spirit by celebrating the Hawaiian host culture and other Maui County cultures through support of cultural-education programs, festivals, celebrations, and ceremonies.			✓
(e) Support the perpetuation of Hawaiian arts and culture.			✓
(f) Support programs and activities that record the oral and pictorial history of residents.			✓
(g) Support the development of repositories for culture, history, genealogy, oral history, film, and interactive learning.			✓
Implementing Actions:			
(a) Establish incentives for the display of public art.			✓
(b) Establish centers and programs of excellence for the perpetuation of Hawaiian arts and culture.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the objective of preserving the arts, culture, and history of Maui County for present and future generations. This is a multifamily residential project that will help meet the housing need in Maui.**			
Objective:			
(4) Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.		✓	
Policies:			
(a) Support the development of island-wide historic, archaeological, and cultural resources inventories.		✓	
(b) Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place.			✓
(c) Identify a sustainable rate of use and set forth specific policies to protect cultural resources.			✓
(d) Protect and preserve lands that are culturally or historically significant.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(e) Support programs that protect, record, restore, maintain, provide education about, and interpret cultural districts, landscapes, sites, and artifacts in both natural and museum settings.			✓
(f) Perpetuate the authentic character and historic integrity of rural communities and small towns.			✓
(g) Seek solutions that honor the traditions and practices of the host culture while recognizing the needs of the community.			✓
(h) Support the development of an Archaeological District Ordinance.			✓
(i) Protect summits, slopes, and ridgelines from inappropriate development.			✓
(j) Support the registering of important historic sites on the State and Federal historic registers.			✓
(k) Provide opportunities for public involvement with restoration and enhancement of all types of cultural resources.			✓
(l) Foster partnerships to identify and preserve or revitalize historic and cultural sites.			✓
Implementing Actions:			
(a) Identify, develop, map, and maintain an inventory of locally significant natural, cultural, and historical resources for protection.		✓	
(b) Prepare, continually update, and implement a cultural-management plan for cultural sites, districts, and landscapes, where appropriate.			✓
(c) Enact an Archaeological District Ordinance.			✓
(d) Nominate important historic sites to the State and Federal historic registers.			✓
Analysis: **The proposed action is indirectly applicable to the objectives and related policies and implementing actions to preserve historic properties, resources and cultural landscapes. Archaeological investigations and a Cultural Impact Assessment (CIA) were conducted and determined that there are no historic properties or existing cultural practices on the site.**			
C. IMPROVE EDUCATION			
Goal: Residents will have access to lifelong formal and informal educational options enabling them to realize their ambitions.			✓
Objective:			
(1) Encourage the State to attract and retain school administrators and educators of the highest quality.			✓
Policies:			
(a) Encourage the State to provide teachers with nationally competitive pay and benefit packages.			✓
(b) Encourage the State to ensure teachers will have the teaching tools and support staff needed to provide students with an excellent education.			✓
(c) Explore Maui County district- and school-based decision making in public education.			✓
Analysis: **The objective and policies related to retaining administrators and educators are not directly or indirectly applicable to the proposed action.**			
Objective:			
(2) Provide nurturing learning environments that build skills for the 21st century.		✓	
Policies:			
(a) Expand professional-development opportunities in disciplines that support the economic-development goals of Maui County.			✓
(b) Plan for demographic, social, and technological changes in a timely manner.			✓
(c) Encourage collaborative partnerships to improve conditions of learning environments.			✓
(d) Promote development of neighborhood schools and educational centers.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(e) Integrate schools, community parks, and playgrounds, and expand each community's use of these facilities.			✓
(f) Support coordination between land use and school-facility planning agencies.			✓
(g) Encourage the upgrade and ongoing maintenance of public-school facilities.		✓	
(h) Encourage the State Department of Education to seek reliable, innovative, and alternative methods to support a level of per-pupil funding that places Hawai'i among the top tier of states nationally for its financial support of public schools.			✓
(i) Encourage the State to promote healthier, more productive learning environments, including by providing healthy meals, more physical activity, natural lighting, and passive cooling.			✓
(j) Encourage the State to support the development of benchmarks to measure the success of Hawai'i's public-education system and clarify lines of accountability.			✓
(k) Design school and park facilities in proximity to residential areas.			✓
(l) Support technology- and natural-environment-based learning.			✓
(m) Encourage the State to support lower student-teacher ratios in public schools.			✓
(n) Encourage alternative learning and educational opportunities.			✓
Implementing Actions:			
(a) Develop safe walking and bicycling programs for school children.			✓
Analysis: **Through the payment of impact fees to the Department of Education, the proposed project indirectly ensures the provision of adequate and accessible educational services and facilities in Central Maui. It will afford many families the opportunity to be closer in proximity to schools and services that can support their educational experience.**			
Objective:			
(3) Provide all residents with educational opportunities that can help them better understand themselves and their surroundings and allow them to realize their ambitions.			✓
Policies:			
(a) Encourage the State to improve Maui Community College as a comprehensive community college that will serve each community.			✓
(b) Broaden the use of technology and telecommunications to improve educational opportunities throughout the County.			✓
(c) Attract graduate-level research programs and institutions.			✓
(d) Promote the teaching of traditional practices, including aquaculture; subsistence agriculture; Pacific Island, Asian, and other forms of alternative health practices; and indigenous Hawaiian architecture.			✓
(e) Integrate cultural and environmental values in education, including self-sufficiency and sustainability.			✓
(f) Foster a partnership and ongoing dialogue between business organizations, formal educational institutions, and vocational training centers to tailor learning and mentoring programs to County needs.			✓
(g) Ensure teaching of the arts to all ages.			✓
(h) Expand and develop vocational learning opportunities by establishing trade schools.			✓
(i) Encourage the State to integrate financial and economic literacy in elementary, secondary, and higher-education levels.			✓
Implementing Actions:			
(a) Encourage the State to establish a four-year university, and support the development of other higher-education institutions to enable residents to obtain bachelor degrees and postgraduate degrees in Maui County.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Analysis: **The proposed project indirectly supports the objective and policies as it will afford many families the opportunity to be closer in proximity to schools and services that can support their educational experience.**			
Objective:			
(4) Maximize community-based educational opportunities.			✓
Policies:			
(a) Encourage the State and others to expand pre-school, after-school, and homebased (parent-child) learning.			✓
(b) Support public-private partnerships to develop youth-internship, -apprenticeship, and -mentoring programs.			✓
(c) Support the development of a wide range of informal educational and cultural programs for all residents.			✓
(d) Improve partnerships that utilize the skills and talents at Hawai'i's colleges and universities to benefit the County.			✓
(e) Support career-development and job-recruitment programs and centers.			✓
(f) Attract learning institutions and specialty schools to diversify and enhance educational opportunities.			✓
(g) Expand education of important life skills for the general public.			✓
(h) Support community facilities such as museums, libraries, nature centers, and open spaces that provide interactive-learning opportunities for all ages.			✓
Analysis: **The proposed project involves development of 120 units of affordable housing for families earning 60 percent or less of the AMI and is not applicable to the objectives and goals of community-based educational opportunities.**			
D. STRENGTHEN SOCIAL AND HEALTHCARE SERVICES			
Goal: Health and social services in Maui County will fully and comprehensively serve all segments of the population.		✓	
Objective:			
(1) In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.		✓	
Policies:			
(a) Work with other levels of government and the nonprofit sector to expand services to address hunger, homelessness, and poverty.			✓
(b) Support the improvement of opportunities for disadvantaged youth, encourage the tradition of hanai relatives, and support expanded opportunities for foster care.			✓
(c) Support expanded long-term-care options, both in institutions and at home, for patients requiring ongoing assistance and medical attention.			✓
(d) Encourage the expansion and improvement of local hospitals, facilitate the establishment of new healthcare facilities, and facilitate prompt and high-quality emergency- and urgent-care services for all.			✓
(e) Support broadened access to affordable health insurance and health care, and recognize the unique economic challenges posed to families when healthcare services are provided off-island.			✓
(f) Encourage equal access to social and healthcare services through both technological and traditional means.			✓
Analysis**: Indirectly, this proposed project will support access to services. By providing affordable housing to families in a centrally located area, they will have easier access to utilize social and healthcare services, if needed.**			
Objective:			
(2) Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Policies:			
(a) Strengthen partnerships with government, nonprofit, and private organizations to provide funding and to improve counseling and other assistance to address substance abuse, domestic violence, and other pressing social challenges.			✓
(b) Encourage the State to improve the quality of medical personnel, facilities, services, and equipment.			✓
(c) Encourage investment to improve the recruitment of medical professionals and the quality of medical facilities and equipment throughout Maui County.			✓
(d) Promote the development of continuum-of-care facilities that provide assisted living, hospice, home-care, and skilled-nursing options allowing the individual to be cared for in a manner congruent with his or her needs and desires.			✓
(e) Support improved social, healthcare, and governmental services for special needs populations.			✓
(f) Plan for the needs of an aging population and the resulting impacts on social services, housing, and healthcare delivery.			✓
(g) Improve coordination among the police, the courts, and the public in the administration of social and healthcare services.			✓
(h) Support programs that address needs of veterans.			✓
(i) Support programs that address the needs of immigrants.			✓
Implementing Actions:			
(a) Invest in programs designed to improve the general welfare and quality of life of Native Hawaiians.			✓
(b) Assist and facilitate the State Department of Public Safety and others in efforts to strengthen programs and facilities that will improve the mental and social health of incarcerated people and assist in prison inmates' successful transition back into Maui County communities.			✓
(c) Develop and maintain a comprehensive index that will measure the health and wellness needs of families.			✓
(d) Provide heliports countywide for emergency health and safety purposes.			✓
Analysis: **The objective and policies related to the quality and delivery of social services and healthcare are not applicable to the proposed project.**			
Objective:			
(3) Strengthen public-awareness programs related to healthy lifestyles and social and medical services.			✓
Policies:			
(a) Expand public awareness about personal safety and crime prevention.			✓
(b) Encourage residents to pursue education and training for careers in the healthcare, social services, and community-development fields.			✓
(c) Expand public awareness and promote programs to achieve healthy eating habits and drug-free lifestyles.			✓
Analysis: **The objective and policies related to strengthening public-awareness programs related to healthy lifestyles and social and medical services are not directly or indirectly applicable to this affordable housing project.**			
E. EXPAND HOUSING OPPORTUNITIES FOR RESIDENTS			
Goal: Quality, island-appropriate housing will be available to all residents.			
Objective:			
(1) Reduce the affordable housing deficit for residents.	✓		
Policies:			
(a) Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.	✓		

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(b) Seek innovative ways to lower housing costs without compromising the quality of our island lifestyle.		✓	
(c) Seek innovative methods to secure land for the development of low- and moderate-income housing.		✓	
(d) Provide the homeless population with emergency and transitional shelter and other supportive programs.			✓
(e) Provide for a range of senior-citizen and special needs housing choices on each island that affordably facilitates a continuum of care and services.			✓
(f) Support the Department of Hawaiian Home Lands' development of homestead lands.			✓
(g) Manage property-tax burdens to protect affordable resident homeownership.			✓
(h) Explore taxation mechanisms to increase and maintain access to affordable housing.			✓
(i) Improve awareness regarding available affordable homeowner's insurance.			✓
(j) Redevelop commercial areas with a mixture of affordable residential and business uses, where appropriate.			✓
(k) Ensure residents are given priority to obtain affordable housing units developed in their communities, consistent with all applicable regulations.	✓		
(l) Establish pricing for affordable housing that is more reflective of Maui County's workforce than the United States Housing and Urban Development's median-income estimates for Maui County.			✓
(m) Develop neighborhoods with a mixture of accessible and integrated community facilities and services.		✓	
(n) Provide alternative regulatory frameworks to facilitate the use of Kuleana lands by the descendants of Native Hawaiians who received those lands pursuant to the Kuleana Act of 1850.			✓
(o) Work with lending institutions to expand housing options and safeguard the financial security of homeowners.			✓
(p) Promote the use of the community land trust model and other land-lease and land-financing options.			✓
(q) Support the opportunity to age in place by providing accessible and appropriately designed residential units.		✓	
Analysis: **The proposed project is directly applicable to the objective, policies and implementing actions related to providing island-appropriate housing, as it provides additional affordable home opportunities for Maui County families earning 60 percent or less of the AMI in an area that is close to the government, business, and commercial centers of Wailuku and Kahului. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services in Central Maui.**			
Objective:			
(2) Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County's rural and small town character.	✓		
Policies:			
(a) Seek innovative ways to develop 'ohana cottages and accessory-dwelling units as affordable housing.			✓
(b) Design neighborhoods to foster interaction among neighbors.			✓
(c) Encourage a mix of social, economic, and age groups within neighborhoods.			✓
(d) Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.	✓		
(e) Encourage the building industry to use environmentally sustainable materials, technologies, and site planning.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(f) Develop workforce housing in proximity to job centers and transit facilities.	✓		
(g) Provide incentives to developers and owners who incorporate green building practices and energy-efficient technologies into their housing developments.			✓
Implementing Actions:			
(a) Revise laws to support neighborhood designs that incorporate a mix of housing types that are appropriate for island living.			✓
Analysis: **The proposed project provides affordable housing opportunities in Waiehu. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services in Central Maui .**			
Objective:			
(3) Increase and maintain the affordable housing inventory.	✓		
Policies:			
(a) Recognize housing as a basic human need, and work to fulfill that need.	✓		
(b) Prioritize available infrastructure capacity for affordable housing.			✓
(c) Improve communication, collaboration, and coordination among housing providers and social-service organizations.			✓
(d) Study future projected housing needs, monitor economic cycles, and prepare for future conditions on each island.		✓	
(e) Develop public-private and nonprofit partnerships that facilitate the construction of quality affordable housing.	✓		
(f) Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.			✓
(g) Minimize the intrusion of housing on prime, productive, and potentially productive agricultural lands and regionally valuable agricultural lands.		✓	
(h) Encourage long-term residential use of existing and future housing to meet residential needs.	✓		
Implementing Actions:			
(a) Develop policies to even out the peaks and valleys in Maui County's construction-demand cycles.			✓
Analysis: **The proposed project is directly applicable to the goal to increase and maintain affordable housing. This project provides 120 units of affordable housing for families earning 60 percent or less of the AMI in close proximity to businesses, schools, and commercial centers.**			
Objective:			
(4) Expand access to education related to housing options, homeownership, financing, and residential construction.			✓
Policies:			
(a) Broaden access to information about County, State, and Federal programs that provide financial assistance to renters and home buyers.			✓
(b) Expand access to information about opportunities for homeownership and self-help housing.			✓
(c) Educate residents about making housing choices that support their individual needs, the needs of their communities, and the health of the islands' natural systems.			✓
(d) Improve home buyers' education on all aspects of homeownership.			✓
Analysis: **This project is not directly or indirectly related to the objective and policies of expanding access to education related to housing options, homeownership, financing, and residential construction. The proposed Project will provide rental units to families earning 60 percent or less of the AMI.**			
F. STRENGTHEN THE LOCAL ECONOMY			
Goal: Maui County's economy will be diverse, sustainable, and supportive of community values.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Objective:			
(1) Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.		✓	
Policies:			
(a) Support economic decisions that create long-term benefits.		✓	
(b) Promote lifelong education, career development, and technical training for existing and emerging industries.			✓
(c) Invest in infrastructure, facilities, and programs that foster economic diversification.			✓
(d) Support and promote locally produced products and locally owned operations and businesses that benefit local communities and meet local demand.			✓
(e) Support programs that assist industries to retain and attract more local labor and facilitate the creation of jobs that offer a living wage.			✓
(f) Encourage work environments that are safe, rewarding, and fulfilling to employees.			✓
(g) Support home-based businesses that are appropriate for and in character with the community.			✓
(h) Encourage businesses that promote the health and well-being of the residents, produce value-added products, and support community values.			✓
(i) Foster an understanding of the role of all industries in our economy.			✓
(j) Support efforts to improve conditions that foster economic vitality in our historic small towns.			✓
(k) Support and encourage traditional host-culture businesses and indigenous agricultural practices.			✓
(l) Support public and private entities that assist entrepreneurs in establishing locally operated businesses.			✓
Implementing Actions:			
(a) Develop regulations and programs that support opportunities for local merchants, farmers, and small businesses to sell their goods and services directly to the public.			✓
(b) Monitor the carrying capacity of the islands' social, ecological, and infrastructure systems with respect to the economy.			✓
Analysis: **During construction, this project will provide job opportunities. After completion, families residing in the project will support the businesses surrounding them, thus impacting the economy in a positive way.**			
Objective:			
(2) Diversify and expand sustainable forms of agriculture and aquaculture.			✓
Policies:			
(a) Support programs that position Maui County's agricultural products as premium export products.			✓
(b) Prioritize the use of agricultural land to feed the local population, and promote the use of agricultural lands for sustainable and diversified agricultural activities.			✓
(c) Capitalize on Hawai'i's economic opportunities in the ecologically sensitive aquaculture industries.			✓
(d) Assist farmers to help make Maui County more self-sufficient in food production.			✓
(e) Support ordinances, programs, and policies that keep agricultural land and water available and affordable to farmers.			✓
(f) Support a tax structure that is conducive to the growth of the agricultural economy.			✓
(g) Enhance County efforts to monitor and regulate important agricultural issues.			✓
(h) Support education, research, and facilities that strengthen the agricultural industry.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(i) Maintain the genetic integrity of existing food crops.			✓
(j) Encourage healthy and organic farm practices that contribute to land health and regeneration.			✓
(k) Support cooperatives and other types of nontraditional and communal farming efforts.			✓
(l) Encourage methods of monitoring and controlling genetically modified crops to prevent adverse effects.			✓
(m) Work with the State to ease the permitting process for the revitalization of traditional fish ponds.			✓
Implementing Actions:			
(a) Redirect efforts in the Office of Economic Development to further facilitate the development of the agricultural section and to monitor agricultural legislation and issues.			✓
(b) Publicly identify, with signage and other means, the field locations of all genetically modified crops.			✓
(c) Create agricultural parks in areas distant from genetically modified crops.			✓
Analysis: **The objective and policies as it relates to diversification and expansion of sustainable forms of agriculture and aquaculture are not directly or indirectly applicable to the proposed project.**			
Objective:			
(3) Support a visitor industry that respects the resident culture and the environment.			✓
Policies:			
(a) Promote traditional Hawaiian practices in visitor-related facilities and activities.			✓
(b) Encourage and educate the visitor industry to be sensitive to island lifestyles and cultural values.			✓
(c) Encourage a spirit of welcome for residents at visitor facilities, such as by offering kamaʻāina incentives and discount programs.			✓
(d) Support the renovation and enhancement of existing visitor facilities.			✓
(e) Support policies, programs, and a tax structure that redirect the benefits of the visitor industry back into the local community.			✓
(f) Encourage resident ownership of visitor-related businesses and facilities.			✓
(g) Develop partnerships to provide educational and training facilities to residents employed in the visitor industry.			✓
(h) Foster an understanding of local cultures, customs, and etiquette, and emphasize the importance of the Aloha Spirit as a common good for all.			✓
(i) Support the diversification, development, evolution, and integration of the visitor industry in a way that is compatible with the traditional, social, economic, spiritual, and environmental values of island residents			✓
(j) Improve collaboration between the visitor industry and the other sectors of Maui County's economy.			✓
(k) Perpetuate an authentic image of the Hawaiian culture and history and an appropriate recognition of the host culture.			✓
(l) Support the programs and initiatives outlined in the Maui County Tourism Strategic Plan 2017-2025.			✓
(m) Promote water conservation, beach conservation, and open-space conservation in areas providing services for visitors.			✓
(n) Recognize the important contributions that the visitor industry makes to the County's economy, and support a healthy and vibrant visitor industry.			✓
Analysis: **The proposed action is an affordable housing project. The objectives and policies around supporting a visitor industry is not applicable to the project.**			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Objective:			
(4) Expand economic sectors that increase living-wage job choices and are compatible with community values.			✓
Policies:			
(a) Support emerging industries, including the following: • Health and wellness industry; • Sports and recreation industry; • Film and entertainment industry; • Arts and culture industry; • Renewable-energy industry; • Research and development industry; • High-technology and knowledge-based industries; • Education and training industry; • Ecotourism industry; and • Agritourism industry.		✓	
Analysis: **The objective of expanding economic sectors that increase living-wage job choices compatible with community values are indirectly applicable to the proposed residential project. The developer will seek installing solar panels to support the renewable energy industry, if funding allows.**			
G. IMPROVE PARKS AND PUBLIC FACILITIES			
Goal: A full range of island-appropriate public facilities and recreational opportunities will be provided to improve the quality of life for residents and visitors.		✓	
Objective:			
(1) Expand access to recreational opportunities and community facilities to meet the present and future needs of residents of all ages and physical abilities.		✓	
Policies:			
(a) Protect, enhance, and expand access to public shoreline and mountain resources.			✓
(b) Expand and enhance the network of parks, multi-use paths, and bikeways.		✓	
(c) Assist communities in developing recreational facilities that promote physical fitness.		✓	
(d) Expand venue options for recreation and performances that enrich the lifestyles of Maui County's people.			✓
(e) Expand affordable recreational and after-school programs for youth.			✓
(f) Encourage and invest in recreational, social, and leisure activities that bring people together and build community pride.			✓
(g) Promote the development and enhancement of community centers, civic spaces, and gathering places throughout our communities.		✓	
(h) Expand affordable access to recreational opportunities that support the local lifestyle.		✓	
Implementing Actions:			
(a) Identify and reserve lands for cemeteries, and preserve existing cemeteries on all islands, appropriately accommodating varying cultural and, faith-based traditions.			✓
Analysis: **The proposed project will indirectly support the goal, objective, and policies of expanding access to recreational opportunities and community facilities to meet the needs of residents. The central location of the site of this project will provide easy access to existing recreational activities and community facilities. The project will also incorporate an onsite clubhouse building and play areas for residents.**			
Objective:			
(2) Improve the quality and adequacy of community facilities.		✓	
Policies:			
(a) Provide an adequate supply of dedicated shelters and facilities for disaster relief.			✓
(b) Provide and maintain community facilities that are appropriately designed to reflect the traditions and customs of local cultures.			✓
(c) Ensure that parks and public facilities are safe and adequately equipped for the needs of all ages and physical abilities to the extent reasonable.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(d) Maintain, enhance, expand, and provide new active and passive recreational facilities in ways that preserve the natural beauty of their locations.		✓	
(e) Redesign or retrofit public facilities to adapt to major shifts in environmental or urban conditions to the extent reasonable.			✓
Analysis: **The objective and policies related to improving the quality and adequacy of community facilities are indirectly applicable. The project will incorporate an onsite clubhouse building for residents.**			
Objective:			
(3) Enhance the funding, management, and planning of public facilities and park lands.			✓
Policies:			
(a) Identify and encourage the establishment of regulated and environmentally sound campgrounds.			✓
(b) Manage park use and control access to natural resources in order to rest sensitive places and utilize the resources in a sustainable manner.			✓
(c) Provide public-recreational facilities that are clean and well-maintained.			✓
(d) Develop partnerships to ensure proper stewardship of the islands' trails, public lands, and access systems.			✓
(e) Ensure that there is an adequate supply of public restrooms in convenient locations.			✓
Implementing Actions:			
(a) Encourage the State to allow for overnight fishing along the shoreline in accordance with management plans and regulations.			✓
(b) Develop and regularly update functional plans, including those relating to public facilities, parks, and campgrounds.			✓
(c) Develop and adopt local level-of service standards for public facilities and parks.			✓
(d) Identify, acquire, and develop lands for parks, civic spaces, and public uses.			✓
Analysis: **The proposed project does not meet the objective of enhancing funding, management, and planning of public facilities and park lands. The policies outlined to meet this objective does not apply to the proposed project.**			
H. DIVERSIFY TRANSPORTATION OPTIONS			
Goal: Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.		✓	
Objective:			
(1) Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.		✓	
Policies:			
(a) Execute planning strategies to reduce traffic congestion.		✓	
(b) Plan for the efficient relocation of roadways for the public benefit.			✓
(c) Support the use of alternative roadway designs, such as traffic-calming techniques and modern roundabouts.			✓
(d) Increase route and mode options in the ground-transportation network.		✓	
(e) Ensure that roadway systems are safe, efficient, and maintained in good condition.		✓	
(f) Preserve roadway corridors that have historic, scenic, or unique physical attributes that enhance the character and scenic resources of communities.			✓
(g) Design new roads and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass.		✓	
(h) Promote a variety of affordable and convenient transportation services that meet countywide and community needs and expand ridership of transit systems.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(i) Collaborate with transit agencies, government agencies, employers, and operators to provide planning strategies that reduce peak-hour traffic.			✓
(j) Develop and expand an attractive, island-appropriate, and efficient public transportation system.			✓
(k) Provide and encourage the development of specialized transportation options for the young, the elderly, and persons with disabilities.			✓
(l) Evaluate all alternatives to preserve quality of life before widening roads.			✓
(m) Encourage businesses in the promotion of alternative transportation options for resident and visitor use.			✓
(n) Support the development of carbon-emission standards and an incentive program aimed at achieving County carbon-emission goals.			✓
Implementing Actions:			
(a) Create incentives and implement strategies to reduce visitor dependence on rental cars.			✓
(b) Establish efficient public-transit routes between employment centers and primary workforce residential areas.		✓	
(c) Create attractive, island-appropriate, conveniently located park-and-ride and ride- share facilities.			✓
Analysis: **The TIAR prepared for this project determined that the proposed action will have a minimal increase in traffic for the region. As such, no significant impacts are anticipated and all movements at the project's three (3) driveways are anticipated to operate at Level of Service B or better across peak hours. Coordination with the County and State on traffic mitigation measures will continue during the development of the proposed project, and appropriate BMPs will be implemented before, during and after construction.**			
Objective:			
(2) Reduce the reliance on the automobile and fossil fuels by encouraging walking, bicycling, and other energy-efficient and safe alternative modes of transportation.		✓	
Policies:			
(a) Make walking and bicycling transportation safe and easy between and within communities.		✓	
(b) Require development to be designed with the pedestrian in mind.		✓	
(c) Design new and retrofit existing rights-of-way with adequate sidewalks, bicycle lanes, or separated multi-use transit corridors.		✓	
(d) Support the development of a countywide network of bikeways, equestrian trails, and pedestrian paths.			✓
(e) Support the reestablishment of traditional trails between communities, to the ocean, and through the mountains for public use.			✓
(f) Encourage educational programs to increase safety for pedestrians and bicyclists.			✓
Implementing Actions:			
(a) Design, build, and modify existing bikeways to improve safety and separation from automobiles.			✓
(b) Increase enforcement to reduce abuse of bicycle and pedestrian lanes by motorized vehicles.			✓
(c) Identify non-motorized transportation options as a priority for new sources of funding.			✓
Analysis: **The proposed affordable housing project that is centrally located in Waiehu and has an existing bicycle lane on the shoulder along Kahekili Highway that encourages the use of alternative forms of transportation.**			
Objective:			
(3) Improve opportunities for affordable, efficient, safe, and reliable air transportation.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Policies:			
(a) Discourage private helicopter and fixed-wing landing sites to mitigate environmental and social impacts.			✓
(b) Encourage the use of quieter aircraft and noise-abatement procedures for arrivals and departures.			✓
(c) Encourage the modernization and maintenance of air-transportation facilities for general-aviation activities.			✓
(d) Encourage a viable and competitive atmosphere for air carriers to expand service and ensure sufficient intra-County flights and affordable fares for consumers.			✓
(e) Continue to support secondary airports, and encourage the State to provide them with adequate funding.			✓
(f) During Community Plan updates, explore the use of the smaller airports.			✓
(g) Encourage the State to provide efficient, adequate, and affordable parking and transit connections within and around airports.			✓
Analysis: **This residential project is not applicable to objective and policies of improving opportunities for affordable, efficient, safe, and reliable air transportation.**			
Objective:			
(4) Improve opportunities for affordable, efficient, safe, and reliable ocean transportation.			✓
Policies:			
(a) Support programs and regulations that reduce the disposal of maritime waste and prevent spills into the ocean.			✓
(b) Encourage the upgrading of harbors to resist damage from natural hazards and disasters.			✓
(c) Encourage the State to study the use of existing harbors and set priorities for future use.			✓
(d) Explore all options to protect the traditional recreational uses of harbors, and mitigate harbor-upgrade impacts to recreational uses where feasible.			✓
(e) Encourage the upgrading of harbors and the separation of cargo and bulk materials from passenger and recreational uses.			✓
(f) Encourage the State to provide for improved capacity at shipping, docking, and storage facilities.			✓
(g) Encourage the State to provide adequate parking facilities and transit connections within and around harbor areas.			✓
(h) Encourage the redevelopment and revitalization of harbors while preserving historic and cultural assets in harbor districts.			✓
(i) Encourage the State to provide adequate facilities for small-boat operations, including small-boat launch ramps, according to community needs.			✓
(j) Support the maintenance and cleanliness of harbor facilities.			✓
(k) Support the redevelopment of harbors as pedestrian-oriented gathering places.			✓
Analysis: **The proposed project involves development of 120 affordable multi-family housing units to families earning 60 percent or less of the AMI and are not applicable to the objectives and policies related to improving opportunities for affordable, efficient, safe, and reliable ocean transportation.**			
Objective:			
(5) Improve and expand the planning and management of transportation systems.		✓	
Policies:			
(a) Encourage progressive community design and development that will reduce transportation trips.		✓	
(b) Require new developments to contribute their pro rata share of local and regional infrastructure costs.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(c) Establish appropriate user fees for private enterprises that utilize public transportation facilities for recreational purposes.			✓
(d) Support the revision of roadway-design criteria and standards so that roads are compatible with surrounding neighborhoods and the character of rural areas.			✓
(e) Plan for multi-modal transportation and utility corridors on each island.			✓
(f) Support designing all transportation facilities, including airport, harbor, and mass- transit stations, to reflect Hawaiian architecture.			✓
(g) Utilize transportation-demand management as an integral part of transportation planning.			✓
(h) Accommodate the planting of street trees and other appropriate landscaping in all public rights-of-way.		✓	
Analysis: **The TIAR prepared for this project determined a minimal increase in traffic for the region. As such, no significant impacts are anticipated and all movements at the project's three (3) driveways are anticipated to operate at Level of Service B or better across peak hours. Coordination with the County and State on traffic mitigation measures will continue during the development of the proposed project, and appropriate BMPs will be implemented before, during, and after construction.**			
I. IMPROVE PHYSICAL INFRASTRUCTURE			
Goal: Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.		✓	
Objective:			
(1) Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.		✓	
Policies:			
(a) Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.		✓	
(b) Develop and fund improved water-delivery systems.			✓
(c) Ensure a reliable and affordable supply of water for productive agricultural uses.			✓
(d) Promote the reclamation of gray water, and enable the use of reclaimed, gray, and brackish water for activities that do not require potable water.			✓
(e) Retain and expand public control and ownership of water resources and delivery systems.			✓
(f) Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.			✓
(g) Explore and promote alternative water-source-development methods.			✓
(h) Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.			✓
Implementing Actions:			
(a) Develop a process to review all applications for desalination.			✓
Analysis: **The proposed project indirectly supports the objective and policies related to maintaining Maui's physical infrastructure as it is located in an area that is serviced by existing County water infrastructure. Coordination will be undertaken with the DWS to determine if certain improvements to the County's water system will be required to service the project.**			
Objective:			
(2) Improve waste-disposal practices and systems to be efficient, safe, and as environmentally sound as possible.		✓	
Policies:			
(a) Provide sustainable waste-disposal systems and comprehensive, convenient recycling programs to reduce the flow of waste into landfills.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(b) Support innovative and alternative practices in recycling solid waste and wastewater and disposing of hazardous waste.			✓
(c) Encourage vendors and owners of automobile, appliance, and white goods to participate in the safe disposal and recycling of such goods, and ensure greater accountability for large waste producers.			✓
(d) Develop strategies to promote public awareness to reduce pollution and litter, and encourage residents to reduce, reuse, recycle, and compost waste materials.			✓
(e) Pursue improvements and upgrades to existing wastewater and solid-waste systems consistent with current and future plans and the County's Capital Improvement Program.		✓	
Implementing Actions:			
(a) Establish recycling, trash-separation, and materials recovery programs and facilities to reduce the flow of waste into landfills.			✓
(b) Study the feasibility of developing environmentally safe waste-to-energy facilities.			✓
(c) Utilize taxes and fees as means to encourage conservation and recycling.			✓
(d) Implement and regularly update the Integrated Solid Waste Management Plan.			✓
(e) Phase out the use of injection wells.			✓
Analysis: **The objectives, policies and actions related to improving waste disposal practices are indirectly applicable to the proposed project. The project proposes connection to the County wastewater system. Coordination will be undertaken with the DEM regarding connection. Construction waste will be disposed at the County's Central Maui Landfill or appropriate construction recycling centers. In the long term, solid waste generated at the multi-family residential project will be collected by private refuse collection companies and disposed at the Central Maui Landfill. Onsite recycling services will be coordinated and managed by Hale Mahaolu.**			
Objective:			
(3) Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.		✓	
Policies:			
(a) Promote the use of locally renewable energy sources, and reward energy efficiency.		✓	
(b) Consider tax incentives and credits for the development of sustainable- and renewable-energy sources.			✓
(c) Expand education about energy conservation and self-sufficiency.			✓
(d) Encourage small-scale energy generation that utilizes wind, sun, water, biowaste, and other renewable sources of energy.		✓	
(e) Expand renewable-energy production.		✓	
(f) Develop public-private partnerships to ensure the use of renewable energy and increase energy efficiency.			✓
(g) Require the incorporation of locally appropriate energy-saving and green building design concepts in all new developments by providing energy efficient urban design guidelines and amendments to the Building Code.			✓
(h) Encourage the use of sustainable energy to power vehicles.			✓
(i) Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.		✓	
(j) Encourage green footprint practices.			✓
(k) Reduce Maui County's dependence on fossil fuels and energy imports.		✓	
(l) Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and recycle water.			✓
(m) Promote and support environmentally friendly practices in all energy sectors.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
Implementing Actions:			
(a) Adopt an energy-efficiency policy for Maui County government as a model for other jurisdictions.			✓
(b) Adopt a Green Building Code, and support green building practices.			✓
Analysis: **The proposed development may include solar panels for supplemental electricity, if feasible. These actions indirectly supports this objective and related policies by advancing measures to lessen dependence on fossil fuel based energy.**			
Objective:			
(4) Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.		✓	
Policies:			
(a) Capitalize on existing infrastructure capacity as a priority over infrastructure expansion.		✓	
(b) Planning for new towns should only be considered if a region's growth is too large to be directed into infill and adjacent growth areas.			✓
(c) Utilize appropriate infrastructure technologies in the appropriate locations.			✓
(d) Promote land use patterns that can be provided with infrastructure and public facilities in a cost-effective manner.		✓	
(e) Support catchment systems and on-site wastewater treatment in rural areas and aggregated water and wastewater systems in urban areas if they are appropriately located.			✓
Implementing Actions:			
(a) Develop a streamlining system for urban infill projects.			✓
(b) Identify appropriate areas for urban expansion of existing towns where infrastructure and public facilities can be provided in a cost-effective manner.	✓		
Analysis: **The proposed project will be implemented in an area planned for future growth in Central Maui, and in proximity to existing infrastructure and services. Families will be centrally located near jobs, schools, recreation, and other services.**			
Objective:			
(5) Improve the planning and management of infrastructure systems.		✓	
Policies:			
(a) Provide a reliable and sufficient level of funding to enhance and maintain infrastructure systems.			✓
(b) Require new developments to contribute their pro rata share of local and regional infrastructure costs.			✓
(c) Improve coordination among infrastructure providers and planning agencies to minimize construction impacts.			✓
(d) Maintain inventories of infrastructure capacity, and project future infrastructure needs.			✓
(e) Require social-justice and -equity issues to be considered during the infrastructure-planning process.			✓
(f) Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.			✓
(g) Ensure that infrastructure is built concurrent with or prior to development.		✓	
(h) Ensure that basic infrastructure needs can be met during a disaster.			✓
(i) Locate public facilities and emergency services in appropriate locations that support the health, safety, and welfare of each community and that minimize delivery inefficiencies.			✓
(j) Promote the undergrounding of utility and other distribution lines for health safety, and aesthetic reasons.			✓
Implementing Actions:			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(a) Develop and regularly update functional plans for infrastructure systems.			✓
(b) Develop, adopt, and regularly update local or community-sensitive level-of service standards for infrastructure systems.			✓
Analysis: **The proposed project is indirectly applicable to the objective and policies related to planning and management of infrastructure systems. The proposed project will be implemented in proximity to developed area with existing infrastructure and services in Central Maui. The project will also be implementing infrastructure improvements to service the proposed development, as necessary.**			
J. PROMOTE SUSTAINABLE LAND USE AND GROWTH MANAGEMENT			
Goal: Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.		✓	
Objective:			
(1) Improve land use management and implement a directed-growth strategy.		✓	
Policies:			
(a) Establish, map, and enforce urban- and rural-growth limits.		✓	
(b) Direct urban and rural growth to designated areas.		✓	
(c) Limit the number of visitor-accommodation units and facilities in Community Plan Areas.			✓
(d) Maintain a sustainable balance between the resident, part-time resident, and visitor populations.			✓
(e) Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.		✓	
(f) Discourage new entitlements for residential, resort, or commercial development along the shoreline.			✓
(g) Restrict development in areas that are prone to natural hazards, disasters, or sea-level rise.		✓	
(h) Direct new development in and around communities with existing infrastructure and service capacity, and protect natural, scenic, shoreline, and cultural resources.		✓	
(i) Establish and maintain permanent open space between communities to protect each community's identity.			✓
(j) Support the dedication of land for public uses.			✓
(k) Preserve the public's rights of access to and continuous lateral access along all shorelines.			✓
(l) Enable existing and future communities to be self-sufficient through sustainable land use planning and management practices.			✓
(m) Protect summits, slopes, and ridgelines from inappropriate development.			✓
Implementing Actions:			
(a) Regularly update urban- and rural-growth boundaries and their maps.			✓
(b) Establish transfer and purchase of development rights programs.			✓
(c) Develop and adopt a green infrastructure plan.			✓
(d) Develop studies to help determine a sustainable social, environmental, and economic carrying capacity for each island.			✓
(e) Identify and define resort-destination areas.			✓
Analysis: **The proposed project will be developed within the Urban Growth Boundary as designated by the County of Maui's Maui Island Plan. The project is located in Central Maui, in proximity to existing infrastructure and services. The project will be developed in an area outside of the sea level rise exposure area.**			
Objective:			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(2) Improve planning for and management of agricultural lands and rural areas.			✓
Policies:			
(a) Protect prime, productive, and potentially productive agricultural lands to maintain the islands' agricultural and rural identities and economies.			✓
(b) Provide opportunities and incentives for self-sufficient and subsistence homesteads and farms.			✓
(c) Discourage developing or subdividing agriculturally designated lands when non-agricultural activities would be primary uses.			✓
(d) Conduct agricultural-development planning to facilitate robust and sustainable agricultural activities.			✓
Implementing Actions:			
(a) Inventory and protect prime, productive, and potentially productive agricultural lands from competing non-agricultural land uses.			✓
Analysis: **In the context of the amount of viable agriculture lands on the island of Maui, implementation of the proposed action is not considered to adversely affect agricultural productivity on Maui. As such, the objective of improving planning for and managing agriculture lands and rural areas are not applicable to this project.**			
Objective:			
(3) Design all developments to be in harmony with the environment and to protect each community's sense of place.		✓	
Policies:			
(a) Support and provide incentives for green building practices.			✓
(b) Encourage the incorporation of green building practices and technologies into all government facilities to the extent practicable.			✓
(c) Protect and enhance the unique architectural and landscape characteristics of each Community Plan Area, small town, and neighborhood.		✓	
(d) Ensure that adequate recreational areas, open spaces, and public-gathering places are provided and maintained in all urban centers and neighborhoods.		✓	
(e) Ensure business districts are distinctive, attractive, and pedestrian-friendly destinations.			✓
(f) Use trees and other forms of landscaping along rights-of-way and within parking lots to provide shade, beauty, urban-heat reduction, and separation of pedestrians from automobile traffic in accordance with community desires.		✓	
(g) Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.		✓	
(h) Ensure better connectivity and linkages between land uses.		✓	
(i) Adequately buffer and mitigate noise and air pollution in mixed-use areas to maintain residential quality of life.			✓
(j) Protect rural communities and traditional small towns by regulating the footprint, locations, site planning, and design of structures.			✓
(k) Support small-town revitalization and preservation.			✓
(l) Facilitate safe pedestrian access, and create linkages between destinations and within parking areas.			✓
Implementing Actions:			
(a) Establish design guidelines and standards to enhance urban and rural environments.			✓
(b) Provide funding for civic-center and civic-space developments.			✓
(c) Establish and enhance urban forests in neighborhoods and business districts.		✓	
Analysis: **The proposed project will provide an onsite clubhouse building and incorporate architectural style and landscaping to enhance residents' sense of place within an urban setting. The**			

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proposed project will incorporate landscape features and trees to provide vegetative buffers from the surrounding urban character.			
Objective:			
(4) Improve and increase efficiency in land use planning and management.		✓	
Policies:			
(a) Assess the cumulative impact of developments on natural ecosystems, natural resources, wildlife habitat, and surrounding uses.		✓	
(b) Ensure that new development projects requiring discretionary permits demonstrate a community need, show consistency with the General Plan, and provide an analysis of impacts.		✓	
(c) Encourage public and private partnerships to preserve lands of importance, develop housing, and meet the needs of residents.	✓		
(d) Promote creative subdivision designs that implement best practices in land development, sustainable management of natural and physical resources, increased pedestrian and bicycle functionality and safety, and the principles of livable communities.		✓	
(e) Coordinate with Federal, State, and County officials in order to ensure that land use decisions are consistent with County plans and the vision local populations have for their communities.			✓
(f) Enable greater public participation in the review of subdivisions.			✓
(g) Improve land use decision making through the use of land- and geographic information systems.			✓
Implementing Actions:			
(a) Institute a time limit and sunsetting stipulations on development entitlements and their implementation.			✓
Analysis: **The proposed project entails the development of affordable housing for Maui County families, and an environmental assessment has been prepared for the proposed project to assess potential, cumulative and secondary impacts. The proposed action supports smart growth principles.**			
K. STRIVE FOR GOOD GOVERNANCE			
Objective:			
(1) Strengthen governmental planning, coordination, consensus building, and decision making.		✓	
Policies:			
(a) Plan and prepare for the effects of social, demographic, economic, and environmental shifts.			✓
(b) Plan for and address the possible implications of Hawaiian sovereignty.			✓
(c) Encourage collaboration among government agencies to reduce duplication of efforts and promote information availability and exchange.		✓	
(d) Expand opportunities for the County to be involved in and affect State and Federal decision making.			✓
(e) Plan and prepare for large-scale emergencies and contingencies.			✓
(f) Improve public awareness about preparing for natural hazards, disasters, and evacuation plans.			✓
(g) Improve coordination among Federal, State, and County agencies.			✓
Implementing Actions:			
(a) Develop policies, regulations, and programs to protect and enhance the unique character and needs of the County's various communities.			✓
(b) Evaluate and if necessary, recommend modifications to the County Charter that could result in a possible change to the form of governance for Maui County.			✓

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(c) Study and evaluate the feasibility and implications of voting in Maui County Council elections.			✓
(d) Study and evaluate the feasibility of authorizing town governments in Maui County.			✓
Analysis: **The objective of strengthening governmental planning, coordination, consensus building, and decision making along with the policies that support this objective are not directly applicable to the proposed project. However, it is important to note that continuing coordination between government entities is critical to the success of the project.**			
Objective:			
(2) Promote civic engagement.		✓	
Policies:			
(a) Foster consensus building through in-depth, innovative, and accessible public participatory processes.		✓	
(b) Promote and ensure public participation and equal access to government among all citizens.			✓
(c) Encourage a broad cross-section of residents to volunteer on boards and commissions.			✓
(d) Encourage the State to improve its community-involvement processes.			✓
(e) Support community-based decision making.		✓	
(f) Expand advisory functions at the community level.			✓
(g) Expand opportunities for all members of the public to participate in public meetings and forums.		✓	
(h) Facilitate the community's ability to obtain relevant documentation.			✓
(i) Increase voter registration and turnout.			✓
Implementing Actions:			
(a) Implement two-way communication using audio-visual technology that allows residents to participate in the County's planning processes.			✓
(b) Ensure and expand the use of online notification of County business and public meetings, and ensure the posting of all County board and commission meeting minutes.			✓
(c) Explore funding mechanisms to improve participation by volunteers on boards and commissions.			✓
(d) Develop a project-review process that mandates early and ongoing consultation in and with communities affected by planning and land use activities.			✓
Analysis: **As mentioned previously, the design and environmental review processes involves opportunities for the public to provide input throughout the environmental review process.**			
Objective:			
(3) Improve the efficiency, reliability, and transparency of County government's internal processes and decision making.			✓
Policies:			
(a) Use advanced technology to improve efficiency.			✓
(b) Simplify and clarify the permitting process to provide uniformity, reliability, efficiency, and transparency.			✓
(c) Improve communication with Lānaʻi and Molokaʻi through the expanded use of information technologies, expanded staffing, and the creation and expansion of government-service centers.			✓
(d) Ensure that laws, policies, and regulations are internally consistent and effectuate the intent of the General Plan.			✓
Implementing Actions:			

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(a) Update the County Code to be consistent with the General Plan.			✓
(b) Identify and update County regulations and procedures to increase the productivity and efficiency of County government.			✓
(c) Develop local level-of-service standards for infrastructure, public facilities, and services.			✓
(d) Implement plans through programs, regulations, and capital improvements in a timely manner.			✓
(e) Expand government online services.			✓
Analysis: **The objective and policies as it relates to improving the efficiency, reliability, and transparency of County government's internal processes and decision making is not applicable to the proposed project.**			
Objective:			
(4) Adequately fund in order to effectively administer, implement, and enforce the General Plan.			✓
Policies:			
(a) Adequately fund, staff, and support the timely update and implementation of planning policy, programs, functional plans, and enforcement activities.			✓
(b) Ensure that the County's General Plan process provides for efficient planning at the County, island, town, and neighborhood level.			✓
(c) Encourage ongoing professional development, education, and training of County employees.			✓
(d) Encourage competitive compensation packages for County employees to attract and retain County personnel.			✓
(e) Enable the County government to be more responsive in implementing our General Plan and Community Plans.			✓
(f) Review discretionary permits for compliance with the Countywide Policy Plan.			✓
(g) Strengthen the enforcement of County, State, and Federal land use laws.			✓
Implementing Actions:			
(a) Establish penalties to ensure compliance with County, State, and Federal land use laws.			✓
Analysis: **The objective and policies regarding the funding of the General Plan do not apply to the proposed action. The project acknowledges the importance of this objective and the importance of the General Plan.**			
Objective:			
(5) Strive for County government to be a role model for implementing cultural and environmental policies and practices.			✓
Policies:			
(a) Educate residents on the benefits of sustainable practices.			✓
(b) Encourage the retention and hiring of qualified professionals who can improve cultural and environmental practices.			✓
(c) Incorporate environmentally sound and culturally appropriate practices in government operations and services.			✓
(d) Encourage all vendors with County contracts to incorporate environmentally sound and culturally appropriate practices.			✓
Analysis: **The objective and policies regarding the County of Maui implementing cultural and environmental practices does not apply to the proposed project.**			
L. MITIGATE CLIMATE CHANGE AND WORK TOWARD RESILIENCE			
Goal: Minimize the causes and negative effects of climate change.		✓	
Objective:			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(1) Lower carbon emissions levels to mitigate climate change impacts and limit the rate of global warming.			✓
Policies:			
(a) Increase reforestation efforts by encouraging residents and visitors to plant non- invasive gardens and trees.			✓
(b) Improve communication, coordination, and collaboration among those that work to mitigate climate change impacts.			✓
(c) Promote the teaching and use of regenerative agriculture.			✓
(d) Invest in infrastructure that is not dependent on fossil fuels and utilizes renewable energy.		✓	
(e) Improve efforts to mitigate and plan for the impact of natural disasters and global warming.			✓
(f) Encourage the building industry to use environmentally sustainable materials, technology, and site planning.		✓	
(g) Reduce air, noise, light, land, and water pollution, and reduce Maui County's contribution to global climate change.			✓
(h) Plan and prepare for and educate visitors and residents about the possible effects of global warming.			✓
(i) Promote programs and incentives that decrease greenhouse-gas emissions and improve environmental stewardship.			✓
(j) Support the development of carbon-emission standards and an incentive program aimed at achieving County carbon-emission goals.			✓
Implementing Actions:			
(a) Implement Federal and State policies that require a reduction of greenhouse-gas emissions.		✓	
(b) Establish a Countywide Climate Action Plan			✓
(c) Develop programs that assist residents and businesses with obtaining access to renewable energy sources.			✓
(d) Revise laws to support neighborhood designs that incorporate the use of renewable energy sources that are appropriate for island living.			✓
(e) Incorporate planting of native and indigenous trees as a major component of Urban Design to both cool neighborhoods and reduce carbon dioxide.	✓		
(f) Coordinate with State, County, and private landowners in the development of forestry and prioritizing of native and indigenous trees to reduce carbon dioxide.			✓
(g) Strongly support efforts to restore and improve Maui County's watersheds for the purpose of improving the water supply, controlling carbon dioxide levels, decreasing soil runoff, and reducing coastal flooding.			✓
Analysis: **The proposed project will incorporate the use of energy efficient fixtures and appliances and will potentially install solar panels, if feasible. The proposed project will also incorporate native and indigenous trees and plants in the project site landscaping. With this information in mind, the objectives and policies for the goal of minimizing the causes and negative effects of climate changes is indirectly applicable to the proposed project.**			
Objective:			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(2) Reduce the impacts of sea-level rise by acknowledging climate change, adapting, mitigating, and planning accordingly.			✓
Policies:			
(a) Evaluate development to assess potential short-term and long-term sea-level rise impacts on nearshore environments.			✓
(b) Improve efforts to mitigate and plan for the impact of sea-level rise.			✓
(c) Protect undeveloped beaches, dunes, and ecosystems, and restore natural shoreline processes.			✓
(d) Develop an inventory of private wastewater systems (septic systems, cesspools) that may be affected by sea-level rise.			✓
(e) Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.			✓
(f) Educate the construction and landscape industries and property owners about the use of best management practices to prevent erosion and nonpoint source pollution.			✓
(g) Discourage beach hardening processes such as building sea walls and revetments that block movement of the shoreline and can accelerate erosion.			✓
(h) Discourage new entitlements for residential, resort, or commercial development along the shoreline.			✓
(i) Restrict development in areas that are prone to sea-level rise.			✓
(j) Move or rebuild public facilities away from nearshore environments to account for sea-level rise to the extent reasonable.			✓
(k) Move or rebuild roads that are in sea-level nse inundation zones to the extent reasonable.			✓
(l) Ensure that public or affordable housing projects include siting and design standards that promote equity and resilience for vulnerable populations.	✓		
(m) Identify, research, and evaluate innovative and sustainable financing to support mitigation and adaptation to sea level rise.			✓
Implementing Actions:			
(a) Develop programs to help transition shoreline property owners out of their nearshore locations and develop a long-term plan to stay out of the way of natural beach migration.			✓
(b) Identify buildings, roads, and other infrastructure that are in sea-level rise inundation zones and assist in adaptive efforts, including nature-based solutions, elevation, or moving them away from such zones.			✓
(c) Identify disaster redevelopment alternatives that support resilience-focused adaptation to sea level rise in the event of a catastrophic coastal event.			✓
Analysis: **The project site will not be affected by sea level rise as it is located outside of the 3.2-foot projected sea level rise exposure area.**			
Objective:			
(3) Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.		✓	
Policies:			
(a) Promote the use of locally renewable energy sources, and reward energy efficiency.		✓	
(b) Consider tax incentives and credits for the development of sustainable- and renewable-energy sources.		✓	
(c) Expand education about energy conservation and self-sufficiency.			✓
(d) Encourage small-scale energy generation that utilizes wind, sun, water, biowaste, and other renewable sources of energy.			✓
(e) Expand renewable-energy production.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable)	DA	IA	N/A
(f) Develop public-private partnerships to ensure the use of renewable energy and increase energy efficiency.			✓
(g) Require the incorporation of locally appropriate energy-saving and green building design concepts in all new developments by providing energy-efficient urban design guidelines and amendments to the Building Code.			✓
(h) Encourage the use of sustainable energy to power vehicles.			✓
(i) Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.		✓	
(j) Encourage green footprint practices.		✓	
(k) Reduce Maui County's dependence on fossil fuels and energy imports.			✓
(l) Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and recycle water.		✓	
(m) Promote and support environmentally friendly practices in all energy sectors.			✓
Implementing Actions:			
(a) Adopt an energy-efficiency policy for Maui County government as a model for other jurisdictions.			✓
(b) Adopt a Green Building Code and support green building practices.			✓
Analysis: **The proposed project will incorporate the use of energy efficient fixtures and appliances and will potentially install solar panels, if feasible.**			

MAUI ISLAND PLAN – ASSESSMENT OF PROJECT APPLICABILITY TO GOALS, OBJECTIVES, AND POLICIES

APPENDIX

L-3

APPENDIX "L-3"
MAUI ISLAND PLAN
ASSESSMENT OF PROJECT APPLICABILITY TO GOALS, OBJECTIVES, AND POLICIES

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
CHAPTER 1 – POPULATION			
Goal:			
1.1 Maui's people, values, and lifestyles thrive through strong, healthy, and vibrant island communities.	✓		
Objective:			
1.1.1 Greater retention and return of island residents by providing viable work, education, and lifestyle options.	✓		
Policies:			
1.1.1.a Expand programs that enable the community to meet the education, employment, housing, and social goals of youth and young adults.		✓	
1.1.1.b Expand housing, transportation, employment, and social opportunities to ensure residents are able to comfortably age within their communities.	✓		
1.1.1.c Measure and track resident satisfaction through surveys and community indicators.			✓
1.1.1.d Support funding for transportation, housing, health care, recreation, and social service programs that help those with special needs (including the elderly and disabled).			✓
Analysis: **The proposed project is directly applicable to the goal and objectives related to healthy vibrant island communities as it provides additional affordable housing opportunities in an architecturally designed community setting for Maui county families in Waiehu. Further, the proposed project will provide for additional housing options for local families seeking to live on Maui island to be closer to their families and local employment, education, and social opportunities.**			
CHAPTER 2 – HERITAGE RESOURCES			
CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES ISSUES			
Goal:			
2.1 Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.		✓	
Objective:			
2.1.1 An island culture and lifestyle that is healthy and vibrant as measured by the ability of residents to live on Maui, access and enjoy the natural environment, and practice Hawaiian customs and traditions in accordance with Article XII, Section 7, Hawai'i State Constitution, and Section 7-1, Hawai`i Revised Statutes (HRS).			✓
Policies:			
2.1.1.a Perpetuate the spirit of aloha and celebrate the host Hawaiian culture and other ethnic cultures.			✓
2.1.1.b Perpetuate a respect for diversity and recognize the broad blending of cultures and ethnicities as vital to the quality of life on Maui.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.1.1.c Ensure traditional public access routes, including native Hawaiian trails, are maintained for public use.			✓
2.1.1.d Support the education of visitors and new residents about the customs and etiquette of the Hawaiian culture, as well as other cultures.			✓
Objective:			
2.2 A more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies.		✓	
Policies:			
2.1.2.a Ensure that the island has a comprehensive and up-to-date inventory of historic and archaeological resources, and their cultural significance.		✓	
2.1.2.b Require the update of existing planning and regulatory mechanisms to protect the natural, cultural, scenic, and historic resources within designated Heritage Areas (see Cultural Resources Overlay/Scenic Corridor Protection Technical Reference Map).			✓
2.1.2.c Ensure that cultural, historic, and archaeological resources are protected for the benefit of present and future generations.		✓	
Objective:			
2.3 Enhance the island's historic, archaeological, and cultural resources.		✓	
Policies:			
2.1.3.a Identify and pursue a listing of the properties and sites on the State and National Register of Historic Places.			✓
2.1.3.b Support the use of easements, dedications, and other mechanisms to acquire, maintain, and protect lands with cultural, archaeological, and historic significance.			✓
2.1.3.c Support regulations to require developers, when appropriate, to prepare an Archaeological Inventory Survey, Cultural Impact Assessment, and Ethnographic Inventories that are reviewed and commented upon by the Office of Hawaiian Affairs, Native Hawaiian advisory bodies, the State Historic Preservation Division (SHPD), and the Office of Environmental Quality Control, and systematically comply with the steps listed in SHPD's administrative rules, including consultation and monitoring during construction phases of projects.		✓	
2.1.3.d Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures.			✓
2.1.3.e Encourage property owners to register historic and archaeological sites on the State and National Register.			✓
2.1.3.f Support opportunities for public involvement with the intent to facilitate the protection and restoration of historic and archeological sites, including consultation with stakeholders.		✓	
2.1.3.g Encourage the resolution of land title questions relating to Land Commission Awards and Royal patents.			✓
2.1.3.h Ensure compliance with historic preservation laws, and discourage demolition of properties that are determined to be eligible for listing on the National or State Register of Historic Places.		✓	

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Analysis: **The objectives and policies relating to respecting and protecting archaeological and cultural resources are indirectly applicable to the proposed project. A CIA was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. In this context, the proposed action advances the objective and policies related to preserving local cultures and traditions. Archaeological investigations identified no historic properties within the project site. Nevertheless, an archaeological monitoring will be conducted during construction in accordance with the approved AMP. Landscaping proposed in connection with the project is intended to enhance the project's visual relationship with its immediate surrounding environs.**			
SHORELINE, REEFS, AND NEARSHORE WATERS			
Goal:			
2.2 An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.		✓	
Objective:			
2.2.1 A more comprehensive and community-based ICZM program.			✓
Policies:			
2.2.1.a Encourage a management system that protects and temporarily rests the reef ecosystems from overuse.			✓
2.2.1.b Support the establishment of additional MMAs and reef replenishment areas.			✓
2.2.1.c Work with appropriate agencies and community members to protect any special managed conservation areas from overuse and ensure that surrounding land uses do not contribute to the degradation of the natural resources, such as 'Ahihi-Kina'u Natural Area Reserve, Honolua-Mokulē'ia Bay Marine Life Conservation District, and Mākena State Park.			✓
2.2.1.d Incorporate the following into the MIP, where consistent with the MIP:			
(1) Beach Management Plan for Maui;			✓
(2) Coastal Nonpoint Pollution Control Program Management Plan;			✓
(3) Implementation Plan for Polluted Runoff Control; and			✓
(4) Ocean Resource Management Plan.			✓
2.2.1.e Support greater coordination among governmental agencies involved with the protection of the island's marine resources.			✓
Objective:			
2.2.2 Improved reef health, coastal water quality, and marine life.			✓
Policies:			
2.2.2.a Create additional mechanisms where needed to contain and control runoff and pollution.		✓	
2.2.2.b Allow extraction of high quality, Class A, low silt sands only when they will be used to protect or restore Maui's shorelines and beaches.			✓
2.2.2.c Carefully manage beach nourishment activities to protect the coastal and			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
marine ecosystem.			
2.2.2.d Require, where appropriate, a buffer between landscaped areas and the shoreline, gulches, and streams to reduce the runoff of fertilizers, pesticides, herbicides, and other pollutants into coastal waters.			✓
2.2.2.e Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.			✓
2.2.2.f Support greater protection of Keālia Pond National Wildlife Refuge through the following:			
(1) Enhancement of marine ecosystems;			✓
(2) Beach and sand dune restoration; and			✓
(3) Expansion of habitat for Maui's threatened or endangered sea turtles, birds, and other species.			✓
2.2.2.g Support the development of regulations to prevent the excessive depletion of fish stocks due to non-sustainable practices and gear such as SCUBA spear-fishing and lay nets, within the context of nearshore ecosystems.			✓
2.2.2.h Encourage the State to conduct a regular census of fish populations and monitor coral health.			✓
2.2.2.i Encourage the State to significantly increase the number of park rangers, enforcement officers, and marine biologists to protect coastal resources.			✓
2.2.2.j Encourage the State to prohibit the collection and exportation of fish, coral, algae, and other marine species for the ornamental and aquarium trade.			✓
Objective:			
2.2.3 Water quality that meets or exceeds State Clean Water Act standards.		✓	
Policies:			
2.2.3.a Reduce the amount of impervious surface and devise site plan standards that aim to minimize storm runoff and NPS pollution.		✓	
2.2.3.b Support the revision of existing regulations to require an Erosion and Sedimentation Control Plan (ESCP) for development activities that may pose a threat to water quality.			✓
2.2.3.c Require an on-site monitoring program, where applicable, when grading may pose a threat to water quality or when recommended in the ESCP.			✓
2.2.3.d Avoid development actions that impair Maui's reef systems and remove identified stressors.			✓
2.2.3.e Phase out cesspools and restrict the use of septic systems in ecologically sensitive coastal areas by converting to environmentally-friendly alternative sewage treatment systems, and connecting to central sewerage systems when and where feasible.			✓
2.2.3.f Prohibit the development of new wastewater injection wells, except when unavoidable for public health and safety purposes.			✓
2.2.3.g Ensure that the County upholds its affirmative duty under the Clean Water Act by monitoring and reducing point and NPS pollution to help safeguard coastal waters.			✓
Objective:			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.2.4 Acquire additional shoreline lands and shoreline access rights.			✓
Policies:			
2.2.4.a Promote the use of conservation easements, land trusts, transfer and purchase of development rights, and mitigation banking.			✓
2.2.4.b Require the dedication of public beach and rocky shoreline access ways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval; future subdivisions and developments shall be consistent with and effectuate, to the extent practicable, the *Shoreline Access Inventory Update - Final Report* (March 2005), and its updates.			✓
2.2.4.c Incorporate the *Shoreline Access Inventory Update - Final Report* (March 2005), and its regular updates, into this plan.			✓
2.2.4.d Identify access points while further acquiring key shoreline parcels and easement rights to enhance and protect beach access and shoreline recreation.			✓
Analysis: **The proposed project is located inland, and not in close proximity to the shoreline. With the spatial separation, there are no direct project considerations as it relates to shoreline management programming, reef health, coastal water quality, marine life or shoreline lands and access rights. However, inasmuch as the proposed action does involve grading and earth moving activities, the project may be considered to have indirect applicability to objectives and policies relating to coastal water quality. As such, appropriate BMPs will be implemented during construction to ensure that soil erosion and runoff do not adversely affect coastal waters.**			
WATERSHEDS, STREAMS, AND WETLANDS ISSUES			
Goal:			
2.3 Healthy watersheds, streams, and riparian environments.			✓
Objective:			
2.3.1 Greater protection and enhancement of watersheds, streams, and riparian environments.			✓
Policies:			
2.3.1.a All present and future watershed management plans shall incorporate concepts of ahupua'a management based on the interconnectedness of upland and coastal ecosystems/species.			✓
2.3.1.b Continue to support and be an active member of watershed partnerships.			✓
2.3.1.c Support the establishment of regional water trusts, composed of public and private members, to manage water resources.			✓
2.3.1.d Support regulations to require developments to utilize ahupua'a management practices.			✓
2.3.1.e Work with private and non-profit entities to educate the public about the connection between upland activities within the watershed and the impacts on nearshore ecosystems and coral reefs.			✓
2.3.1.f Provide adequate funding and staff to develop and implement watershed protection plans and policies, including acquisition and management of watershed resources and land.			✓
2.3.1.g Encourage the State to mandate instream assessment to provide adequate			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
water for native species.			
2.3.1.h Maui will protect all watersheds and streams in a manner that guarantees a healthy, sustainable riparian environment.			✓
Objective:			
2.3.2 Decreased NPS and point source pollution.			✓
Policies:			
2.3.2.a Enforce water pollution related standards and codes.			✓
2.3.2.b Support the use of LID Techniques such as those described in the State of Hawai'i LID Practitioner's Guide (June 2006), as amended.			✓
2.3.2.c Encourage farmers and ranchers to use agricultural BMPs to address NPS pollution.			✓
Objective:			
2.3.3 Preserve existing wetlands and improve and restore degraded wetlands.			✓
Policies:			
2.3.3.a Prohibit the destruction and degradation of existing upland, mid-elevation, and coastal wetlands.			✓
2.3.3.b Support and fund wetland protection and improvement, and restoration of degraded wetlands.			✓
2.3.3.c Where applicable, require developers to provide a wetland protection buffer and/or other protective measures around and between development and wetland resources.			✓
Objective:			
2.3.4 Greater preservation of native flora and fauna biodiversity to protect native species.			✓
Policies:			
2.3.4.a Work with appropriate agencies to eliminate feral ungulate populations and invasive species.			✓
2.3.4.b Encourage the State to provide adequate funding to preserve biodiversity, protect native species, and contain or eliminate invasive species.			✓
2.3.4.c Support the work of conservation groups and organizations that protect, reestablish, manage, and nurture sensitive ecological areas and threatened indigenous ecosystems.			✓
Objective:			
2.3.5 Limited development in critical watershed areas.			✓
Policies:			
2.3.5.a Discourage development and subdivision of land within critical watersheds and in areas susceptible to high erosion and sediment loss.			✓
2.3.5.b Designate critical watershed areas as conservation lands.			✓
2.3.5.c Strongly encourage new subdivisions and developments that are proximate to environmentally sensitive watershed resources to prepare and implement CSD			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
plans.			
Objective:			
2.3.6 Enhance the vitality and functioning of streams, while balancing the multiple needs of the community.			✓
Policies			
2.3.6.a Protect and enhance natural streambeds and discourage stream alteration.			✓
2.3.6.b Work with appropriate agencies to establish minimum stream flow levels and ensure adequate stream flow to sustain riparian ecosystems, traditional kalo cultivation, and self-sustaining ahupua'a.			✓
2.3.6.c Respect and participate in the resolution of native Hawaiian residual land and water rights issues (kuleana lands, ceded lands, and historic agricultural and gathering rights).			✓
2.3.6.d Ensure that stream flows implement laws and policies found in the State Constitution and Water Code.			✓
2.3.6.e Work with appropriate agencies and stakeholders to establish minimum stream flow levels, promote actions to support riparian habitat and the use of available lo'i, and maintain adequate flows for the production of healthy kalo crops.			✓
Analysis: **The proposed project is not directly or indirectly applicable to the goal of maintaining healthy watersheds, streams, and riparian environments.**			
WILDLIFE AND NATURAL AREAS			
Goal:			
2.4 Maui's natural areas and indigenous flora and fauna will be protected.		✓	
Objective:			
2.4.1 A comprehensive management strategy that includes further identification, protection, and restoration of indigenous wildlife habitats.		✓	
Policies:			
2.4.1.a Identify and inventory the following:			
(1) Natural, recreational, and open space resources;			✓
(2) Flora and fauna with medium, high, and very high concentrations of threatened or endangered species; and			✓
(3) Location and extent of invasive species.			✓
2.4.1.b Require flora and fauna assessment and protection plans for development in areas with concentrations of indigenous flora and fauna; development shall comply with the assessment and protection plan and shall use the avoidance, minimization, and mitigation approach respectively, with an emphasis on avoidance.		✓	
2.4.1.c Support the implementation of Hawai`i's Comprehensive Wildlife Conservation Strategy (October 2005).			✓
Objective:			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.4.2 A decrease in invasive species through programs and partnerships that eradicate undesirable species and protect native habitat.			✓
Policies:			
2.4.2.a Prevent the introduction of invasive species at all of Maui's airports and harbors.			✓
2.4.2.b Encourage the State to increase funding in support of invasive species interception, control, and eradication.			✓
2.4.2.c Encourage the State to develop programs that allow students to participate in invasive species eradication projects.			✓
Objective:			
2.4.3 Greater protection of sensitive lands, indigenous habitat, and native flora and fauna.		✓	
Policies:			
2.4.3.a Secure an interconnected network of sensitive lands, greenways, watercourses, and habitats.			✓
2.4.3.b Protect Maui's sensitive lands (see Sensitive Lands on Protected Areas Diagrams).			✓
2.4.3.c Promote innovative environmental-planning methods and site-planning standards that preserve and re-establish indigenous flora and fauna habitat, to preserve and restore connected habitat corridors and open space.			✓
2.4.3.d Utilize protection tools such as conservation easements, land trusts, land banks, Purchase of Developments Rights (PDRs), Transfer of Development Rights (TDRs), and other stewardship tools to acquire natural areas			✓
2.4.3.e Encourage discussions with communities to designate heritage areas that protect recreational and cultural lifestyles and resources.			✓
2.4.3.f Support the expansion of Haleakalā National Park, and the creation of new national parks, where appropriate and supported by local communities.			✓
2.4.3.g Encourage reforestation efforts that increase native species' habitat.			✓
2.4.3.h Utilize the Natural Area Partnership Program (NAPP) and other programs to protect natural lands.			✓
2.4.3.i Support increased dedicated funding for the acquisition, protection, restoration, or preservation of important natural areas or open space through the following: grants from the Land and Water Conservation Fund; dedicated funding from real property taxes or other appropriate revenues; bond issues; real estate transfer tax; revenues from the Transient Accommodations Tax; development mitigation fees; and other appropriate funding sources.			✓
Analysis: **The proposed project is indirectly applicable to the objective of greater protection of native habitat and of indigenous flora and fauna. The environmental review process for the proposed action included a flora and fauna survey addressing biological resources in the project area. This assessment addresses the objective of identification and protection (as applicable) of wildlife habitats.**			
SCENIC RESOURCES			
Goal:			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.5 Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.		✓	
Objective:			
2.5.1 A greater level of protection for scenic resources.		✓	
Policies:			
2.5.1.a Protect views to include, but not be limited to, Haleakalā, ʻĪao Valley, the Mauna Kahalawai (West Maui Mountains), Puʻu Ōʻlaʻi, Kahoʻolawe, Molokini, Molokaʻi, and Lānaʻi, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.		✓	
2.5.1.b Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.			✓
2.5.1.c Protect "night sky" resources by encouraging the implementation of ambient light ordinances and encouraging conversion of all sources that create excessive light pollution, affecting our ability to view the stars.			✓
2.5.1.d Protect ridgelines from development where practicable to facilitate the protection of public views.			✓
2.5.1.e Protect scenic resources along Maui's scenic roadway corridors.		✓	✓
Objective:			
2.5.2. Reduce impacts of development projects and public-utility improvements on scenic resources.		✓	
Policies:			
2.5.2.a Enforce the policies and guidelines of the SMA regarding the protection of views.			✓
2.5.2.b Require any new subdivision of land, development, or redevelopment adjacent to a "high" or "exceptional" scenic corridor to submit an impact assessment of the project's scenic impacts; this assessment shall use the avoidance, minimization, and mitigation steps respectively, with an emphasis on avoidance.			✓
2.5.2.c Require appropriate building setbacks and limits on wall heights to protect views along scenic corridors.		✓	
2.5.2.d Encourage the State of Hawai`i Board of Land and Natural Resources to deny any development within the State Conservation District that interferes with a scenic landscape or disrupts important open space resources.			✓
2.5.2.e Require Urban Design and Review Board (UDRB) review and approval of utility poles, facilities, and other visible infrastructure improvements along scenic corridors.			✓
2.5.2.f Ensure little or no effect on scenic resources from utility improvements, primarily power poles.			✓
2.5.2.g Protect scenic vistas from intrusion by power poles.			✓
Objective:			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.5.3 Greater protection of and access to scenic vistas, access points, and scenic lookout points.		✓	
Policy:			
2.5.3.a Protect, enhance, and acquire access to Maui's scenic vistas and resources.		✓	
Analysis: **The objectives and policies relating to protecting and maintaining scenic resources are indirectly applicable to the proposed project. The proposed project will be implemented along Kahekili Highway, which provides views of the West Maui Mountains. The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas.**			
CHAPTER 3 – NATURAL HAZARDS			
Goal:			
3.1 Maui will be disaster resilient.			✓
Objective:			
3.1.1 Increased inter-agency coordination.			✓
Policy:			
3.1.1.a Reinforce the island's preparedness capacity by:			✓
(1) Applying the latest data-gathering techniques/technology;			✓
(2) Pursuing funding opportunities;			✓
(3) Improving monitoring and advance warning systems;			✓
(4) Fostering public awareness; and			✓
(5) Working with external agencies to coordinate disaster mitigation and response.			✓
Objective:			
3.1.2 Greater protection of life and property.			✓
Policies:			
3.1.2.a Identify critical infrastructure, lifelines, roads, and populations that are vulnerable to coastal hazards, and encourage strategic retreat and relocation to safer areas.			✓
3.1.2.b Consider the location of dams, reservoirs, holding ponds, and other water-containing entities that are upstream of inhabited areas to anticipate, avoid, and mitigate inundation risks, and discourage new development in areas where possible inundation hazards may exist.			✓
3.1.2.c Strengthen current development standards to minimize destruction of land and property.			✓
3.1.2.d Encourage the use of construction techniques that reduce the potential for damage from natural hazards.			✓
3.1.2.e Increase the County's resilience to drought.			✓

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3.1.2.f Increase food and energy security through local production and storage.			✓
Objective:			
3.1.3 A more coordinated emergency response system that includes clearly defined and mapped evacuation routes.			✓
Policy:			
3.1.3.a Identify and expand shelter facilities and evacuation routes away from areas susceptible to natural hazards.			✓
Objective:			
3.1.4 A more educated and involved public that is aware of and prepared for natural hazards.			✓
Policies:			
3.1.4.a Promote public education and involvement related to natural hazards awareness and preparedness.			✓
3.1.4.b Coordinate a multi-agency effort to establish and promote a comprehensive public education program that will focus on practical approaches to preparedness, damage prevention, and hazard mitigation.			✓
Analysis: **The objectives and policies related to making Maui disaster-resilient are not directly or indirectly applicable to the proposed project. The proposed action is limited to the development of a new multifamily affordable housing project for Maui County families.**			
CHAPTER 4 – ECONOMIC DEVELOPMENT			
ECONOMIC DIVERSIFICATION			
Goal:			
4.1 Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.		✓	
Objective:			
4.1.1 A more diversified economy.		✓	
Policies:			
4.1.1.a Encourage an economy that is driven by innovation, research and development, and human resource development, including but not limited to, increasing technology- and knowledge-based sectors to be a major component in Maui County's economic base.			✓
4.1.1.b Support the creation of new jobs and industries that provide a living wage.		✓	
4.1.1.c Facilitate and expedite permits and approvals.			✓
4.1.1.d Develop linkages and partnerships among international research and development activities and Maui businesses.			✓
Objective:			
4.1.2 Increase activities that support principles of sustainability.			✓
Policies:			

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4.1.2.a Support industries that are sustainable, and culturally and environmentally sensitive.			✓
4.1.2.b Encourage and support local businesses.		✓	
4.1.2.c Substitute imports with locally-produced services and products where practicable.			✓
4.1.2.d Support the development of economic development clusters in targeted industry sectors.			✓
4.1.2.e Encourage all businesses to save energy, water, and other resources.			✓
Objective:			
4.1.3 Improve the island's business climate.		✓	
Policies:			
4.1.3.a Upgrade, maintain the quality of, and improve access to telecommunications infrastructure.			✓
4.1.3.b Ensure an adequate supply of affordable workforce housing.	✓		
4.1.3.c Develop neighborhoods and communities that are attractive to the workforce of a diversified economy.	✓		
4.1.3.d Encourage, nurture, and reward entrepreneurship and innovation.			✓
4.1.3.e Encourage employers to establish incentive programs. Support flexibility in workforce policies compatible with business and quality of life goals.			✓
4.1.3.f Assist community development organizations with revitalization and development of neighborhoods and communities that are attractive to the workforce of a diversified economy.			✓
Analysis: **The proposed project is indirectly applicable to the goal of economic diversification. The proposed project will generate short term construction-related employment opportunities, as well as supporting the construction industry as a whole, including local businesses that rely on said industry. Further, the proposed action will indirectly affect the local economy, as it is anticipated that residents of the project will support small businesses nearby. From a long-term perspective, the proposed project also provides affordable housing options for Maui County families.**			
TOURISM			
Goal:			
4.2 A healthy visitor industry that provides economic well-being with stable and diverse employment opportunities.			✓
Objective:			
4.2.1 Increase the economic contribution of the visitor industry to the island's environmental well-being for the island's residents' quality of life.			✓
Policies:			
4.2.1.a Engage the visitor industry in the growth of emerging sectors where practicable.			✓
4.2.1.b Support the implementation of the Maui County TSP, when consistent with the MIP.			✓
4.2.1.c Focus economic growth in the visitor industry through enhanced visitor experiences and an emphasis on attracting higher-spending.			✓

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4.2.1.d Provide a rich visitor experience, while protecting the island's natural beauty, culture, lifestyles, and aloha spirit.			✓
4.2.1.e Diversify the tourism industry by supporting appropriate niche activities such as ecotourism, cultural tourism, voluntourism, ag-tourism, health and wellness tourism, educational tourism, medical tourism, and other viable tourism-related businesses in appropriate locations.			✓
4.2.1.f Recognize the important economic contributions that the visitor industry makes and support a healthy and vibrant visitor industry.			✓
4.2.1.g Support the increased availability of kamaʻāina discount programs.			✓
Objective:			
4.2.2 Comprehensively manage future visitor-unit expansion.			✓
Policies:			
4.2.2.a Mitigate the impact of tourism on the host culture, natural environment, and resident lifestyles.			✓
4.2.2.b Allow, where permitted by the community plan, the development of business hotels and small, sensitively-designed inns.			✓
4.2.2.c Manage impacts from transient vacation rentals, hotels, bed and breakfast units, timeshares, and resort condominiums on residential communities, public infrastructure, and community facilities.			✓
4.2.2.d Discourage supplanting of existing island housing to visitor accommodations that may have a negative impact on long-term rental housing, price of housing, and price of land.			✓
4.2.2.e Allow the designation of retreat/mini-conference centers in appropriate locations through the community plan process.			✓
4.2.2.f Community plans should consider establishing standards such as limits on building size, room count, and the number of inns, if any, that will be allowed in small towns.			✓
Objective:			
4.2.3 Maximize residents' benefits from the visitor industry.			✓
Policies:			
4.2.3.a Promote a desirable island population by striving to not exceed an island-wide visitor population of roughly 33 percent of the resident population.			✓
4.2.3.b Use the required General Plan Annual Status Report to monitor trends related to residents and visitors.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the goal for tourism and its accompanying objectives for increasing the visitor industry's contributions to our island's quality of life, managing future visitor unit expansion, and maximizing residents' benefits from the visitor industry.**			
AGRICULTURE			
Goal:			
4.3 Maui will have a diversified agricultural industry contributing to greater economic, food, and energy security and prosperity.			✓

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Objective:			
4.3.1 Strive for at least 85 percent of locally-consumed fruits and vegetables and 30 percent of all other locally-consumed foods to be grown in-State.			✓
Policies:			
4.3.1.a Strive to substitute food/agricultural product imports with a reliable supply of locally produced food and agricultural products.			✓
4.3.1.b Facilitate and support the direct marketing/sale of the island's agricultural products to local consumers, through farmers markets and similar venues.			✓
4.3.1.c Encourage growing a diverse variety of crops and livestock to ensure the stewardship of our land while safeguarding consumer safety.			✓
4.3.1.d Work with the State to regulate and monitor genetically-modified-organism (GMO) crops to ensure the safety of all crops and label all GMO products.			✓
Objective:			
4.3.2 Maintain or increase agriculture's share of the total island economy.			✓
Policies:			
4.3.2.a Encourage the export of the island's agricultural products to offshore markets.			✓
4.3.2.b Support infrastructure investments at harbors, such as ferry service, airports, and other facilities for the rapid and cost-effective export of island-grown products.			✓
4.3.2.c Encourage the continued viability of sugar cane production, or other agricultural crops, in central Maui and all of Maui Island.			✓
4.3.2.d Work with the State to reduce excise taxes for commercial agricultural products produced within the State.			✓
4.3.2.e Coordinate with appropriate State and Federal Departments and agencies, private shipping companies, and farmers associations to assist in the rapid and cost-effective export of Maui's agricultural products to off-island markets.			✓
Objective:			
4.3.3 Expand diversified agriculture production at an average annual rate of 4 percent.			✓
Policies:			
4.3.3.a Promote the development of locally-grown and ecologically-sound biofuels, aquaculture, and forest products.			✓
4.3.3.b Support the development of farming associations/cooperatives.			✓
4.3.3.c Work with educational institutions and appropriate agencies to provide education and training for farm owners and entrepreneurs.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the goal for agriculture and its related objectives for consumption for locally produced fruits and vegetables, maintaining or increasing agriculture's share in the local economy, and expanding diversified agricultural production. The proposed project is located on vacant agricultural land. The proposed action is a prudent use of land that has been underutilized for many years to benefit Maui County families with affordable rental housing that is centrally located and in proximity to government services and employment opportunities.**			

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EMERGING SECTORS			
Goal:			
4.4 A diverse array of emerging economic sectors.			✓
Objective:			
4.4.1 Support increased investment and expanded activity in emerging industries.			✓
Policies:			
4.4.1.a Support the development of and access to state-of-the-art voice, video, and data telecommunications systems and high-speed Internet.			✓
4.4.1.b Attract and assist industries to compete in high technology activities such as those related to renewable energy, green technologies, diversified agriculture, ocean sciences, health sciences, space technologies, and other knowledge-based industries.			✓
4.4.1.c Support new industries that are environmentally and culturally sensitive such as health and wellness, sports and outdoor activities, cultural activities, the arts, film-making, entertainment, and digital media.			✓
4.4.1.d Support a sustainable, culturally sensitive, astronomy industry.			✓
4.4.1.e Support the continued development of the Maui Research and Technology Park in Kihei, as a center for research and development, education, and diversified economic development, as provided by the Maui County Code.			✓
4.4.1.f Work with appropriate organizations to support the development of high technology clusters around renewable energy, diversified agriculture, ocean sciences, health sciences, and other knowledge-based industries.			✓
Objective:			
4.4.2 Increase the development of renewable energy technologies that are supported by the local community.			✓
Policies:			
4.4.2.a Support the expansion of the renewable energy sector and the use of solar, wind, wave, and biofuel technologies.			✓
4.4.2.b Provide incentives to encourage renewable energy development, the use of green energy technologies, and energy conservation.			✓
4.4.2.c Ensure an adequate supply of land and facilitate permitting to meet the needs for renewable energy technologies such as solar, wind, wave, biofuel, and other technologies, provided that environmental, view plane, and cultural impacts are addressed.			✓
4.4.2.d Support the Maui County Energy Alliance Plan where consistent with the MIP.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the goal for emerging sectors. The accompanying objectives for increased investment in and expansion of emerging industries, and increased development of renewable energy technologies are not affected by the proposed action.**			
SMALL BUSINESS DEVELOPMENT			
Goal:			
4.5 Small businesses will play a key role in Maui's economy.		✓	

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Objective:			
4.5.1 Increase the number of and revenue generated by small businesses and decrease the percentage of small business failures.		✓	
Policies:			
4.5.1.a Provide incentives and support for small businesses and entrepreneurs that incorporate sustainable technologies and practices into their operations, utilize local materials, or produce and sell locally-made goods or services.			✓
4.5.1.b Assist traditional "mom and pop" business establishments.		✓	
4.5.1.c Reduce barriers to small business development.			✓
4.5.1.d Require, where feasible, the government procurement of goods and services from locally-owned, small businesses.			✓
4.5.1.e Support community markets and venues that sell locally-made produce, goods, and services.		✓	
Analysis: **The proposed project consists of the development of a new multifamily affordable housing complex in Waiehu. Though the goal of making small businesses play a key role in Maui's economy is not directly applicable to the proposed project, it is anticipated that residents of the project will support small, locally-owned businesses that are in the vicinity. As such, the objective and policies related to small-business development are indirectly applicable to the proposed action.**			
HEALTH CARE SECTOR			
Goal:			
4.6 Maui will have a health care industry and options that broaden career opportunities that are reliable, efficient, and provide social well-being.			✓
Objective:			
4.6.1 Expand the economic benefits of the health care sector.			✓
Policies:			
4.6.1.a Encourage expanded services at MMMC and at other medical facilities.			✓
4.6.1.b Support expansion of federally qualified health centers with the direct involvement of the residents of the communities served.			✓
4.6.1.c Support the use of multimedia as a means to provide healthcare information.			✓
4.6.1.d Encourage digitalization of all diagnostic equipment at all facilities on Maui to enable sharing of data and more efficient use of limited provider workforce, consistent with data protection and patient privacy.			✓
4.6.1.e Support the expansion of telemedicine.			✓
4.6.1.f Encourage expansion and improved access to emergency care in all communities.			✓
Objective:			
4.6.2 Be more efficient in the delivery of health care services and in minimizing health care costs.			✓
Policies:			

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4.6.2.a Support expansion of health care providers and facilities to improve access to quality care throughout the island.			✓
4.6.2.b Encourage the expansion of veteran health care services.			✓
4.6.2.c Allow home-based out-patient medical care that does not interfere with surrounding neighborhoods.			✓
Objective:			
4.6.3. Expand Maui's alternative health care services, including spiritual practices.			✓
Policies:			
4.6.3.a Support efforts to promote alternative medicine.			✓
4.6.3.b Allow small-scale home-alternative medicine businesses such as massage, chiropractic care, traditional Hawaiian healing, and acupuncture that do not interfere with surrounding neighborhoods.			✓
Analysis: **The proposed project does not have direct or indirect relationships to the goal for the health care and its related objectives for expanding the economic benefits of the health care sector, increasing efficiency of the health care delivery system, minimizing the costs of health care, and expanding Maui's alternative health care system.**			
EDUCATION AND WORKFORCE DEVELOPMENT			
Goal:			
4.7 Maui will have effective education and workforce development programs and initiatives that are aligned with economic development goals.			✓
Objective:			
4.7.1 Improve preschool and K-12 education to allow our youth to develop the skills needed to successfully navigate the 21st century.			✓
Objective:			
4.7.1.a Encourage the State to implement programs such as:			
(1) Universally available preschool for children between the ages of one and five;			✓
(2) Mandatory kindergarten;			✓
(3) Mandatory K-5th grade classroom size limits of 1 teacher to 20 students;			✓
(4) Mandatory nutrition programs; and			✓
(5) Mandatory Native Hawaiian programs at all grade levels.			✓
4.7.1.b Encourage the DOE to extend the school day by at least an hour.			✓
4.7.1.c Encourage the State to increase funding for public education so that Hawai'i is among the top 10 states nationally as measured by investment per pupil.			✓
4.7.1.d Encourage the State to ensure teacher certifications relate to effective delivery and improved student performances, and develop an industry experience/equivalency certification to assure our DOE students have access to career technical education and training.			✓

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4.7.1.e Encourage the UHMC to provide dormitory space for high school students.			✓
4.7.1.f Encourage the development and implementation of curriculum on native Hawaiian history, culture, and practices, in consultation with native Hawaiian groups and associations.			✓
Objective:			
4.7.2 Encourage an increase in the number of certificate recipients and associate, bachelors, and graduate degrees conferred.			✓
Policies:			
4.7.2.a Encourage the State to increase the number of articulation agreements between the UHMC and four-year universities, particularly the University of Hawai'i at Manoa.			✓
4.7.2.b Encourage the State to expand accredited 2-year, 4-year, and graduate programs through the UHMC.			✓
4.7.2.c Encourage the education and training of our residents to meet the needs of a diversified economy.			✓
4.7.2.d Support education and training programs such as student internships, vocational training, and career development opportunities to ensure a highly skilled workforce			✓
4.7.2.e Work with educational institutions to improve and expand access to education and training through multiple modes, including distance learning.			✓
Objective:			
4.7.3 Strive to ensure that more of Maui's jobs are developed in STEM-related sectors by 2030.			✓
Policies:			
4.7.3.a Support the development of STEM-related certificates and degrees at the two- and four year levels.			✓
4.7.3.b Support the education initiatives of the Maui Agricultural Development Plan.			✓
4.7.3.c Expand and seek funding for internships, mentoring, job shadowing, etc. to foster interest in health and green workforce careers.			✓
4.7.3.d Work with MEDB, UHMC, and other similar organizations to expand internship/education programs to support STEM careers.			✓
4.7.3.e Continue to partner with the MEDB and other similar organizations to recruit, assist, and retain emerging industries, research and development activities, and educational/workforce opportunities.			✓
Analysis: **The goal for education and workforce development is not directly or indirectly applicable to the proposed action. As well, the related objectives of improving preschool and K-12 education, increasing higher education certificates and degrees, and developing more jobs in the STEM-related sectors are not affected by the proposed project. The proposed project will also comply with the requirement for school impact fees and will coordinate with the Department of Education on appropriate school impact fees.**			
CHAPTER 5 – HOUSING			
Goal:			

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5.1 Maui will have safe, decent, appropriate, and affordable housing for all residents developed in a way that contributes to strong neighborhoods and a thriving island community.	✓		
Objective:			
5.1.1 More livable communities that provide for a mix of housing types, land uses, income levels, and age.	✓		
Policies:			
5.1.1.a Promote livable communities (compact/walkable/bikeable, access to transit) that provide for a mix of housing types and land uses, including parks, open space, and recreational areas.	✓		
5.1.1.b Promote planning approaches that provide a mix of multifamily and single-family housing units to expand housing choices.			✓
5.1.1.c Discourage gated communities.		✓	
5.1.1.d Provide incentives for the rehabilitation or adaptive reuse of historic structures to facilitate more housing choices.			✓
5.1.1.e Use planning and regulatory approaches to provide higher housing densities.	✓		
Objective:			
5.1.2 Better monitoring, evaluation, and refinement of affordable housing policy in conjunction with the economic cycle.	✓		
Policies:			
5.1.2.a Improve data on resident and nonresident housing.			✓
5.1.2.b Utilize the following approaches to promote resident housing and to minimize offshore market impacts:			
(1) Ensure that the future housing stock is composed of a mix of housing types (multifamily, small lots, ohana units, co-housing, cottage houses, etc.);			✓
(2) Encourage new housing in proximity to jobs and services, in places that are conducive/affordable to island residents; and	✓		
(3) Explore taxation alternatives and building fee structures.			✓
Objective:			
5.1.3 Provide affordable housing, rental or in fee, to the broad spectrum of our island community.	✓		
Policies:			
5.1.3.a Consider regulations that can help keep affordable housing available at affordable rents.			✓
5.1.3.b Seek to have ownership of affordable for-sale and rental housing vested in a non-profit community land trust, or other qualified housing provider, committed to keeping such housing affordable in perpetuity.	✓		
5.1.3.c Facilitate the use of public lands in urban areas that are suitable for affordable housing.			✓
5.1.3.d Develop or support partnerships and initiatives that provide housing-related education/outreach.			✓
5.1.3.e Support the continuing efforts of the County and its community partners to:			

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(1) Disseminate information on different housing/financial assistance programs (loans, grants, etc.) including information on housing rehabilitation/restoration/adaptive reuse;			✓
(2) Provide housing-related counseling including budget, credit, and financial planning assistance; and			✓
(3) Create and maintain a comprehensive/master list of available affordable housing to help residents secure a unit that satisfies their need.			✓
Objective:			
5.1.4 Provide infrastructure in a more timely manner to support the development of affordable housing.			✓
Policies:			
5.1.4.a Prioritize the development of infrastructure that supports the development of affordable housing.			✓
5.1.4.b Utilize appropriate financing approaches and assistance tools to encourage the development of infrastructure and public facilities.			✓
5.1.4.c Tailor infrastructure requirements to correspond with appropriate level-of-service standards to help control housing costs and to maintain safety.			✓
Objective:			
5.1.5 A wider range of affordable housing options and programs for those with special needs.			✓
Policies:			
5.1.5.a Ensure that residents with special needs have access to appropriate housing.			✓
5.1.5.b Encourage housing to be built or rehabilitated to allow the elderly and those with special needs to live in their homes.			✓
5.1.5.c Ensure and facilitate programs to assist those with special needs from becoming homeless.			✓
5.1.5.d Promote programs that stimulate the production of sustainable homeless shelters and alternative housing technologies.			✓
5.1.5.e Support programs that offer home modification counseling on low-interest retrofit loans and grants to those with special needs.			✓
Objective:			
5.1.6 Reduce the cost to developers of providing housing that is affordable to families with household incomes 160 percent and below of annual median income.	✓		
Policies:			
5.1.6.a Support fast-track processing procedures for the following housing-related entitlements: affordable housing projects/units; indigenous Hawaiian housing/units; and special-needs housing units (seniors, disabled, homeless, etc.).	✓		
5.1.6.b Require the construction of affordable for-sale and rental housing units as part of the construction of new housing developments.			✓
5.1.6.c Offer extra incentives in boom periods and withdraw incentives during slack periods.			✓
Objective:			

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5.1.7 Increased preservation and promotion of indigenous Hawaiian housing and architecture.		✓	
Policies:			
5.1.7.a Preserve, promote, and give priority to Hawaiian housing/architecture forms to preserve Hawaiian culture.			✓
5.1.7.b Provide for indigenous architecture as an allowable structure for native Hawaiian uses to include hula and lāʻau lapaʻau.			✓
Analysis: **The proposed project is directly applicable to the goal and objectives related to providing affordable housing for Maui families. The proposed project provides 120 units of affordable housing for Maui County families earning 60 percent or less of the AMI in Waiehu. The proposed development will be located near other urban areas, making prudent use of existing infrastructure and resources.**			
CHAPTER 6 – INFRASTRUCTURE AND PUBLIC FACILITES			
SOLID WASTE			
Goal:			
6.1 Maui will have implemented the ISWMP thereby diverting waste from its landfills, extending their capacities.		✓	
Objective:			
6.1.1 Meet our future solid waste needs with a more comprehensive planning and management strategy.		✓	
Policies:			
6.1.1.a Update and publicize the ISWMP every ten years.			✓
6.1.1.b Strengthen inter-agency coordination including Planning and Environmental Management departments.			✓
6.1.1.c Divert waste from the landfills and educate the public about the recommendations of the ISWMP.		✓	
6.1.1.d Minimize future active, unlined landfill cells to the extent feasible.			✓
Objective:			
6.1.2 Divert at least 60 percent of solid waste from the island's landfills.			✓
Policies:			
6.1.2.a Require residents and commercial enterprises that generate waste to pay a fair proportion of disposal costs.			✓
6.1.2.b Encourage environmentally safe waste-to-energy solutions.			✓
6.1.2.c Facilitate the reduction of solid waste generated by packaging, food service products, construction waste, etc.			✓
6.1.2.d Educate residents and visitors about the impacts of and methods to reduce, reuse, and recycle.			✓
6.1.2.e Discourage the disposal of landfill leachate by diversion to wastewater treatment plants, where practicable.			✓
Analysis: **The proposed project is indirectly applicable to the goal of solid waste. Solid waste generated by the project during construction will be recycled to the extent practicable**			

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and disposed at appropriately permitted construction waste disposal sites. Recycle bins will be provided for residents of the project to divert waste and to minimize impact on landfill capacity.			
WASTEWATER			
Goal:			
6.2 Maui will have wastewater systems that comply with or exceed State and Federal regulations; meet levels-of-service needs; provide adequate capacity to accommodate projected demand; ensure efficient, effective, and environmentally sensitive operation; and maximize wastewater reuse where feasible.		✓	
Objective:			
6.2.1 A wastewater planning program capable of efficiently providing timely and adequate capacity to service projected demand where economically feasible and practicable.		✓	
Policies:			
6.2.1.a Encourage the use of renewable energy in support of wastewater treatment facilities.			✓
6.2.1.b Focus the expansion of wastewater systems to accommodate planned growth consistent with the MIP Directed Growth Strategy.		✓	
6.2.1.c Establish new wastewater treatment plant(s) outside the tsunami zone.			✓
Objective:			
6.2.2 Adequate levels of wastewater service with minimal environmental impacts.			✓
Policies:			
6.2.2.a Meet or exceed all State and Federal standards regulating wastewater disposal or reuse.			✓
6.2.2.b Encourage tertiary treatment for all municipal wastewater that is disposed through deep injection wells. Phase out all municipal and private injection wells in coordination with water reuse programs, where feasible, by 2020.			✓
6.2.2.c Improve and upgrade the County's existing wastewater collection, treatment, and reuse facilities consistent with current and future plans and the County's CIP.			✓
6.2.2.d Maintain an ongoing sewer inspection program for public and private multi-user systems to identify potential problems and forecast each system's residual life.			✓
6.2.2.e Require all new developments to fund system improvements in proportion to the development impact and in accordance with the County's wastewater functional plan.			✓
6.2.2.f Require appropriate funding mechanisms, such as a sinking fund, to adequately maintain or replace aging water-system components.			✓
6.2.2.g Strongly encourage the phase out of cesspools.			✓
Objective:			

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6.2.3 Increase the reuse of wastewater.			✓
Policies:			
6.2.3.a Strengthen coordination between the Department of Water Supply (DWS) and the WWRD to promote reuse/recycling of wastewater.			✓
6.2.3.b Expand the reuse of wastewater from the Central Maui, Kīhei, Lahaina, and other wastewater systems.			✓
Analysis: **The proposed project is indirectly applicable to the goal, objectives and policies related to wastewater systems that meet level of service needs. The proposed project will connect to the County wastewater system. Coordination will be undertaken with the DEM regarding connection to the County system and any required upgrades to the wastewater system to service the proposed project.**			
WATER			
Goal:			
6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.		✓	
Objective:			
6.3.1 More comprehensive approach to water resources planning to effectively protect, recharge, and manage water resources including watersheds, groundwater, streams, and aquifers.			✓
Policies:			
6.3.1.a Ensure that DWS actions reflect its public trust responsibilities toward water.			✓
6.3.1.b Ensure the WUDP implements the State Water Code and MIP's goals, objectives, and policies.			✓
6.3.1.c Regularly update the WUDP, to maintain compliance with the General Plan.			✓
6.3.1.d Ensure that the County's CIP for water-source development is consistent with the WUDP and the MIP.			✓
6.3.1.e Where desirable, retain and expand public ownership and management of watersheds and fresh-water systems.			✓
6.3.1.f Encourage and improve data exchange and coordination among Federal, State, County, and private land use planning and water resource management agencies.			✓
Objective:			
6.3.2 Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.		✓	
Policies:			
6.3.2.a Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.			✓
6.3.2.b Encourage increased education about and use of private catchment systems where practicable for nonpotable uses.			✓
6.3.2.c Maximize the efficient use of reclaimed wastewater to serve nonpotable needs.			✓

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6.3.2.d Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.			✓
6.3.2.e Ensure water conservation through education, incentives, and regulations.			✓
6.3.2.f Acquire and develop additional sources of potable water.			✓
Objective:			
6.3 Improve water quality and the monitoring of public and private water systems.			✓
Policy:			
6.3.3.a Protect and maintain water delivery systems.			✓
Analysis: **The goal related to water systems is indirectly applicable to the proposed project. The project is located in an area that is serviced by existing County water infrastructure. Coordination will be undertaken with the DWS regarding connection to the County's water system.**			
TRANSPORTATION			
Goal:			
6.4 An interconnected, efficient, and well-maintained, multimodal transportation system.		✓	
Objective:			
6.4.1 Provide for a more integrated island-wide transportation and land use planning program that reduces congestion and promotes more efficient (transit-friendly) land use patterns.		✓	
Policies:			
6.4.1.a Plan for an integrated multi-modal transportation system comprised of public transit, bicycle, pedestrian, automobile, and other transportation modes.		✓	
6.4.1.b Refocus transportation investment from the construction of additional roadways only for the automobile to the expansion of a multimodal transportation system.			✓
6.4.1.c Encourage the use of "complete streets" design methods.		✓	
6.4.1.d Encourage employers to implement TDM strategies.			✓
Objective:			
6.4.2 Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.		✓	
Policies:			
6.4.2.a Ensure transit-, roadway-, and pedestrian-facilities design and level-of-service standards respect the unique character of our communities.		✓	
6.4.2.b Prioritize transportation improvements list to cost-effectively meet existing and future needs consistent with the MIP.			✓
6.4.2.c Require new development, where appropriate, to integrate sidewalks, pathways, bikeways, and transit infrastructure into new commercial and residential projects while enhancing community character.		✓	

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6.4.2.d Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.			✓
6.4.2.e Consider identification, acquisition where appropriate, and utilization of abandoned right of-ways for bikeways, pedestrian pathways, and open-space networks.			✓
6.4.2.f Support the implementation of the *Central Maui Pedestrian & Bicycle Master Plan* (March 2012), when consistent with the MIP.			✓
Objective:			
6.4.3 An island-wide, multimodal transportation system that respects and enhances the natural environment, scenic views, and each community's character.		✓	
Policies:			
6.4.3.a Ensure that the roadway and transit alignments respect the natural environment and scenic views.		✓	
6.4.3.b Ensure that roadways and transit systems in rural areas and small towns enhance community character.			✓
6.4.3.c Design all transit systems to respect visual corridors and Maui's character.			✓
Analysis: **The proposed project site is located near bus stops for the Waihe'e Villager Route 8, which passes by the north end of the property area on Waiehu Beach Road. There are 4-foot paved shoulders available for bicyclists on both sides of Kahekili Highway between Waiehu Beach Road and Piihana Road. Kahekili Highway is currently a "signed shared roadway", which is a roadway shared by both vehicles and bicycles that accommodates bicycles through wider vehicular travel lanes or paved shoulders. Given its location, the project indirectly supports the objectives of providing a multimodal transportation system that respects and enhances the natural environment, scenic views, and the surrounding community's character.**			
TRANSIT			
Goal:			
6.5 An island-wide transit system that addresses the needs of residents and visitors and contributes to healthy and livable communities.		✓	
Objective:			
6.5.1 An integrated transit system that better serves all mobility needs of Maui's residents and visitors.		✓	
Policies:			
6.5.1.a Maximize access to public transit in town centers, commercial districts, and employment centers.		✓	
6.5.1.b Expand regional and inter-regional transit services, where appropriate, in heavily traveled corridors and within communities			✓
6.5.1.c Increase the frequency of current service, add additional bus routes as demand requires, and transition to nonpolluting transit vehicles, as funding permits.			✓
6.5.1.d Provide adequate transit infrastructure (e.g., bus pullouts, waiting benches and shelters, signs) along existing and future transit right-of-ways.			✓
6.5.1.e Require new development where appropriate, to provide right-of-ways (ROWs)		✓	

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to accommodate transit circulation and support facilities.			
6.5.1.f Identify, protect, and preserve, or acquire corridors for future inter-community transit use, including but not limited to, rail and also multimodal use corridors.			✓
6.5.1.g Establish transit corridors by planning for and securing right-of-way when appropriate for alternative modes of transportation (such as rail and water ferry service).			✓
6.5.1.h Pursue improvements and upgrades to the existing transit system consistent with updated MDOT planning studies/transit plans (within the framework of comprehensive island-wide multimodal transportation plans).			✓
6.5.1.i Increase inter-agency coordination between the Department of Planning, State Department of Transportation, County Department of Public Works, and other applicable agencies.			✓
Objective:			
6.5.2 Plan for a more diversified and stable funding base to support transportation goals.			✓
Policies:			
6.5.2.a Support alternative methods and sources of funding transportation improvements (including impact fees, higher taxes, fare adjustments, dedicated sources of funding, and assessments).			✓
6.5.2.b Collaborate with public-private entities or nonprofit organizations to reduce public transit operational expenses.			✓
6.5.2.c Coordinate with appropriate Federal, State, and County agencies to fund transportation projects in areas where growth is anticipated.			✓
Analysis: **The proposed project is indirectly applicable to the goals and objectives for transit, specifically those relating to the advancement of an integrated island-wide transit system. The Maui Public Bus system's Waihe'e Villager Route 8 passes along the north end of the project area on Waiehu Beach Road, and serves a number of locations throughout Waiehu, Waihe'e and Kahului.**			
PARKS			
Goal:			
6.6 Maui will have a diverse range of active and passive recreational parks, wilderness areas, and other natural-resource areas linked, where feasible, by a network of greenways, bikeways, pathways, and roads that are accessible to all.		✓	
Objective:			
6.6.1 More effective, long-range planning of parks and recreation programs able to meet community needs.			✓
Policies:			
6.6.1.a Support, consistent with the MIP, the implementation of open-space and recreational plans, such as the *Pali to Puamana Parkway* Master Plan and the *Upcountry Greenways Master Plan*.			✓
6.6.1.b Utilize the ahupua'a approach by integrating mauka-to-makai natural landscapes into an island-wide parks and recreation functional plan.			✓

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6.6.1.c Provide a balanced mix of passive and active parks, including neighborhood, community, and regional parks, in each community plan area.		✓	
6.6.1.d Support the expansion of Haleakala National Park, where supported by affected communities.			✓
6.6.1.e Support lo‘i and dryland taro restoration in County, State, and Federal parks.			✓
6.6.1.f Encourage private landowners to dedicate land to Federal, State, or County governments, or nonprofit land trusts, for parks and open-space protection consistent with the MIP.			✓
6.6.1.g Strengthen inter-agency coordination including State and County departments, such as resolving joint use of facilities and properties.			✓
6.6.1.h Work with the State to prepare and implement a master management plan for ‘Āhihi-Kīna‘u and La Perouse-Keone‘ō‘io Bay to Kanaloa Point region.			✓
Objective:			
6.6.2 Achieve parks and recreation opportunities to meet the diverse needs of our community.		✓	
Policies:			
6.6.2.a Establish appropriate level-of-service standards at the neighborhood, community, and regional levels.			✓
6.6.2.b Identify and acquire parks and recreational facilities that address existing park inadequacies and complement and enhance neighborhoods, communities, and natural land features.			✓
6.6.2.c Design park facilities to preserve and enhance natural site characteristics, maximize views, protect environmental and cultural sites, and minimize water demands.		✓	
6.6.2.d Acquire lands along the shoreline, between coastal roadways and the ocean.			✓
6.6.2.e Encourage the development of regional parks, district parks, and greenways in a manner that helps to contain sprawl, provide separation between distinct communities, or offer open space within urban communities.		✓	
6.6.2.f Require large master-planned communities that incorporate a mixture of park facilities pursuant to parks standards and functional plans.		✓	
6.6.2.g Support appropriate areas for cultural parks (e.g., Kepaniwai) in each community plan area.			✓
6.6.2.h Incorporate community input to determine the appropriate location, design, and long-term stewardship of parks and recreation facilities.			✓
6.6.2.i Manage commercial activities at public parks to minimize impacts to residents.			✓
6.6.2.j Support public-private partnerships to implement the acquisition and development of parks when consistent with the General Plan.		✓	
6.6.2.k Support a coordinated program to improve, operate, and maintain joint-use facilities and grounds.			✓
Objective:			
6.6.3 An expanded network of greenways, trails, pathways, and bikeways.		✓	

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Policies:			
6.6.3.a Link existing and future park sites, natural areas, the shoreline, and residential areas with a network of bikeways, pedestrian paths, trails, and greenways.		✓	
6.6.3.b Support the implementation of plans and programs that facilitate pedestrian mobility and access to active and passive recreation areas and sites.		✓	
6.6.3.c Collaborate with the State and private land owners to ensure perpetual access and proper stewardship of traditional trails and access systems.			✓
6.6.3.d Facilitate the development of well-managed noncommercial campgrounds throughout the island.			✓
6.6.3.e Consider requiring commercial bike rental businesses to provide funding that supports a mauka-to-makai Haleakalā bikeway improvement program.			✓
6.6.3.f Ensure ADA compliance and seek opportunities to make all parks and recreational facilities accessible to people with disabilities.			✓
Analysis: **The proposed project indirectly supports the goal on parks and wilderness areas connected by a network of greenways, bikeways and roads that are accessible to all. Though the proposed project mainly consists of the development of a 120 multi-family affordable housing units, the proposed action also consists of the inclusion of a clubhouse for residents. The proposed project is centrally located and connected by existing roadways and bikeways to local recreational parks and natural resource areas in the Waiehu region.**			
PUBLIC FACILITIES			
Goal:			
6.7 Maui will have adequate public facilities that meet the diverse needs of residents.			✓
Objective:			
6.7.1 More effective planning for public facilities to meet community needs.			✓
Policies:			
6.7.1.a Ensure the development and update of island-wide public facilities functional plans that incorporate prioritized facilities, programs, and a financial component.			✓
6.7.1.b Establish appropriate level-of-service standards for public facilities provided by the County.			✓
6.7.1.c Pursue improvements and upgrades of County public facilities consistent with the public facilities functional plan.			✓
6.7.1.d Recognize Wailuku Town as Maui’s Civic Center and support the revitalization of the Civic Center District by consolidating government office spaces, enhancing landscape beautification, and providing adequate public parking.			✓
6.7.1.e Support, with community input, the relocation of the Maui Community Correctional Center from Wailuku to an appropriate location in Pu‘unēnē.			✓
6.7.1.f Adequately plan and fund public safety facilities (fire, police, ambulance, civil defense) to meet community needs.			✓
6.7.1.g Increase joint facilities utilization and program coordination between State and County agencies such as baseyards, communication centers, recreational facilities, etc., where feasible.			✓
6.7.1.h Focus future expenditures for additional government office space, parking, and related facilities in Wailuku’s Civic Center District.			✓

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6.7.1.i Encourage continuous and safe walkways for children within one mile of each school.			✓
6.7.1.j Encourage public-private partnerships to identify and resolve public facility plan shortcomings when consistent with the General Plan.			✓
6.7.1.k Incorporate community/area residents' input to determine the appropriate location and design of public facilities.			✓
Analysis: **The proposed action has an indirect relationship to the goal for public facilities. In this context, the project does include a clubhouse building for residents which advance or promote the objective or more effective planning for public facilities which meet community needs.**			
SCHOOLS AND LIBRARIES			
Goal:			
6.8 Maui will have school and library facilities that meet residents' needs and goals.		✓	
Objective:			
6.8.1 Assist in providing appropriate school and library facilities in a timely manner and in strategic locations.		✓	
Policies:			
6.8.1.a Work in partnership with all educational institutions to meet current and future needs including appropriate location, timing, and design of future facilities.			✓
6.8.1.b Allow for the expansion and intensification of uses at the UHMC including satellite campuses operating in remote areas.			✓
6.8.1.c Encourage the DOE to build and maintain smaller, community-oriented schools.			✓
6.8.1.d Encourage better cooperation by the State and County for use of State and County facilities.			✓
6.8.1.e Encourage the State to upgrade, modernize, and expand school facilities, including those in remote communities.		✓	
6.8.1.f Work with the State to develop a master plan for the expansion of UHMC in accordance with the MIP.			✓
6.8.1.g Support partnerships (public/private/nonprofit) to build and staff new schools and improve existing facilities.			✓
6.8.1.h Work with the BOE HSPLS to provide centralized library services (including telecommunications) to all areas of Maui.			✓
6.8.1.i Work with the State to expedite planning and construction of Kīhei High School, including the integration of the high school with the Maui Research and Technology Park.			✓
6.8.1.j Work with the State to identify intermediate school sites in Central Maui and other areas where needed.			✓
Objective:			
6.8.2 Provide a more expansive network of safe and convenient pedestrian-friendly streets, trails, pathways, and bikeways between neighborhoods and schools where appropriate.		✓	
Policies:			

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6.8.2.a Encourage the State to build new school facilities in appropriate locations that minimize time and distance for students to travel to and from school.			✓
6.8.2.b Encourage the State to implement the Safe Routes to School initiative with funding commitments to help the County plan and fund projects that ensure safe access routes to school.		✓	
Analysis: **Through the payment of impact fees to the DOE, the proposed project indirectly ensures the provision of adequate and accessible educational services and facilities in Central Maui. Further, the objective and policy related to providing connectivity between neighborhoods and schools is indirectly supported by the proposed action, as there are paved shoulders for pedestrians and bicycles on Kahekili Highway adjacent to the project site.**			
HEALTH CARE			
Goal:			
6.9 All of Maui residents will have the best possible health care to include healthy living, disease prevention, as well as acute and long-term care.			✓
Objective:			
6.9.1 Greater autonomy to the Maui region in their efforts to improve medical care on the island.			✓
Policies:			
6.9.1.a Encourage the State to give greater autonomy to the Maui region in their efforts to improve medical care on the island.			✓
6.9.1.b Support innovative financial solutions, such as capital partnerships, joint ventures, and consolidations for MMMC and other health institutions.			✓
6.9.1.c Support MMMC as a major core medical center that provides a greater range of services.			✓
6.9.1.d Support the immediate development of a critical access hospital in West Maui.			✓
6.9.1.e Support the expansion of regional critical-access facilities, where allowed by Federal regulations.			✓
6.9.1.f Improve medical service to remote and outlying regions.			✓
6.9.1.g Support transportation services for dialysis patients and community dialysis programs.			✓
6.9.1.h Work with the State to determine the feasibility of appropriate medical facilities in South Maui and Hāna, including the possible reestablishment of a small community hospital in Hāna, the establishment of a hospital in South Maui, and assist the State in securing funding to meet Maui's health care needs.			✓
Objective:			
6.9.2 An expansion of long-term care facilities and long-term care alternatives to meet the needs of our aging population.			✓
Policies:			
6.9.2.a Support efforts to increase Maui's long-term care bed capacity to cover current and future needs, close to large population centers.			✓
6.9.2.b Recognize that facilities for low-income elders who need long-term care are a needed form of affordable and subsidized housing.			✓

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6.9.2.c Evaluate the needs of the long-term disabled and provide planning support for their care, if there is a need for long-term care facilities.			✓
6.9.2.d Consider long-term care facilities as a major potential employment base and encourage the recruitment and training of potential employees.			✓
Objective:			
6.9.3 More support to home-care and community-based programs so they become alternatives to traditional nursing homes.			✓
Policies:			
6.9.3.a Support the establishment of a program to assist the elderly and people with disabilities to remain in their homes or in a home-like setting.			✓
6.9.3.b Support the establishment of senior and adult-day-care centers and senior housing.			✓
6.9.3.c Continue to support existing senior centers (e.g. Kaunoa), and establish new senior centers that will provide day-care sites and programs for the disabled and elderly.			✓
6.9.3.d Support funding alternatives for community-based services that assist home-care efforts.			✓
6.9.3.e Encourage the State to adopt the recommendations contained within the Legislative Reference Bureau's report entitled "Gimme a Break: Respite Care Services in Other States," (December 2007) where appropriate, feasible, and consistent with the MIP.			✓
Objective:			
6.9.4 Improved preventative medicine and primary health care.			✓
Policies:			
6.9.4.a Develop and utilize health-status benchmarks to measure prevention and primary health care service delivery.			✓
6.9.4.b Support programs that provide family planning assistance.			✓
Analysis: **The proposed action does not have direct or indirect relationships to the goal for healthcare. In this context, the project does not advance or promote the objectives for greater healthcare system autonomy, increase long-term care capacity and alternatives, support home care and community based programs, and improve preventative medicine and primary health care.**			
ENERGY			
Goal:			
6.10 Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.		✓	
Objective:			
6.10.1 Reduce fossil fuel consumption. Using the 2005 electricity consumption as a baseline, reduce by 15 percent in 2015; 20 percent by 2020; and 30 percent by 2030.		✓	
Policies:			
6.10.1.a Support energy efficient systems, processes, and methods in public and private operations, buildings, and facilities.		✓	

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6.10.1.b Support the Maui Solar Rooftop initiative.		✓	
6.10.1.c Support Hawai`i Energy and other Public Utility Commission (PUC) approved energy efficiency programs.		✓	
Objective:			
6.10.2 Increase the minimum percentage of electricity obtained from clean, renewable energy sources. By 2015, more than 15 percent of Maui's electricity will be produced from locally-produced, clean, renewable energy sources, 25 percent by 2020, and 40 percent by 2030.		✓	
Policies:			
6.10.2.a Evaluate available renewable energy resource sites and applicable technologies.			✓
6.10.2.b Encourage the installation of renewable energy systems, where appropriate.		✓	
6.10.2.c Support the establishment of new renewable energy facilities at appropriate locations provided that environmental, view plane, and cultural impacts are addressed.			✓
6.10.2.d Encourage all new County facilities completed after January 1, 2015, to produce at least 15 percent of their projected electricity needs with onsite renewable energy.			✓
Objective:			
6.10.3 Increased use of clean, renewable energy.		✓	
Policies:			
6.10.3.a Support efforts in the PUC to upgrade Maui's power grid to integrate renewable energy from multiple sources and wheeling of electricity.			✓
6.10.3.b Encourage the PUC to work with the County to implement and expedite community supported renewable energy projects.			✓
6.10.3.c Encourage efforts to produce more renewable energy using distributed generation.			✓
6.10.3.d Encourage import substitution by MECO and the broader community to become more self-sufficient in energy production.			✓
6.10.3.e Educate the public on the economic and environmental benefits from the increased use of renewable energy.			✓
6.10.3.f Encourage support from the Federal government, State, and the private sector for Maui's renewable energy objectives.			✓
6.10.3.g Encourage incentives to support the development and use of renewable energy.			✓
Objective:			
6.10.4 More efficient distribution of power throughout the island while preserving island beauty.			✓
Analysis: **The proposed project will incorporate the use of energy efficient fixtures and appliances and will potentially install solar panels, if feasible. With this information in mind, the objectives and policies of the goal to meeting Maui's energy needs through local sources of clean, renewable energy and through conservation are indirectly applicable to the proposed project.**			

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HARBORS AND AIRPORT			
Goal:			
6.11 Maui will have harbors and airports that will efficiently, dependably, and safely facilitate the movement of passengers and cargo.			✓
Objective:			
6.11.1 Upgraded harbor facilities to handle larger volumes of freight and passengers and additional small boat harbors.			✓
Policies:			
6.11.1.a Support the expansion and upgrade of Kahului Harbor through the following, provided that any expansion is respectful of cultural practices and existing recreational uses and supports improved water quality:			✓
(1) Accommodate increasing volumes of cargo;			✓
(2) Provide deeper pier depths and greater fuel-receiving and storing capacities; and			✓
(3) Ensure safe and efficient work areas, including separating passenger operations from fuel and cargo operations.			✓
6.11.1.b Work with public and private entities to provide adequate pier slips, utilities, repair facilities, and waste-disposal capabilities.			✓
6.11.1.c Encourage the State to safely separate passenger (cruise and ferry) operations from hazardous bulk fuels and heavy cargo transporting operations, while not decreasing harbor's capacity to safely support various recreational uses.			✓
6.11.1.d Encourage the State to develop cargo inspecting sites and facilities for efficient cargo and container processing and transportation and to prevent alien species entry.			✓
6.11.1.e Support a State and County task force to study the feasibility of a second commercial harbor on Maui.			✓
Objective:			
6.11.2 Establish more economically thriving and environmentally sensitive small boat harbors accommodating resident and business activity, including fishing, recreation, and tour boats.			✓
Policy:			
6.11.2.a Provide for needed shore-side facilities and capabilities to support small boat harbor users (e.g. repair facilities, parking, cold storage, and mass-transit connections).			✓
Objective:			
6.11.3 Upgraded airport facilities and navigation aids to serve the needs of passengers, freight movements, and general aviation.			✓
Policies:			
6.11.3.a Protect the island's airports from encroaching urbanization that may negatively impact the airport operations.			✓
6.11.3.b Support State efforts to improve Kahului Airport operations to better serve passenger and cargo needs.			✓

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6.11.3.c Support State efforts to identify sites and plan to relocate and accommodate small and rotary wing aircraft.			✓
6.11.3.d Encourage the State to improve airport safety including lighting, fuel transmission, fuel safety, etc.			✓
6.11.3.e Consider expansion of rental car facilities in West and South Maui.			✓
6.11.3.f Consider expansion of mass transit (bus, fixed-rail, shuttle, and taxis, bicycle, and pedestrian facilities) to and from Kahului Airport and not limited to passenger movements (allowing for luggage and cargo).			✓
6.11.3.g Encourage the State to maintain airport capacity and to encourage more responsive air services to Hāna and Kapalua.			✓
Analysis: **The goal for harbors and airports are not applicable to the proposed project. In particular, the project does not advance or promote the upgrading of harbor and airport facilities, and establishing appropriately planned and functional small boat harbors.**			
CHAPTER 7 – LAND USE			
AGRICULTURAL LANDS			
Goal:			
7.1 Maui will have a prosperous agricultural industry and will protect agricultural lands.			✓
Objective:			
7.1.1 Significantly reduce the loss of productive agricultural lands.			✓
Policies:			
7.1.1.a Allow, where appropriate, the clustering of development on agricultural lands when approved as a CSD plan or similar approval mechanism.			✓
7.1.1.b Require, where appropriate, the review and approval of CSD plans prior to the subdivision of agricultural land.			✓
7.1.1.c Discourage developing or subdividing productive agricultural lands for residential uses in which the residence would be the primary use and any agricultural activities would be secondary uses.			✓
7.1.1.d Consider requirements for public notification and review of the subdivision of agricultural land into four or more lots.			✓
7.1.1.e Focus urban growth, to the extent practicable, away from productive and important agricultural lands.			✓
7.1.1.f Strongly discourage the conversion of productive and important agricultural lands (such as sugar, pineapple, and other produce lands) to rural or urban use, unless justified during the General Plan update, or when other overriding factors are present.			✓
7.1.1.g Further develop the requirements for agricultural assessments found under Section 19.510, MCC.			✓
7.1.1.h Provide incentives for landowners to preserve and protect agricultural lands from development through the use of TDR/PDR, tax credits, easement programs, or similar means.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
7.1.1.i Promote the use of U.S.D.A. Farm and Ranch Lands Protection Program grants to fund the acquisition of conservation easements on eligible agricultural lands.			✓
7.1.1.j Require all major developments adjacent to agricultural lands to provide an appropriate and site-specific agricultural protection buffer as part of a required site plan.			✓
7.1.1.k Support and promote the viability of Maui's agricultural businesses through property tax incentives and other programs and subsidies.			✓
7.1.1.l Encourage future community plan efforts to identify lands within the County Agricultural zoning district that are primarily being used for large-lot residential or rural use and consider such lands for reclassification to an appropriate County Rural zone.			✓
Objective:			
7.1.2 Reduction of the island's dependence on off-island agricultural products and expansion of export capacity.			✓
Policies:			
7.1.2.a Coordinate with the agricultural community, associations/community groups, agricultural landowners, and the State to designate IALs.			✓
7.1.2.b Support an incentive package for productive Agricultural Lands which aims to ensure agricultural viability for small- and commercial-scale agricultural producers.			✓
7.1.2.c Actively look to acquire land and provide infrastructure to expand the agricultural park and establish new agricultural parks.			✓
7.1.2.d Support the designation of a research and development area within agricultural parks to help farmers stay attuned to new technology and research.			✓
7.1.2.e Support local cooperative extension services to facilitate timely technology transfer opportunities.			✓
7.1.2.f Support plans and programs to develop additional sources of water for irrigation purposes.			✓
7.1.2.g Consider appropriate subdivision requirements (gravel roads, above-ground utilities, etc.) in those subdivisions creating Agricultural Parks where lots are limited to agricultural production with no dwellings.			✓
7.1.2.h Support the recommendations, policies, and actions contained within the Maui Agricultural Development Plan, July 2009, when consistent with the MIP.			✓
7.1.2.i Allow water and tax discounts for legitimate farming operations on rural and agricultural land.			✓
7.1.2.j Give priority in delivery and use of agricultural water and agricultural land within County agricultural parks to cultivation of food crops for local consumption.			✓
7.1.2.k Support programs that control pests and diseases that affect agriculture.			✓
7.1.2.l Support the development of training and apprenticeship programs to encourage an adequate supply of agricultural workers.			✓
Objective:			
7.1.3 Support and facilitate connectivity between communities.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Policies:			
7.1.3.a Evaluate the impact of gated communities on interconnectivity.			✓
7.1.3.b Discourage land use and urban design that impedes interconnectivity between adjacent communities.			✓
Analysis: **The project will be developed on vacant agricultural land that has not been in agricultural production in over 20 years. Moreover, the project site is situated adjacent to residential neighborhoods and in proximity to existing infrastructure services. Given the abundance of agricultural land on Maui and the dire need for affordable housing, implementation of the proposed project will not adversely affect agriculture productivity on Maui.**			
RURAL AREAS			
Goal:			
7.2 Maui will have a rural landscape and lifestyle where natural systems, cultural resources and farm lands are protected and development enhances and compliments the viability and character of rural communities.		✓	
Objective:			
7.2.1 Reduce the proliferation and impact of residential development outside of urban, small town, and rural growth boundaries.		✓	
Policies:			
7.2.1.a Focus development to areas inside urban, small town, and rural growth boundaries to preserve natural, cultural, and agricultural resources.	✓		
7.2.1.b Encourage cluster development with a mandatory buffer requirement/clear edge at the interface of country towns, agricultural uses, and surrounding rural landscapes.			✓
7.2.1.c Encourage or require, where appropriate, CSDs and the use of green spaces/natural separations to protect the character of rural landscapes.			✓
7.2.1.d Encourage basic goods/services in business country towns.			✓
7.2.1.e Allow for mixed uses, including residential uses, within Business Country Town Districts.			✓
7.2.1.f Encourage the use of alternative stormwater management techniques that minimize land disturbance and preserve natural drainage features.			✓
7.2.1.g Encourage green belts, open space buffers, and riparian zones to minimize conflicts between agriculture and residential uses.			✓
7.2.1.h Evaluate the impact of gated communities on inter-connectivity.			✓
Objective:			
7.2.2 More appropriate service/infrastructure standards to enhance and protect the island's rural character and natural systems.			✓
Policies:			
7.2.2.a Minimize impermeable surfaces within rural areas.			✓
7.2.2.b Protect and support the character, economic viability, and historic integrity of Maui's small towns.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
7.2.2.c Use infrastructure, public service, and design standards that are appropriate to rural areas.			✓
7.2.2.d Discourage land use and urban design that impede interconnectivity between adjacent communities.		✓	
Analysis: **The proposed project is located within the Urban Growth Boundaries as designated by the County of Maui MIP. The proposed project is directly and indirectly applicable with these policies related to keeping Maui's rural landscape protected.**			
URBAN AREAS			
Goal:			
7.3 Maui will have livable human-scale urban communities, an efficient and sustainable land use pattern, and sufficient housing and services for Maui residents.	✓		
Objective:			
7.3.1 Facilitate and support a more compact, efficient, human-scale urban development pattern.	✓		
Policies:			
7. 3.1.a Ensure higher-density compact urban communities, infill, and redevelopment of underutilized urban lots within Urban Growth Boundaries.	✓		
7.3.1.b Maintain a distinct separation between communities, such as but not limited to, Wailuku and Waikapū; Wailuku and Waiheʻe; Pukalani and Makawao; Pukalani and Kula; Makawao and Hāliʻimaile; Lahaina and Kāʻanapali; Kīhei and Māʻalaea; and Māʻalaea and Waikapū, to protect the character and identity of Maui's communities.			✓
7.3.1.c Strengthen evaluation requirements for new urban expansion, new towns, and major urban infill projects within urban growth areas. Tailor submittal requirements to reflect the impact or scale of different projects.		✓	
7.3.1.d Ensure future amendments to urban growth boundaries achieve the following: (1) provide a beneficial extension of the existing community; (2) are in areas where it is cost-effective to provide and operate infrastructure/public service facilities; and (3) do not promote automobile-oriented land use patterns.			✓
7.3.1.e Evaluate the impact of gated communities on inter-connectivity.			✓
7.3.1.f Encourage the development and implementation of neighborhood design standards that are environmentally friendly, such as LEED for Neighborhood Development (LEED – ND) standards.			✓
7.3.1.g Discourage future pyramid zoning within the industrial zoning districts, while allowing accessory commercial uses and grandfathering existing uses.			✓
7.3.1.h Promote agriculture by encouraging community gardening, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			✓
7.3.1.i Discourage land use and urban design that impedes inter-connectivity between adjacent communities.		✓	
Objective:			
7.3.2 Facilitate more self-sufficient and sustainable communities.	✓		

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Policies:			
7.3.2.a When developing new communities, provide sufficient lands for commercial, appropriate industrial, educational, spiritual, and non-profit uses to serve the daily needs of community residents.			✓
7.3.2.b Site community facilities such as schools, parks, libraries, and community centers within walking and biking distance of residences.		✓	
7.3.2.c Facilitate self-sufficient communities and shorten commutes by:			
(1) Directing residential development to job-rich areas;		✓	
(2) Allowing for appropriate commercial development and community services to shorten commutes; and			✓
(3) Allowing home occupations or home-based businesses that are compatible with surrounding neighborhoods and lifestyles.			✓
7.3.2.d Ensure, where appropriate, that affordable employee housing and multi-modal transportation opportunities are located near major employment centers.	✓		
7.3.2.e Discourage the establishment of bedroom communities where long commutes are required to employment centers.			✓
7.3.2.f Facilitate the development of housing by focusing projects in locations where land and infrastructure costs facilitate the development of affordably-priced housing.	✓		
7.3.2.g Provide incentives to facilitate the development of multifamily housing.		✓	
7.3.2.h Encourage the placement of rental housing projects in the same areas as for-sale housing to facilitate mixed-income communities.	✓		
7.3.2.i Develop communities that provide sufficient parks, schools, libraries, and other essential public facilities and services to serve resident needs.			✓
7.3.2.j Promote agriculture by encouraging community gardening, edible landscaping, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			✓
Objective:			
7.3.3 Strengthen the island's sense of place.		✓	
Policies:			
7.3.3.a Protect and enhance the unique architectural and landscape characteristics of each community.			✓
7.3.3.b Encourage Hawaiian architecture and tropical building designs.			✓
7.3.3.c Support the continued revitalization of historic country towns, Wailuku Town, and Kahului's commercial core and harbor-front without displacing traditional, cultural, recreational and customary uses.		✓	
7.3.3.d Strongly encourage the preservation of buildings, structures, and sites of historic significance.			✓
7.3.3.e Require community input through Design Workshops for major new urban expansion, new towns, and major urban infill projects.		✓	
7.3.3.f Require design enhancement, landscaping, and integration of park and rides, bicycle parking areas, and mass-transit infrastructure to mitigate the effect of		✓	

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
parking lots and structured parking on the urban landscape.			
7.3.3.g Ensure that safe and attractive public spaces (e.g., plazas, parks, town/village squares) are provided throughout the island's urban areas.		✓	
Objective:			
7.3.4 Strengthen planning and management for the visitor industry to protect resident quality of life and enhance the visitor experience.			✓
Policies:			
7.3.4.a Discourage the conversion of hotel units to timeshares and fractional ownership.			✓
7.3.4.b Monitor and manage the amount of, and impacts from, timeshares and fractional ownership.			✓
7.3.4.c Manage short-term rentals and bed-and-breakfast homes through a permitting and regulatory process in accordance with adopted ordinances and community plan policies.			✓
7.3.4.d Limit large-scale resort development to the four existing resort destination areas of Wailea, Mākena, Kapalua and Kāʻanapali. "Large Scale Resort" is defined as complexes that include multiple accommodation facilities, activity businesses, retail complexes, and other amenities.			✓
Objective:			
7.3.5 Ensure that Maui's planning and development review process becomes more transparent, efficient, and innovative.			✓
Policies:			
7.3.5.a Encourage greater community involvement in land use planning and decision making.		✓	
7.3.5.b Establish a predictable and timely development review process that facilitates the approval of projects that meet planning and regulatory requirements.			✓
7.3.5.c Increase inter-agency coordination between the Department of Planning and all State and County agencies responsible for infrastructure and public facilities provision, particularly as it relates to the mitigation of long-term cumulative impacts resulting from development projects.		✓	
7.3.5.d Provide greater certainty and transparency in the development review process.			✓
7.3.5.e Expand and maintain land use and geographic information system databases for improved decisions, and make data and products available to the public.			✓
Analysis: **The proposed project is directly applicable to the goal of livable human-scale urban communities. The proposed project provides 120 affordable rental housing units and related improvements for Maui County families in Waiehu. The proposed project has been carefully designed to be in harmony with the surrounding residential development and provides an efficient and sustainable land use pattern for a multi-family residential development. The project site is in proximity to businesses and public facilities that are offered to the community. The proposed multi-family development will be consistent with the character of Waiehu while also remaining respectful of open space. Further, the proposed project has and continues to seek community involvement and input in the land use planning process. Ongoing coordination with various State and County agencies will continue as detailed project plans are developed.**			
CHAPTER 8 – DIRECTED GROWTH PLAN			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
URBAN AND SMALL TOWN GROWTH AREA			
Goal:			
8.1 Maui will have well-serviced, complete, and vibrant urban communities and traditional small towns through sound planning and clearly defined development expectations.	✓		
Policies:			
8.1.a The County, with public input, will be responsible for designating new growth areas where infrastructure and public facilities will be provided, consistent with the policies of the MIP and in accordance with State and County infrastructure plans.			✓
8.1.b Amendments to a UGB or STB shall be reviewed as a MIP amendment. A UGB or STB shall only be expanded if the island-wide inventory (maintained by the Department of Planning) of existing land uses (residential, commercial, industrial) indicates that additional urban density land is necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			✓
8.1.c Community plans shall provide for urban density land use designations only within UGBs and Small Towns. The County may only support and approve State Urban Land Use Designations for areas within UGBs, STBs, and Rural Villages.			✓
8.1.d The unique character and function of existing small towns shall be protected to retain and preserve their sense of place.			✓
8.1.e New development shall be consistent with the UGBs, STBs, and all other applicable policies of the MIP. New urban-density development shall not be allowed outside of a UGB or STB.	✓		
8.1.f The County, as a condition of development approval, shall require developers of privately owned infrastructure systems to provide financial insurance (bonding, etc.) for the operation and maintenance of these systems.			✓
8.1.g The County shall implement a zoning program to comprehensively redistrict and rezone lands within UGBs according to updated community plan policies and map designations.			✓
8.1.h The County will seek to focus capital improvements (schools, libraries, roads, and other infrastructure and public facilities) within the UGBs and STBs in accordance with the MIP.			✓
8.1.i The County will promote (through incentives, financial participation, expedited project review, infrastructure/public facilities support, etc.) appropriate urban infill, redevelopment and the efficient use of buildable land within UGBs to avoid the need to expand the UGBs.			✓
8.1.j The MIP's UGBs and STBs shall not be construed or implemented to prohibit the construction of a single-family dwelling on any existing parcel where otherwise permitted by law.			✓
Analysis: The proposed project is located within the Urban Growth Boundary of the County of Maui's MIP. The project is in consonance with the objective and policies of the MIP and within an area planned for growth.			
RURAL GROWTH AREA			
Goal:			
8.2 Maui will maintain opportunities for agriculture and rural communities through			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable		DA	IA	NA
	sound planning and clearly defined development expectations.			
Policies:				
8.2.a	Amendments to a RGB shall be reviewed as an MIP amendment. A RGB shall only be expanded if an island-wide inventory of existing land uses (residential, commercial, industrial) indicates that additional lands are necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			✓
8.2.b	New development shall be consistent with RGB and all other applicable policies and requirements of the MIP. Public, quasi-public, civic, and limited commercial or industrial uses may be allowed in the RGB when the proposed uses demonstrate a public need and are consistent with the Community Plan and zoning.			✓
8.2.c	Environmental protection and compatibility will be a top priority in rural growth areas.			✓
8.2.d	All development within rural growth areas should avoid encroachment upon prime agricultural land.			✓
8.2.e	Rural growth areas include Rural Residential Areas and Rural Villages. Rural residential areas may be designated when they are located in association with or on the border of urban growth areas or Small Towns; and/or when they provide for complete, self-sufficient rural communities with a range of uses to be developed at densities that do not require urban infrastructure.			✓
8.2.f	Community plans shall provide for rural density land use designations only within RGBs; provided that limited community plan urban designations may be allowed within Rural Villages. New rural growth areas shall not be located where urban expansion may ultimately become necessary or desirable. New rural-density development shall not be allowed outside of a RGB.			✓
8.2.g	New rural growth areas intended to be complete, self-sufficient rural communities must be located a significant distance from existing urban areas, distinctly separated by agricultural or open lands.			✓
8.2.h	Urban-scale infrastructure and public facilities shall not be provided in rural areas except as described in the defined Level-of-Service (LOS) standards. There should be no expectations of urban services in rural areas.			✓
8.2.i	Urban development standards shall not be required within RGBs except in fulfillment of Federal law.			✓
8.2.j	The unique character and function of existing small towns and rural communities shall be protected to retain and preserve their sense of place.			✓
8.2.k	Preserve rural landscapes in which natural systems, cultural resources, and agricultural lands are protected and development compliments rural character and contributes to the viability of communities and small towns.			✓
8.2.l	The MIP's RGBs shall not be construed or implemented to prohibit the construction of a single family dwelling on any existing parcel where otherwise permitted by law.			✓
8.2.m	The County shall implement a zoning program to comprehensively redistrict and rezone lands within RGBs, and to implement community plan policies and map designations.			✓
8.2.n	At the time of zoning from agricultural to rural, Council will consider prohibiting restrictions on agricultural activity.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable		DA	IA	NA
Analysis: **The proposed project is located within the Urban Growth Boundary of the MIP and the objectives and policies related to Rural Growth Boundaries are not applicable.**				
PROTECTED AREA POLICY				
8.3.a	The Protected Areas in Diagrams E-1, NW-1, N-1, NE-1, S-1, SE-1, and WC-1 should be concurrently reviewed with Table 8-2 and with any proposed land uses that may result in an adverse impact on a Protected Area. The County Council and the Administration should be notified if a Protected Area may be compromised by a development proposal.			✓
Analysis: **Protected areas, as defined in Table 8-2 of the MIP are those lands categorized as preservation, park, greenbelt, greenway, and sensitive land. The proposed action does not occur on protected areas as delineated on Diagram WC-1.**				

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