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COUNTY OF MAUI
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WAILUKU, MAUI, HAWAI'I 96793
http://www.mauicounty.gov/water



July 25, 2025

Ms. Mary Alice Evans
State of Hawai'i
Office of Planning and Sustainable Development
Environmental Review Program
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

Re: DRAFT ENVIRONMENTAL ASSESSMENT AND ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT FOR THE PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT AT LAHAINA, MAUI, HAWAI'I; TMK (2)4-3-001:001(por.); (2)4-6-018:007(por.); (2)4-6-019:003 (por.); (2)4-6-025:002(por.)

Dear Ms. Evans:

The County of Maui, Department of Public Works hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) for the Launiupoko Exploratory Wells project for publication in the next available edition of the Environmental Notice. The proposed project is proposed within portions of Tax Map Keys: TMK (2)4-3-001:001(por.); (2)4-6-018:007(por.); (2)4-6-019:003 (por); (2)4-6-025:002(por).

In addition to this letter, we have also submitted the electronic version of the Environmental Review Program Publication Form and a searchable PDF-formatted copy of the DEA-AFNSI through the online submission platform.

If you have any questions, please contact Thomas Ochwat, at (808) 270-7553 or via email at planning@munekiyohiraga.com.

Sincerely,

JOHN STUFFLEBEAN, P.E.
Director, Department of Water Supply

cc: Ronald M. Fukumoto, Fukumoto Engineering
Sean Ogata, Fukumoto Engineering
Thomas Ochwat, Department of Water Supply
Tessa Munekiyo Ng, Munekiyo Hiraga
Korwyn Roberts, Munekiyo Hiraga

"By Water All Things Find Life"

From: dbedt.opsd.erp@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Tuesday, July 29, 2025 4:12:10 PM

Action Name

Launiupoko Exploratory Wells Project

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district

Judicial district

Lahaina, Maui

Tax Map Key(s) (TMK(s))

(2)4-3-001:001(por.); (2)4-6-018:007(por.); (2)4-6-019:003(por.); (2)4-6-025:002(por.)

Action type

Agency

Other required permits and approvals

See Chapter VIII of Draft EA

Proposing/determining agency

County of Maui, Department of Water Supply

Agency jurisdiction

County of Maui

Agency contact name

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Map It

Is there a consultant for this action?

Yes

Consultant

Munekiyo Hiraga

Consultant contact name

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305 High Street
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United States
Map It

Action summary

The Launiupoko Exploratory Wells Project involves constructing and testing four exploratory wells in the Lahaina district of West Maui. Five potential sites were evaluated: L-1, L-2, and L-3 in the Launiupoko Aquifer, and H-1 and H-2 in the Honolua Aquifer. The Department of Water Supply (DWS) selected Well Sites L-1 and L-3 for construction, with two wells at each site to provide backup capability for the existing water system and associated water demands and instream flow requirements for Kahanā Stream. Site L-2 was excluded due to its location in the West Maui Forest Reserve, which prohibits exploratory wells. Sites H-1 and H-2 will be assessed as potential alternative sites. The proposed wells at Sites L-1 and L-3 will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Existing dirt and gravel roads will be used to access the sites, and when necessary, new access roads will be graded and surfaced with gravel. The immediate work sites will be graded to create a gently sloping pad, and a chain link security fence will be constructed around each site.

Reasons supporting determination

See Chapter VII of the Draft EA.

Attached documents (signed agency letter & EA/EIS)

- Launiupoko_Exploratory_Wells_Draft_EA_August-20251.pdf
- Launiupoko_Exploratory_Wells_AFNSI_07.25.251.pdf

ADA Compliance certification (HRS §368-1.5):

The authorized individual listed below acknowledges that they retain the responsibility for ADA compliance and are knowingly submitting documents that are unlocked, searchable, and may not be in an ADA compliant format for publication. The project files will be published without further ADA compliance changes from ERP, with the following statement included below the project summary in The Environmental Notice: "If you are experiencing any ADA compliance issues with the above project, please contact (authorized individual submitting the project at email)."

Action location map

- LauniupokoWellSitesPoints1.zip

- LauniupokoParcelPoly1.zip

Authorized individual
Korwyn Roberts
Authorized individual email
korwyn@munekiyohiraga.com
Authorized individual phone
(808) 983-1233
Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

Draft Environmental Assessment

PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT LAHAINA, MAUI

(TMK NOS. (2)4-3-001:001(por.), (2)4-6-018:007(por.), (2)4-6-019:003(por.), (2)4-6-025:002(por.))

Prepared for:

County of Maui,
Department of Water Supply

August 2025

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MUNEKIYO HIRAGA

Planning. Project Management. Sustainable Solutions.

Draft Environmental Assessment

PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT LAHAINA, MAUI

(TMK NOS. (2)4-3-001:001(por.), (2)4-6-018:007(por.), (2)4-6-019:003(por.), (2)4-6-025:002(por.))

Prepared for:

County of Maui,
Department of Water Supply

August 2025

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MUNEKIYO HIRAGA

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Executive Summary

Project Name:
Proposed Launiupoko Exploratory Wells Project

Type of Document:
Draft Environmental Assessment

Legal Authority:
Chapter 343, Hawai'i Revised Statutes

Anticipated Determination:
Anticipated Finding of No Significant Impact (AFONSI)

Applicable Environmental Assessment review "Trigger":
Use of State and County Funds
Use of State Lands
Use of Conservation District Lands

Location:
Maui Island
Lahaina
TMK Nos. (2)4-3-001:001(por.); (2)4-6-018:007(por.); (2)4-6-019:003; (2)4-6-025:002

Landowner:
State of Hawai'i
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813
Phone: (808) 587-0400

Maui Land & Pineapple Company, Inc. (MLP)
200 Village Road
Lahaina, Hawai'i 96761

Proposing and Determining Agency:
County of Maui
Department of Water Supply
200 South High Street, 5th Floor
Wailuku, Hawai'i 96793
Contact: Thomas Ochwat, P.E.
Phone: (808) 270-7835

Consultant:
Munekiyo Hiraga
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Contact: Korwyn Roberts, AICP, Senior Associate
Phone: (808) 983-1233

Project Summary:

The County of Maui, Department of Water Supply (DWS) is proposing the Launiupoko Exploratory Wells Project, which involves the construction and testing of four (4) exploratory wells in the Lahaina district of West Maui. A total of five (5) sites have been evaluated as potential well sites – Well Sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and Well Sites H-1 and H-2 in the Honolua Aquifer. The DWS has selected Well Sites L-1 and L-3 for construction of the exploratory wells. Two (2) exploratory wells will be constructed at each well site (Well Site L-1 and Well Site L-3) in order to provide back-up capability to the existing water supply system and associated water demands and instream flow requirements for Kahanā Stream. As such, a total of four (4) exploratory wells are proposed to be constructed. Well Site L-2 was removed from consideration due to a determination by the State of Hawai'i, Department of Land and Natural Resources (DLNR) that its location in the Pana'ewa section of the West Maui Forest Reserve does not allow an exploratory well. Well Sites H-1 and H-2 will be assessed as potential alternative sites.

The proposed wells at Well Site L-1 and Well Site L-3 will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Existing dirt and gravel roads will be used to access the sites, and when necessary, new access roads will be graded and surfaced with gravel. The immediate work sites will be graded to create a gently sloping pad, and a chain link security fence will be constructed around each site.

Based on water quality test results and pump tests from the exploratory wells, the DWS will determine if the exploratory well sites are suitable for conversion to permanent production wells. If successful, the production wells will be constructed to restore 1.55 million gallons per day (mgd) of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow standards (IIFS). If implemented, the established IIFS would restore the mauka-to-makai flow of Kanahā Stream. If converted to production wells, the wells would serve as a replacement water source for existing West Maui water users.

It is noted that the CWRM designated the Lahaina Aquifer Sector Area (ASA) as a Surface and Ground Water Management Area in August 2022. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. If the exploratory wells are successful, an application for a Water Use Permit will be submitted to the CWRM for future production wells.

Lands underlying the exploratory well site footprints (project site) are classified as "Agricultural" and "Conservation" by the State Land Use District; designated "Agricultural," "Open Space", and "State Conservation" by the West Maui Community Plan; and zoned "Agricultural" and "Interim" by the County of Maui.

The proposed action involves the use of County funds, use of State lands, and work within the Conservation District, which are triggers for the preparation of an Environmental Assessment (EA) pursuant to Chapter 343, Hawai'i Revised Statutes (HRS). As such, this EA is being prepared to evaluate the technical characteristics, environmental impacts, and alternatives, as well as to advance findings relative to the proposed project. The DWS is serving as the Approving Agency for the EA.

List of Acronyms

AeE	Alaeloa Silty Clay, 15 to 35 percent slopes
AFI	Archaeological Field Inspection
AFONSI	Anticipated Finding of No Significant Impact
AIS	archaeological inventory survey
ALISH	Agricultural Lands of Importance to the State of Hawai‘i
amsl	average mean sea level
ASA	Aquifer Sector Area
BLNR	Board of Land and Natural Resources
BMP	Best Management Practices
BWS	State of Hawai‘i, Board of Water Supply
CATV	Cable Television
CDP	Census Designated Place
CDUA	Conservation District Use Application
CDUP	Conservation District Use Permit
CIA	Cultural Impact Assessment
cm	centimeter
CO2	Carbon Dioxide
CWPP	Community Wildfire Protection Plan
CWRM	Commission on Water Resource Management
DBCP	1,2-Dibromo-3-chloropropane
DEM	County of Maui, Department of Environmental Management
DLNR	State of Hawai‘i, Department of Land and Natural Resources
DOE	State of Hawai‘i, Department of Education
DOFAW	State of Hawai‘i, Department of Forestry and Wildlife
DOH	State of Hawai‘i, Department of Health
DOH-CWB	Department of Health, Clean Water Branch
DOH-SDWB	Department of Health, Safe Drinking Water Branch
DOH-SLD	Department of Health, State Laboratories Division
DOT	Department of Transportation
DWS	Department of Water Supply
EA	Environmental Assessment
ECL	Early Consultation Letter
EQ	equivalent
EPA	Environmental Protection Agency
FE	Fukumoto Engineering
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GHG	Greenhouse Gas
gpm	gallons per minute
HAR	Hawai‘i Administrative Rules
HCZMP	Hawai‘i Coastal Zone Management Plan
HDOT	State of Hawai‘i, Department of Transportation
HRS	Hawai‘i Revised Statutes
HwD	Honolua silty clay, 15 to 25 percent slopes
HWMO	Hawai‘i Wildfire Management Organization
IIFS	interim instream flow standards
JHM	Kapalua Airport
LCA	Land Commission Awards

LRFI	Archaeological Literature Review and Field Inspection
LSB	Land Study Bureau
LTRP	Lahaina Long Term Recovery Plan
LWC	Launiupoko Water Company
LWRF	Lahaina Wastewater Reclamation Facility
MCL	maximum contaminant level
MECO	Maui Electric Company
MG	million gallon
mgd	million gallons per day
mg/l	million gallons per liter
MIP	Maui Island Plan
MLP	Maui Land & Pineapple Company, Inc.
NPDES	National Pollutant Discharge Elimination System
OCCL	State of Hawai‘i, Office of Conservation and Coastal Lands
PDR	Preliminary Design Report
PM	particulate matter
por.	portion
ppb	parts per billion
rRR	rough broken land
rSM	stony alluvial land
SCS	Scientific Consultant Services, Inc.
SHPD	State Historic Preservation Division
SMA	Special Management Area
SOH	State of Hawai‘i
SWTP	Surface Water Treatment Plant
TCP	1,2,3-Trichloropropane
TMK	Tax Map Key Number
TNWRE	Tom Nance Water Resource Engineering
UGB	Urban Growth Boundaries
UHMC	University of Hawai‘i Maui College
U.S.	United States
USACE	U.S. Army Corp of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WHP	Wildfire Hazard Potential Map
WMCP	West Maui Community Plan
WRPP	Water Resource Protection Plan
WTF	Water Treatment Facility
WUDP	Water Use and Development Plan
WWRD	Department of Environmental Management, Wastewater Reclamation Division

PROJECT OVERVIEW

1

I. PROJECT OVERVIEW

A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

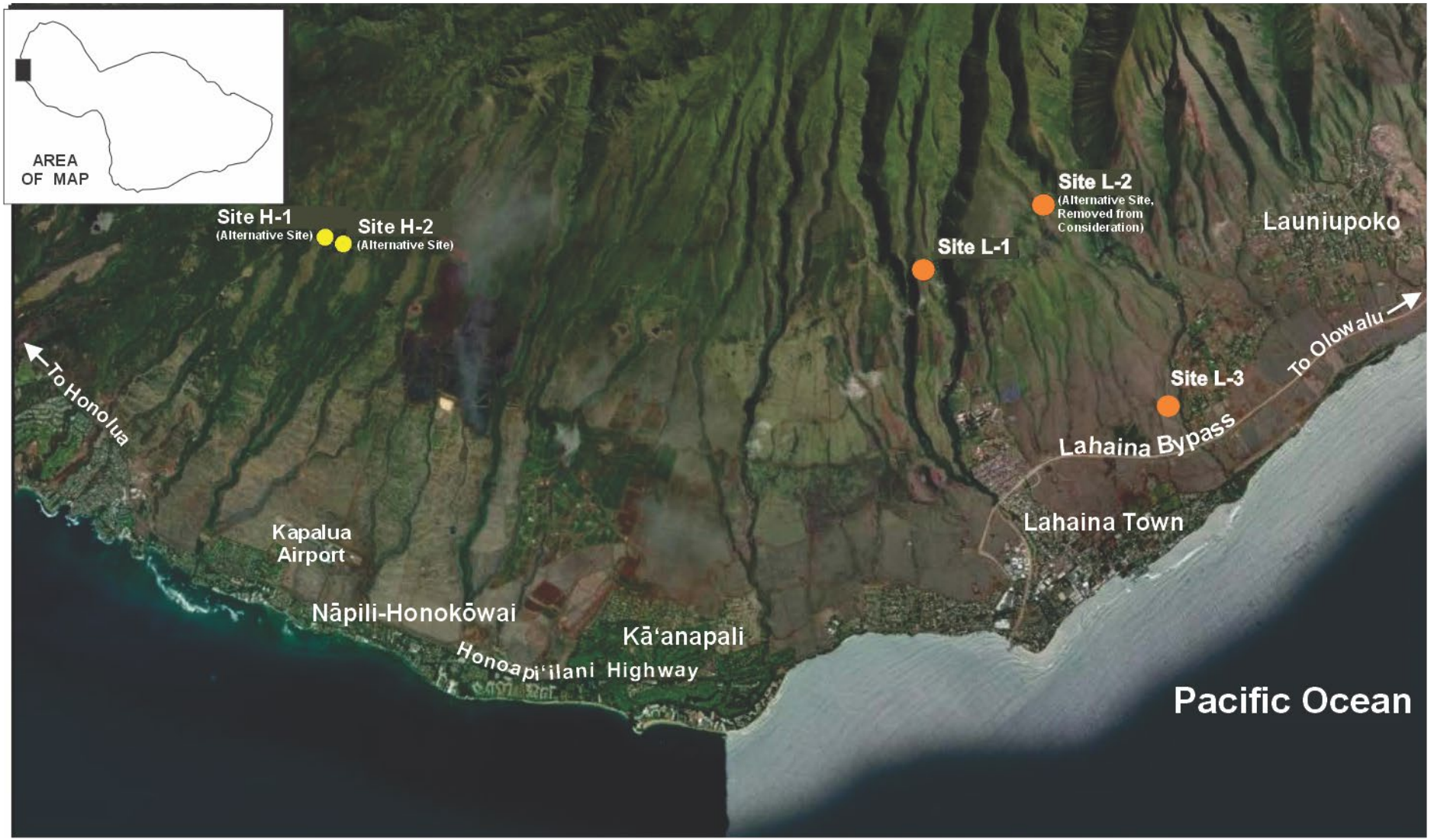
The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the Lahaina district of West Maui. A total of five (5) sites were identified as potential well sites: Sites L-1, L-2, and L-3 in the Launiupoko Aquifer and Sites H-1 and H-2 in the Honolua Aquifer. See **Figure 1**, **Figure 2**, and **Figure 3**. While all sites will be assessed in this Environmental Assessment (EA), Well Sites L-1 and L-3 have been identified as the preferred locations. Well Site L-2 has been removed from consideration due to a determination by the State of Hawai'i, Department of Land and Natural Resources (DLNR) that pursuant to Chapter 13-209-4(6) of the Hawai'i Administrative Rules (HAR), drilling of an exploratory well is not permitted within the Pana'ewa section of the West Maui Forest Reserve in which Well Site L-2 is located. Well Sites H-1 and H-2 will be assessed as potential alternative sites due to private land ownership of the sites and associated potential difficulty to develop.

The affected properties to be evaluated as potential exploratory well sites are outlined in **Table 1**, below.

Table 1. Project Tax Map Keys

Tax Map Key (TMK)	Owner	Project Component
(2)4-6-018:007	**State of Hawai'i**	**Well Site L-1 and Access Roads**
(2)4-6-025:002	State of Hawai'i	Well Site L-2 (Alternative Site, Removed from Consideration) and Access Roads
(2)4-6-019:003	**State of Hawai'i**	**Well Site L-3 and Access Roads**
(2)4-3-001:001	Maui Land & Pineapple Company, Inc.	Well Site H-1 (Alternative Site), Well Site H-2 (Alternative Site), and Access Roads

Well Site L-1 is situated on a ridge north of Kanahā Stream and to the south of Kahoma Stream, approximately 1,300 feet west of the State of Hawai'i Maui Nui Forest Reserve. Well Site L-2 lies on a ridge between two (2) unnamed gulches within the Maui Nui Forest Reserve. Well Site L-3 is located on the north side of Kaua'ula Stream. Well Site H-1 and Well Site H-2 are located on lands formerly used for pineapple cultivation, but are now fallow and overgrown with trees, shrubs, and grasses. Construction of exploratory wells at Well Site L-3, Well Site H-1, and Well Site H-2 would require approximately one (1) acre of land for each site. Well Site L-1 and Well Site L-2 are located on steeper terrain, and therefore, project construction will require approximately two (2) acres each to allow for the potential construction of a pumping station.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/airbus DS, USDA, AeroGRID, IGN, and the GIS User Community

Figure 1

Launiupoko Exploratory Wells
Regional Location Map

0 1500 3000 6000 Feet

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/RegLoca

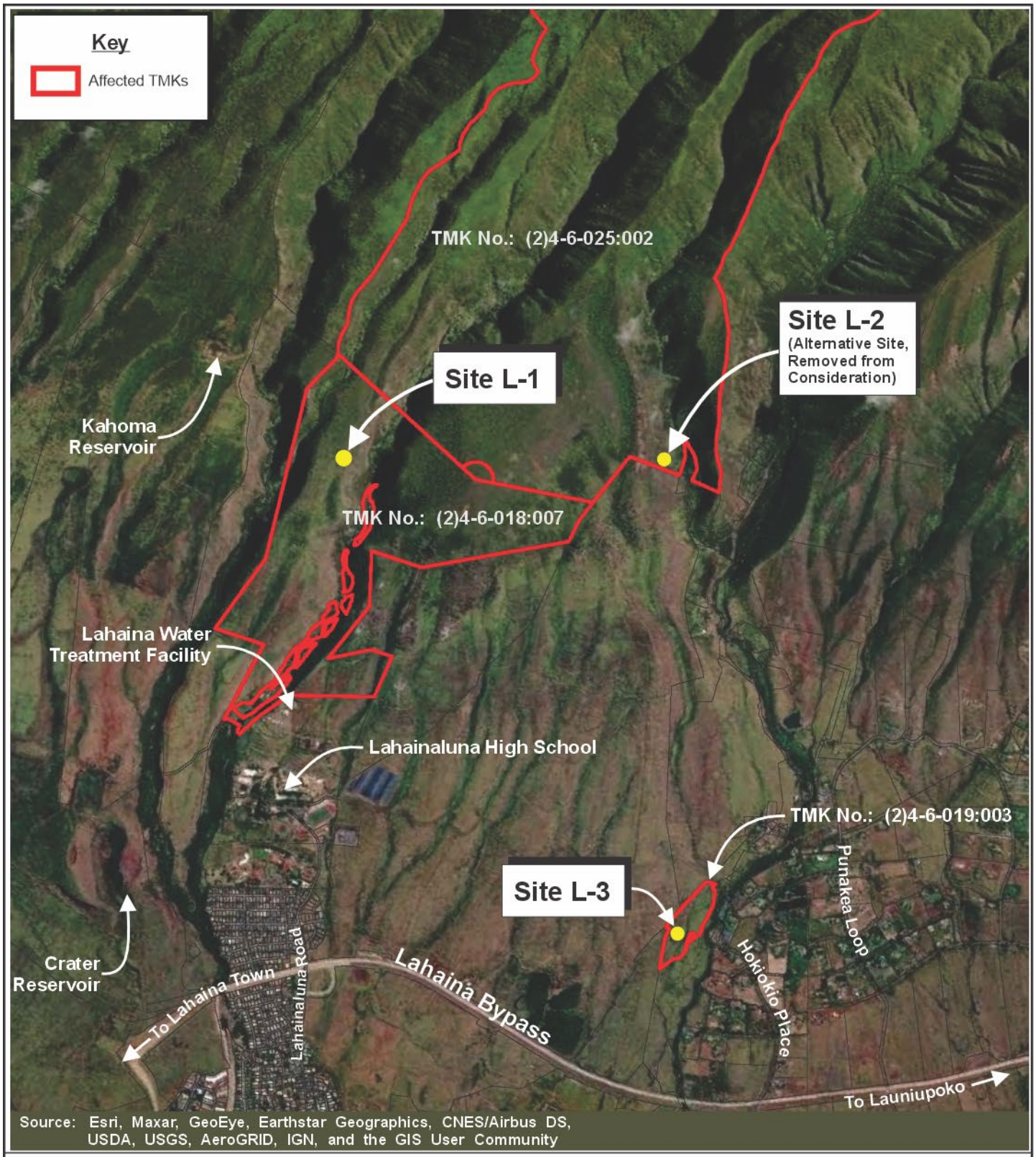


Figure 2

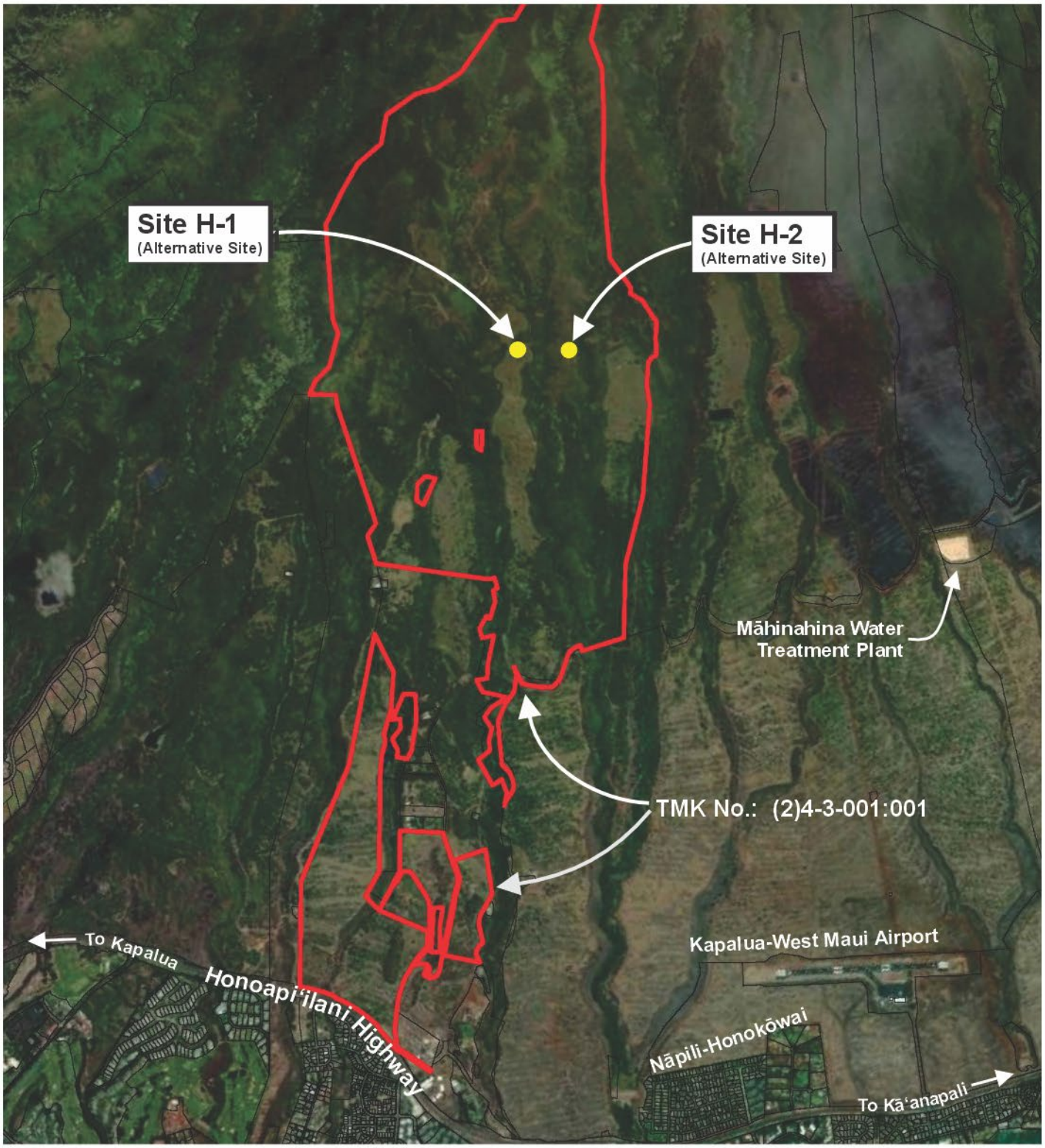
Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Project Location Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figures/L1 L2 L3 ProjLoca



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 3

Launiupoko Exploratory Wells
Sites H-1 and H-2
Project Location Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2ProjLoca

The land use designations for each well site are listed in **Table 2** and shown in Figure 4 and **Figure 5**.

Table 2. Land Use Designations by Site

Well Site	State Land Use	West Maui Community Plan	Maui County Zoning
L-1	Conservation	State Conservation	Agricultural
L-2	Conservation	State Conservation	Interim
L-3	Agricultural	Agricultural	Agricultural
H-1	Agricultural	Open Space	Agricultural
H-2	Agricultural	Open Space	Agricultural

It is noted that the location of Well Site L-3 was adjusted during the preparation of this Draft Environmental Assessment (EA) due to archaeological features identified in the vicinity of the original location. The new Well Site L-3 that is assessed in this EA is approximately 400 feet downslope from the original location. This is discussed further in Chapter V, Alternatives to the Proposed Action.

B. BACKGROUND

The DWS West Maui Water System encompasses two (2) regions: the northern region, north of the Lahaina Civic Center, and the southern region, south of the Civic Center. The Department's customers in both regions are served by surface water and groundwater sources. In the northern region, the Māhinahina Surface Water Treatment Plant (SWTP) treats surface water from the Honokōhau Stream and the Honolua Ditch. In the southern region, the Lahaina Treatment Plant treats surface water from Kanahā Stream. There are multiple groundwater wells within both regions. The DWS operates five (5) drinking water wells in the Honolua Aquifer and four (4) drinking water wells in the Launiupoko Aquifer. There are other groundwater wells within both aquifers, operated by private companies, including the Kapalua Water Company and the Launiupoko Water Company.

According to the Regional Plan for the Lahaina Aquifer Sector Area of the Maui Island Water Use and Development Plan (WUDP), surface water from the Kanahā Stream is currently diverted to supply water to Lahainaluna School and the County DWS. The DWS acknowledges that stream flow restoration of Kanahā Stream is necessary to support traditional and customary Native Hawaiian practices and water rights. In order to restore stream flow to Kanahā Stream, the DWS is seeking new water sources.

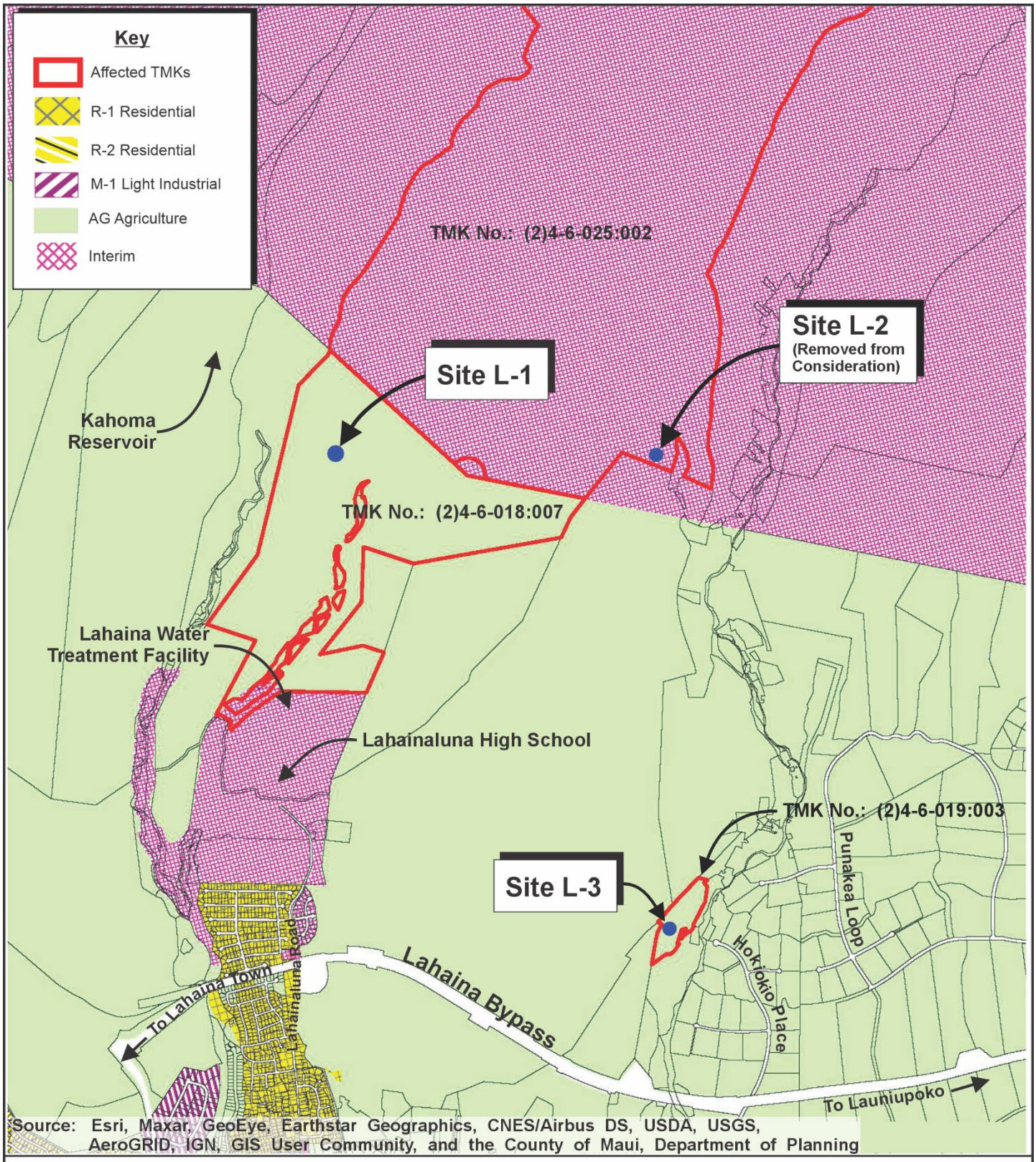


Figure 4

Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Maui County Zoning Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 MCZ

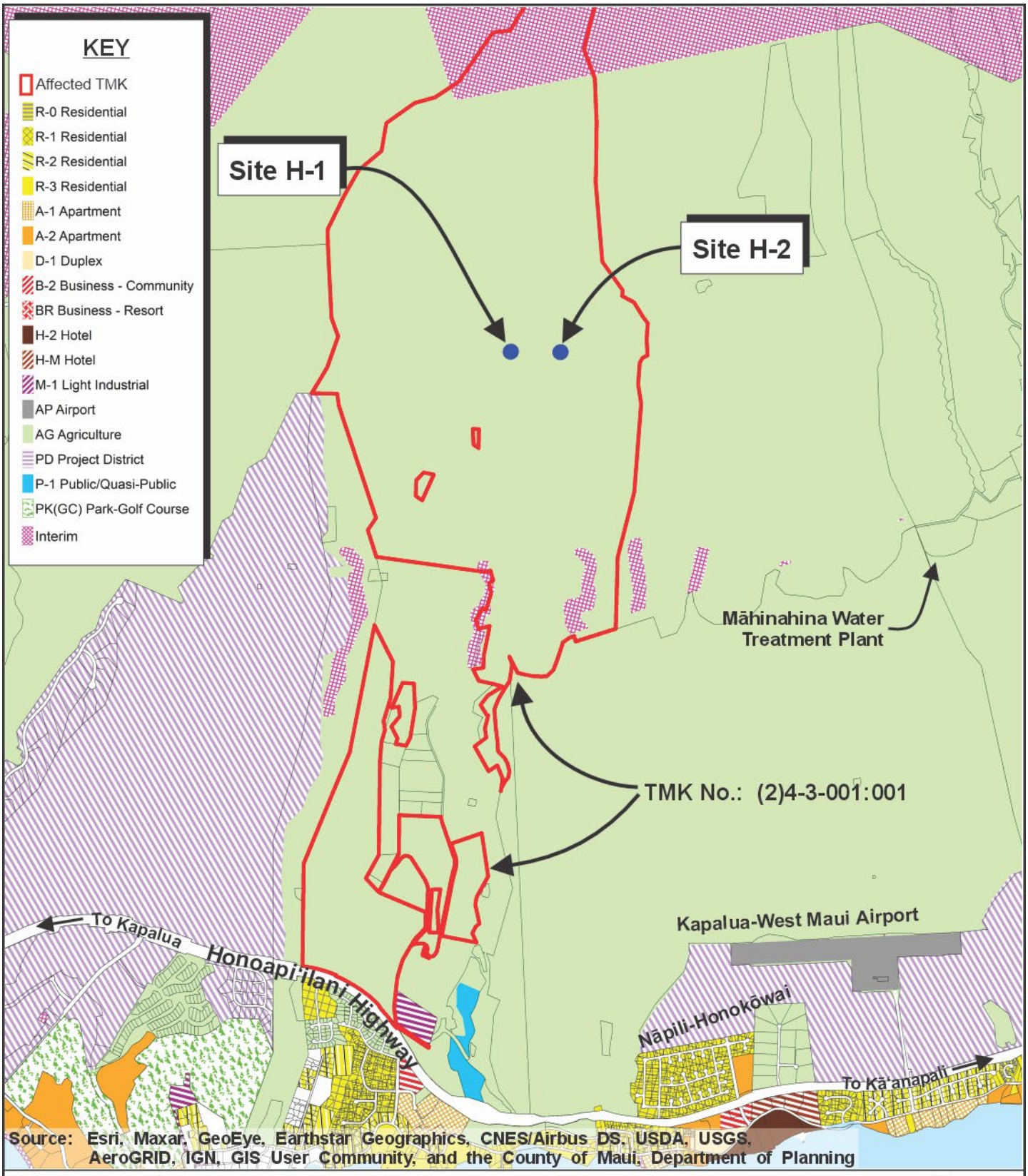


Figure 5

Launiupoko Exploratory Wells
Sites H-1 and H-2
Maui County Zoning Map

1250
0 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 MCZ

It is noted that the DLNR, Commission on Water Resource Management (CWRM) designated the Lahaina Aquifer Sector Area (ASA) as a Surface and Ground Water Management Area in June 2022. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. If the exploratory wells are successful, an application for a Water Use Permit will be submitted to the CWRM for future production wells.

Per the State Water Code, Chapter 174C, Hawai'i Revised Statues (HRS), CWRM shall establish interim instream flow standards (IIFS) on a stream-by-stream basis to protect the public interest in waters of the State. While adoption of permanent instream flow standards is outstanding, CWRM adopted interim instream flow standards in November 2018. HRS Chapter 174C-3 defines instream flow standards as the "*quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses*". In November 2018, CWRM amended the IIFS for the Kahoma Surface Water Hydrologic Unit, which includes Kahoma Stream and Kanahā Stream.

The Lahaina Long Term Recovery Plan (LTRP), released in December 2024, was prepared to focus, coordinate, and prioritize projects to ensure an organized and community-informed approach for the recovery of Lahaina. The LTRP includes the proposed project as a "Priority Project" under the "Water Resource Development" category. The LTRP designates the project in the "Long Term" estimated completion time, which is categorized by an anticipated completion date of six (6) or more years from 2024. The LTRP also highlights the proposed project's alignment with the West Maui Community Plan (County of Maui, December 2024). It is noted that the LTRP misrepresents the project as an expansion of water availability as the project proposes the exploratory wells and associated potential future wells in order to replace 1.55 mgd that will be returned back into the Kanahā Stream in compliance with the 2018 CWRM directive.

C. PROPOSED ACTION

The proposed Launiupoko Exploratory Wells project involves the construction of four (4) exploratory wells in the Lahaina District of West Maui. The DWS has selected the construction of two (2) exploratory wells at Well Site L-1 and the construction of two (2) exploratory wells at Well Site L-3 in the Launiupoko Aquifer for the project. The exploratory wells will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess groundwater quality from the Launiupoko Aquifer System, which is located within the Lahaina ASA. Related site improvements include grading of the immediate work area to create a gently sloping pad and the construction of a chain-link security fence around the footprints of the exploratory well sites (project site).

The proposed project will evaluate and identify viable groundwater sources for possible conversion to permanent production wells. If the exploratory wells are successful, the DWS intends to develop them into production wells, which will replace 1.55 million gallons per day (mgd) of surface water to be released into the Kanahā Stream, as required by the CWRM directive. If implemented, the established IIFS would restore the mauka-to-makai flow of Kanahā Stream.

Well Sites H-1, H-2, and L-2 are evaluated in this EA as potential alternative sites for exploratory wells, though Site L-2 has been eliminated from consideration as discussed above.

Should the exploratory wells be successful, a separate EA will be prepared for the potential conversion of exploratory wells to production wells to replace the 1.55 mgd released from the Lahaina Water Treatment Facility stream intake and restore stream flow to Kanahā Stream. If an exploratory well is unsuccessful, another well may be drilled in the vicinity of the unsuccessful well, or it may be drilled in a different location recommended by the hydrogeologist.

D. REGULATORY CONTEXT

1. Chapter 343, Hawai‘i Revised Statutes

The proposed project will involve the use of State lands, use of County funds, and work within the Conservation District. The use of State lands and County funds, as well as work within the Conservation District, are triggers for the preparation of an EA, pursuant to Chapter 343, HRS. As such, this Draft EA is being prepared in accordance with Chapter 200.1 of Title 11, HAR in order to review the project's technical characteristics, environmental impacts, alternatives, and advances findings and conclusions relative to the significance of the project. The DWS will serve as the Approving Agency for the project.

If the exploratory wells for this proposed project are successful, a separate Chapter 343, HRS EA will be prepared to convert the successful test wells to permanent production wells.

2. Other Regulatory Considerations

In August 2022, the CWRM designated the Lahaina ASA as a Surface and Ground Water Management Area in efforts to protect water resources and uphold the public trust. This designation resulted in more oversight and regulation of surface and ground water withdrawals in the Lahaina ASA. Should the proposed exploratory wells be suitable for conversion to production wells, a Ground Water Use Permit Application will be prepared for review by the CWRM.

The proposed project well sites L-1 and L-2 are located within the State Land Use Conservation District. As such, a Conservation District Use Permit (CDUP) will be obtained from the Board of Land and Natural Resources (BLNR) prior to commencing work within these sites. However, as previously discussed, Well Site L-2 has been removed from consideration due to a determination by DLNR that pursuant to Chapter 13-209-4(6) of the HAR, drilling of an exploratory well is not permitted within the Pana'ewa section of the West Maui Forest Reserve in which Well Site L-2 is located.

E. PROJECT COST AND IMPLEMENTATION SCHEDULE

The cost of the proposed Launiupoko Exploratory Wells project is presented in **Table 3** below. The construction timeline will be approximately two (2) years from the notice to proceed date.

Table 3. Cost of the Proposed Launiupoko Exploratory Wells

Well Site	Estimated Cost
Site L-1	$13.03 million
Site L-2	$12.46 million
Site L-3	$2.44 million
Site H-1	$8.14-8.55 million
Site H-2	$7.78 million (added to Site H-1 cost)
Source: Fukumoto Engineering	

DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

II

II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Use

a. Existing Conditions

The proposed project is located in the Lahaina district of West Maui on the slopes of the West Maui Mountains. The five (5) potential project sites can be classified into two (2) areas – Well Site L-1, Well Site L-2, and Well Site L-3 in the Launiupoko Aquifer, and Well Site H-1 and Well Site H-2 in the Honolua Aquifer.

Well Site L-1 is situated 2.8 miles inland on a ridge to the north of Kanahā Stream and south of Kahoma Stream. Well Site L-1 sits above Lahaina town, Lahainaluna High School, and the County of Maui, DWS Lahaina Water Treatment Facility (WTF) at approximately 1,700 feet above mean sea level (amsl). Well Site L-2 is located 2.7 miles inland on a ridge southeast of Well Site L-1 at an elevation of approximately 1,800 feet amsl to the southwest of Kaua‘ula Stream. Well Site L-3 is located about 1.1 miles inland and north of Kaua‘ula Stream at an elevation of 330 feet amsl.

Both Honolua sites are located approximately 1,000 feet apart on ridges between the Ka‘opala Gulch and the Kahana Stream in the Nāpili-Honokōwai area of Lahaina, northwest of the Māhinahina Water Treatment Plant and the Kapalua Airport. Well Site H-1 is southwest of the Ka‘ōpala Gulch at an elevation of approximately 1,280 amsl. Well Site H-2 is located northeast of the Mailepai Stream at approximately 1,240 amsl. The Kahana Exploratory Well and the Māhinahina Exploratory Well, constructed by DWS in 2017, are located to the east of both Honolua sites. The Honolua sites are within a 1,377-acre parcel owned by the MLP.

b. Potential Impacts and Mitigation Measures

Land uses surrounding the project area consist of former agricultural lands. All well sites are located approximately between one (1) and three (3) miles outside of the existing urbanized and coastal areas of this region. The scope of the proposed project includes the construction of four (4) exploratory wells and access roads with the intent of assessing the water

quality and yield of the exploratory well sites for the potential conversion to production wells. The project is compatible with the adjacent fallow agricultural land uses and is not anticipated to have an adverse impact on other surrounding land uses within the area.

2. Climate

a. Existing Conditions

Like most areas of Hawai'i, West Maui's climate is relatively uniform year-round. West Maui's tropical latitude, its position relative to storm tracts and the North Pacific High anticyclone, and the surrounding ocean combine to produce a stable climate. Variations in climate among different regions on Maui are, therefore, dictated by the inherent characteristics of local terrain.

Average daily temperatures in Lahaina typically range between 71 degrees and 78 degrees Fahrenheit, with maximum recorded temperatures in 2023 of 65.1 degrees and 86.6 degrees Fahrenheit (State of Hawai'i, Department of Business, Economic Development & Tourism 2023). September is historically the warmest month, while January is the coolest (County of Maui, Office of Economic Development 2022).

Rainfall in West Maui is both low and highly seasonal in nature. March is historically the wettest month, with 3.92 inches on average, and June is the driest, with an average of 1.07 inches of precipitation. However, rainfall is typically much greater in the upper reaches of the mountains between about 2,000 feet and 6,500 feet in what is referred to as the Fog Drip Zone. Situated on the leeward side of the West Maui Mountains, this dry region receives most of its rainfall in late afternoon and early evening after sea breezes take moisture upslope during the day (County of Maui, Office of Economic Development 2022).

Although Lahaina experiences relatively temperate climate year-round, there are risks of extreme weather events, such as hurricanes, which may cause flooding or damage from wind. In the case of the August 2023 Lahaina wildfires, extreme winds from Hurricane Dora intensified the spread of the fires, burning over 2,000 acres and destroying approximately 2,200 structures. Similar high wind conditions from Hurricane Lane, in August 2018, also resulted in brushfires that burned over 2,000 acres in the hillsides of Lahaina. As a result, 21 structures and 30 vehicles were destroyed.

b. Potential Impacts and Mitigation Measures

Well Site L-1 is located approximately 1,300 feet west and makai of a State Forest Reserve and is surrounded by vegetation. Well Site L-3 and alternative Well Sites H-1 and H-2 are surrounded by vegetation and fallow agricultural lands. The proposed project includes the construction of exploratory wells that will occupy approximately one (1) to two (2) acres each with access roads. The proposed project will utilize exploratory wells to assess the yield and quality of groundwater sources in West Maui. To address construction impacts of grading and drilling, erosion control Best Management Practices (BMPs), such as silt fences, temporary drilling mud basins, dust control measures, and hydromulch seeding, will be implemented during construction.

3. Water Quality

a. Existing Conditions

The proposed project will evaluate groundwater sources from the Launiupoko Aquifer and Honolua Aquifer, which are located within the Lahaina Auqifer Sector Area (ASA). The uplands of the West Maui Mountains exhibit high recharge due to high rainfall, as well as considerable fog interception and low evapotranspiration due to persistent cloud cover (County of Maui, Department of Water Supply, 2019).

The DWS currently operates four (4) drinking water wells within the Launiupoko Aquifer: Waipuka 1, Waipuka 2, Kanahā 1, and Kanahā 2. The Launiupoko Water Company, LLC owns three (3) wells in the Launiupoko Aquifer to provide potable water to the Mahanalua Nui, Makila Plantation, and the Pu‘unoa residential subdivisions in Launiupoko. In addition, the Launiupoko Irrigation Company operates the LIC-1 and Waine‘e Shaft Wells for the production of non-potable irrigation water.

The Honolua Aquifer contains several DWS wells: Kahana, Nāpili A, Nāpili B, Nāpili C, Honokōhau A, and Honokōhau B. In addition, Kapalua Water Company operates two (2) drinking water wells, Kapalua 1 and Kapalua 2, within the Honolua Aquifer. The Kapalua Water Company has also drilled and tested the Kapalua 3B well, but it is currently not in use. The proposed exploratory well sites were selected to avoid interference with these existing wells.

Fukumoto Engineering prepared a Preliminary Design Report (PDR) to provide recommendations on the location, size, and capacity of four (4)

potential exploratory well sites for the purpose of providing a replacement water source in West Maui. See **Appendix "A"**.

Groundwater contamination levels were reviewed from existing wells within the Launiupoko and Honolua Aquifers to avoid residual organic contaminants and pesticides from former pineapple fields. Since 1982, the State of Hawai'i, Board of Water Supply (BWS) began monitoring drinking water wells and detected 1,2-dibromo-3-chloropropane (DBCP), which is a nematicide that was used for soil fumigation in pineapple fields up until 1985, when the United States (U.S.) Environmental Protection Agency (EPA) decided to ban the use of DBCP. A related pesticide, 1,2,3-trichloropropane (TCP), was also detected in groundwater sources. DBCP and TPC levels are currently monitored by the State of Hawai'i, Department of Health (DOH).

The EPA has established a maximum contaminant level (MCL) measured in parts per billion (ppb) for these contaminants, which set standards for safe drinking water. Although these contaminants have not been in use for over several decades, traces of these pesticides have leached into the soil and groundwater sources and may still be detected today.

The proposed exploratory well sites were selected following review of the level of contaminants found in groundwater wells within the Launiupoko and Honolua Aquifers to minimize contaminants within the proposed well sites.

Table 4 below lists the levels of contaminants that have been detected within the Honolua Aquifer. It is noted that under the proposed project, Well Site H-1 and Well Site H-2 within the Honolua Aquifer are assessed as potential alternative sites to Well Site L-1 and Well Site L-3 within the Launiupoko Aquifer.

Table 4. Contaminants in the Honolua Aquifer Wells

Well Name	Well No.	Contaminant	Detection Date	Detection Level (in parts per billion)	Maximum contaminant Level (in parts per billion)
Honokōhau A	5838-003	TCP	11/30/2005	0.09	0.6
Nāpili A	5838-001	TCP	12/16/2019	0.48	0.6
Nāpili A	5838-001	DBCP	12/16/2019	0.18	0.04
Nāpili C	5838-004	TCP	06/15/2016	0.05	0.6
Source: Fukumoto Engineering					

There are currently no detected contaminants in groundwater sources in the Launiupoko Aquifer.

b. <u>Potential Impacts and Mitigation Measures</u>

In 1990, the CWRM established a sustainable yield of eight (8) million gallons per day (mgd) for the Launiupoko Aquifer and eight (8) mgd for the Honolua Aquifer. In 2008, the CWRM reduced the sustainable yield for the Launuipoko Aquifer to seven (7) mgd and retained the sustainable yield of eight (8) mgd for the Honolua Aquifer. Refer to **Appendix "A"**. The State Water Code defines sustainable yield as "*the maximum rate at which water may be withdrawn from a water source without impairing the utility and quality of the water source as determined by the commission*".

As stated in the PDR and provided in the CWRM Water Resource Protection Plan (WRPP), updated in 2019, the sustainable yield for the Launiupoko Aquifer has the potential to be increased up to 18 mgd due to more recent recharge results that reveal higher recharge rates than previously determined. However, the sustainable yield for the Launiupoko Aquifer is being maintained at seven (7) mgd.

The current pumpage of water in the Launiupoko Aquifer has decreased substantially from when it was used for sugar cultivation. Prior to the Pioneer Mill Company ceasing operations in 1999, the average usage of water from the Launiupoko Aquifer would often exceed 15 mgd. Well pumpage in the post plantation period has been for less than the 7 mgd sustainable yield. Over the past 20 years, an average of 0.4 mgd has been drawn from the DWS wells in the Launiupoko Aquifer. Since being established in 2004, Launiupoko Water Company (LWC) wells have averaged about 1.10 mgd. It is noted that water usage from the LWC wells have increased since 2018 to meet the updated interim stream flow standards established by the CWRM for the Kaua'ula Stream. Even with the prospect of greater groundwater use for irrigation based on CWRM's restriction of surface water use, the Preliminary Design Report (PDR) indicates that there will still be substantial unused amount that could accommodate new wells. Refer to **Appendix "A"**.

It is noted that according to the CWRM Findings of Facts Report prepared in June 2022 for the Lahaina ASA surface and groundwater management area designation, existing and authorized planned withdrawals exceed the sustainable yield for the Launiupoko Aquifer (State of Hawai'i, CWRM, 2022). In response to the June 2022 CWRM Findings of Fact Report, Tom Nance Water Resource Engineering provided an updated assessment of

the capacity of Launiupoko Aquifer. In the 2025 memo, the hydrogeologist indicated that the total existing and authorized use from the Launiupoko Aquifer is 5.31 mgd. Using the current sustainable yield of seven (7) mgd, the memorandum concludes that 1.69 mgd of water supply remains uncommitted. See **Appendix "B"**.

At the time of preparation of this EA, the CWRM was undergoing a review process of Ground Water Use Permit applications from existing uses and would separately be reviewing applications for new users. In addition, planned water users from the Launiupoko aquifer are included as planned uses in the 2019 WRPP. Neither the project nor the construction of production wells would increase the amount of water allocated for any uses, nor could it allow pumping to exceed sustainable yield. As the CWRM has administrative control over pumping in the Lahaina ASA, it is required by law to limit withdrawals below sustainable yield and is obligated to provide for the reservations allocated to users, within that limit. As such, pumping of the potential production wells resulting from successful results of the proposed exploratory wells would not cause the Launiupoko aquifer to be pumped beyond sustainable yield, which may lead to adverse environmental impacts. This limitation on the DWS and pumping from production wells will be enforced in part upon issuance of a Ground Water Use Permit from CWRM for the future production wells, which must taze place prior to any water withdrawal from the aquifer (State of Hawai'i, CWRM 2022).

High-level groundwater has the potential to impact stream flow. Previous test holes drilled in 1970 at Well Site L-1 encountered high-level groundwater at 430 and 820 feet above sea level, which indicates a high probability of successfully reaching high-level groundwater. Additionally, seepage runs conducted by the U.S. Geological Survey (USGS) indicate that the Kanahā Stream and the Kahoma Stream lose their reach above or inland of well sites L-1 and L-2. The high-level groundwater below these sites do not flow to the Kanahā Stream and the Kahoma Stream and, therefore, pumping from wells at Well Site L-1 or Well Site L-2 is not expected to result in significant adverse impacts to the Kanahā Stream and the Kahoma Stream. Refer to **Appendix "A"**.

The CWRM has established a sustainable yield of eight (8) mgd for the Honolua Aquifer. Over the past 10 years, the DWS wells in the Honolua Aquifer have pumped an average of 1.854 mgd, while the Kapalua Water Company wells have pumped an average of 0.557 mgd. The total average pumpage has been 2.429 mgd, which is 5.571 mgd less than the sustainable yield. Similar to the Launiupoko Aquifer, more recent recharge

calculations by the USGS revealed higher recharge rates than previous assessments. As such, the DLNR's Water Resource Protection Plan (2019) indicated the potential sustainable yield could increase to 11 mgd. However, the 8 mgd yield was kept for the Honolua Aquifer. Refer to **Appendix "A"**.

The Honolua Aquifer sites were previously used for pineapple and sugar cultivation. The PDR identifies potential contaminants that may leach into groundwater due to pineapple cultivation, including DBCP and TCP. However, as shown in **Table 4**, the water quality tests indicate the water meets drinking water standards. Tests from the Launiupoko Aquifer did not reveal known contaminants. As such, the proposed locations for the Launiupoko well sites are suitable for test sites for potable groundwater development. Refer to **Appendix "A"**.

Before performing any construction work, each well site will be inspected for old containers or equipment that may have been used to store or apply such soil agricultural chemicals to reduce or eliminate the potential for contamination of the water sources. If such old containers or equipment are found, they will be disposed of properly.

As previously mentioned, the CWRM designated the Lahaina ASA as a Surface and Ground Water Management Area. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. Water Management Areas include hydrologic unit areas that are regulated by the CWRM. The Launiupoko and Honolua aquifers are both within the Lahaina ASA. Therefore, any new water source withdrawal must be permitted by the Commission.

Results from the exploratory wells will determine if the sites are suitable for the potential conversion to permanent production wells. Should the DWS propose permanent production wells, a separate EA would be prepared, and withdrawal of water would need to be approved by the CWRM.

4. Topography and Soil Characteristics

a. Existing Conditions

All project sites are located upon the expansive slopes of the West Maui Mountains and are characterized by steep ravines and sloping, deep valleys, and streams. Well Site L-1 and Well Site L-2 have slopes of about 20 percent and are at elevation levels of 1,700 feet amsl and 1,800 amsl, respectively. Well Site L-3 lies on gently sloping terrain about 150 feet north

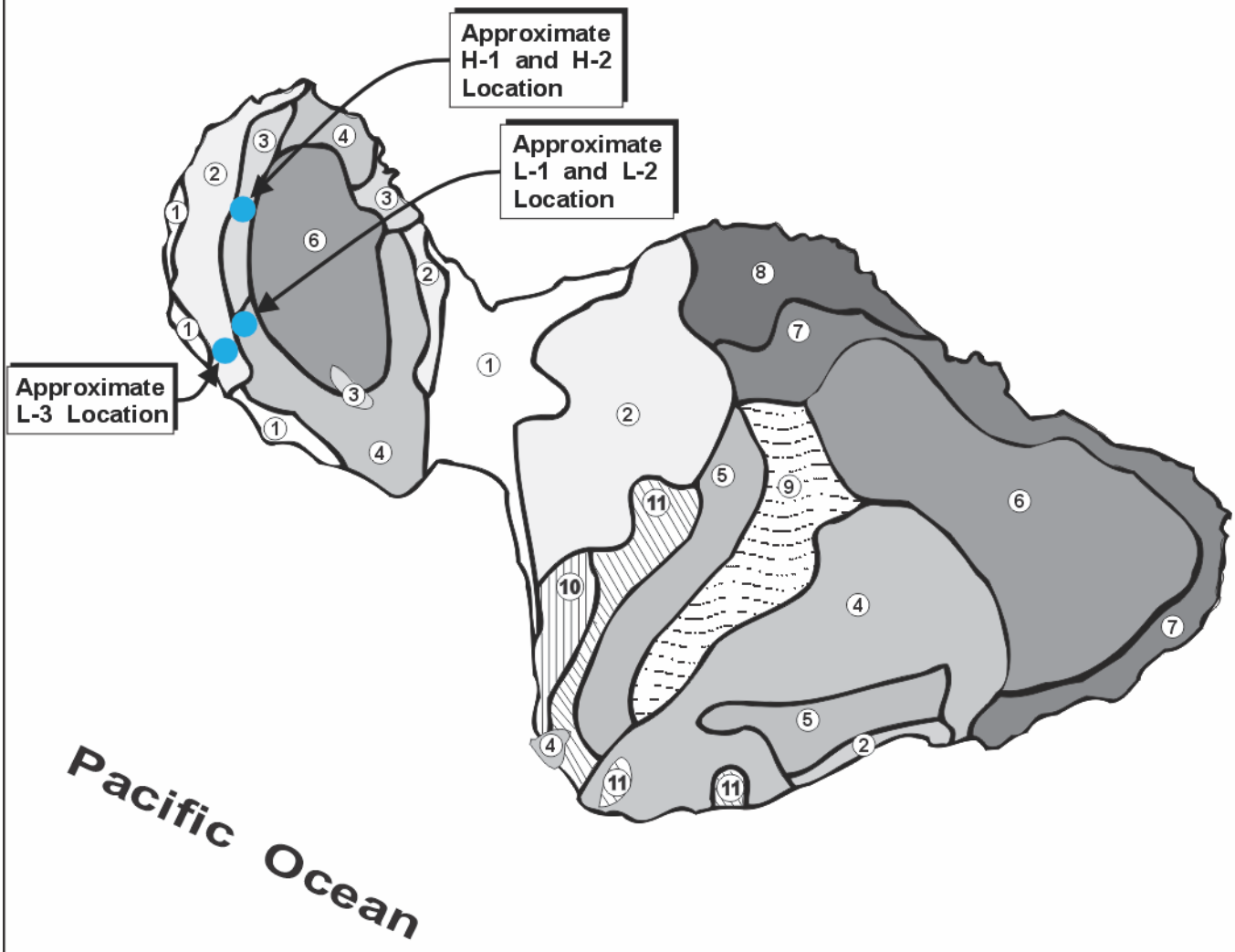
of the centerline of Kaua‘ula Stream at an elevation of about 330 feet amsl and with a ground slope of about 12 percent. Well Site H-1 has a slope of about 16 percent and is located at an elevation of approximately 1,280 feet amsl. Well Site H-2 has a slope of about 12 percent at an elevation of about 1,240 feet amsl.

According to the U.S. Department of Agriculture (USDA) Soil Conservation Service, Soil Survey of Islands of Kaua‘i, O‘ahu, Maui, Moloka‘i, and Lana‘i, State of Hawai‘i (1972), soils within the subject properties are in the vicinity of the Waiakoa-Keahua-Molokai, Honolua-Olelo, and Rock land-Rough mountainous land soil associations. See **Figure 6**. The Waiakoa-Keahua-Molokai association is characterized by moderately deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil on low uplands. The Honolua-Olelo association is characterized by deep, gently sloping to moderately steep, well-drained soils that have a fine-textured subsoil; on intermediate uplands. These soil types are typically used for pineapple, pasture, woodland, water life habitat, and water supply. The Rock land-Rough mountainous land association is characterized by very steep land broken by intermittent drainage channels that occur in gulches or on mountainsides. Soils overlying the rocks are variable and often contain weathered rock fragments. This land type is most used and suitable for watersheds and wildlife habitats.

The specific soil types underlying Well Sites H-1 and H-2 are Honolua silty clay (HwD), 15 to 25 percent slopes. HwD is characterized by well drained soils that display rapid permeability, medium runoff, and moderate erosion hazard. Underlying Well Site L-1 is Alaloa silty clay (AeE), 15 to 35 percent slopes, which consists of well-drained soils with moderate erosion hazard. AeE exhibits moderately rapid permeability and medium runoff. Well Site L-2 is located on rough broken land (rRR), which consists of very steep land broken by numerous intermittent drainage channels, is well-drained, and is used for water supply and wildlife habitats. rRR is characterized by a slope of 40 to 70 percent with rapid runoff and annual rainfall from 25 to over 300 inches. The soil underlying Well Site L-3 is stony alluvial land (rSM), which consists of stones, boulders, and soil deposited by streams along the bottoms of gulches and on alluvial fans. These soil types are typically used for sugar cane, pineapple, homesites, woodland, pasture, wildlife habitat, water supply, watershed, and recreation (U.S. Department of Agriculture, 1972). See **Figure 7** and **Figure 8**.

LEGEND

- 1 Pulehu-Ewa-Jaucas association
- 2 Waiakoa-Keahua-Molokai association
- 3 Honolua-Olelo association
- 4 Rock land-Rough mountainous land association
- 5 Puu Pa-Kula-Pane association
- 6 Hydrandepts-Tropaquods association
- 7 Hana-Makaalae-Kailua association
- 8 Pauwela-Haiku association
- 9 Laumaia-Kaipoipoi-Olinda association
- 10 Keawakapu-Makena association
- 11 Kamaole-Oanapuka association



Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 2006

Figure 6 Launiupoko Exploratory Wells Project
Soil Association Map

NOT TO SCALE

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

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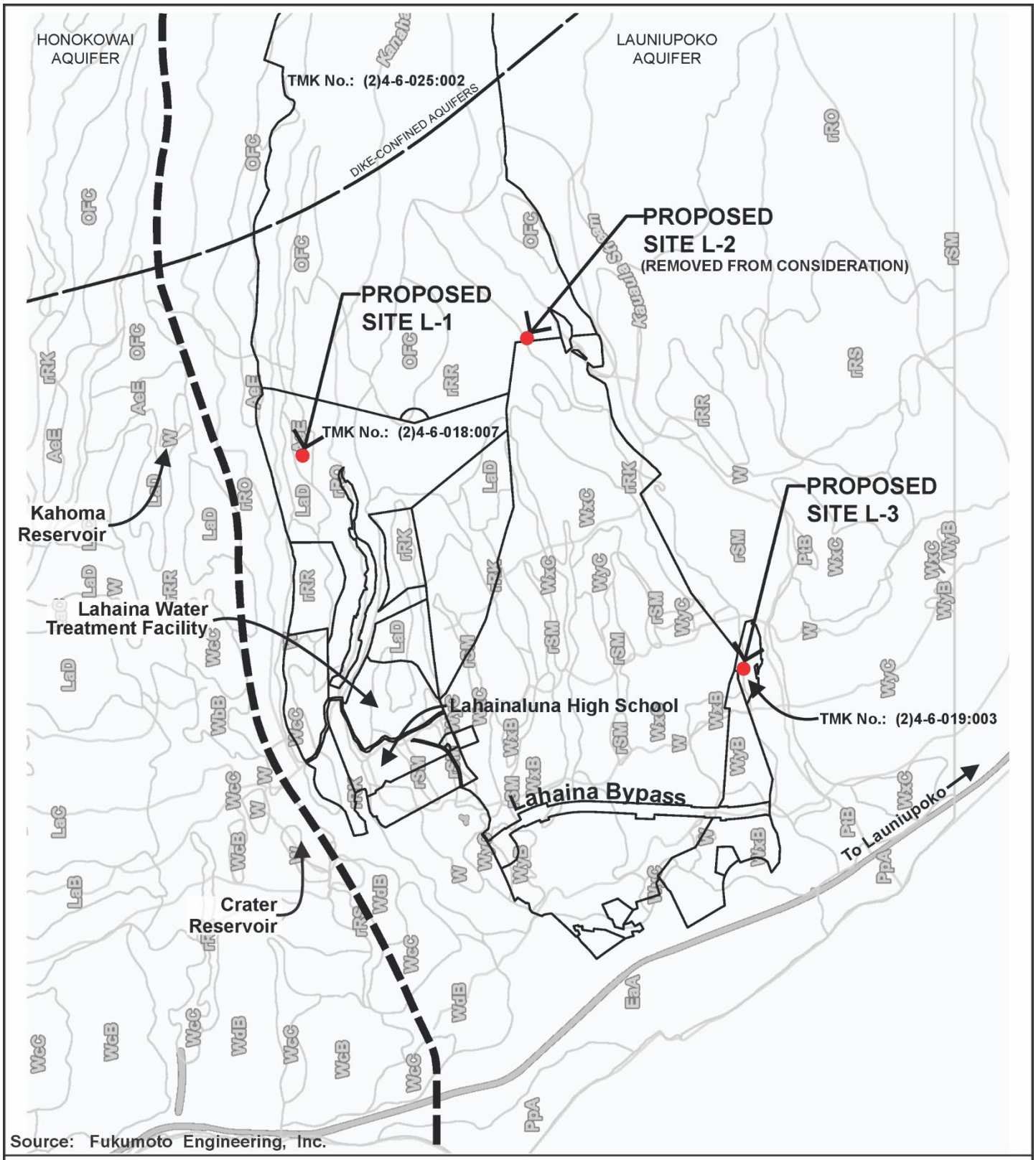


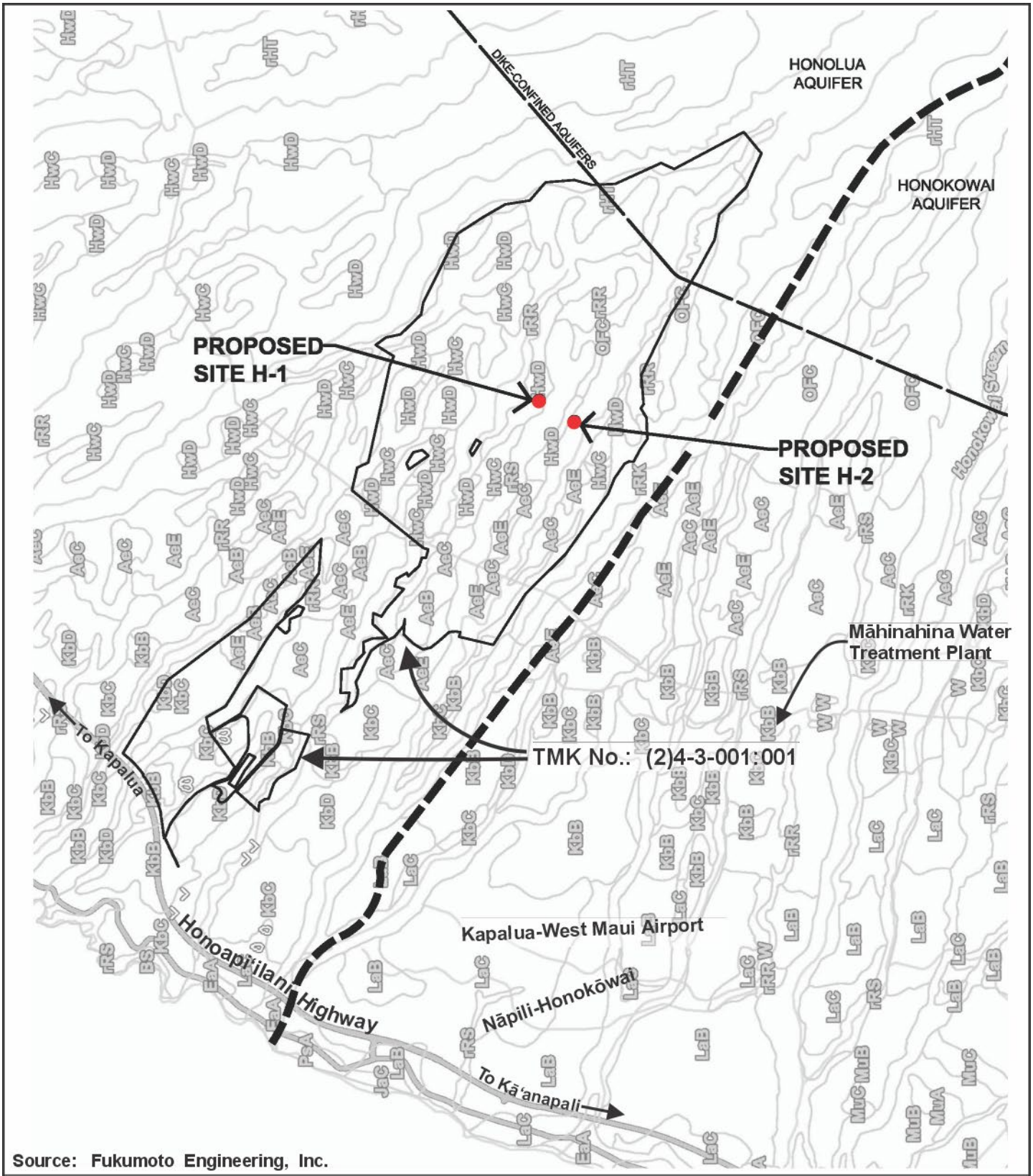
Figure 7 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Soil Classification Map

0 1500 Feet
750 3000

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 Soils



Source: Fukumoto Engineering, Inc.

Figure 8

Launiupoko Exploratory Wells
Sites H-1 and H-2
Soil Classification Map

1250
0 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 Soils

b. Potential Impacts and Mitigation Measures

The total disturbed area of the proposed improvements is estimated to be up to one (1) acre for each well at Well Sites L-3, H-1, and H-2, and two (2) acres for each well at Well Sites L-1 and L-2, in addition to access roads. As discussed above, Well Site L-2 has been removed from consideration, and Well Sites H-1 and H-2 are being assessed as potential alternate sites to Well Sites L-1 and L-3. To minimize soil erosion, the contractor will be required to submit a soil erosion control plan. A grubbing and grading permit and National Pollutant Discharge Elimination System (NPDES) Permit will also be obtained for the project, prior to construction. This plan and permit will contain recommendations for site preparation and handling during project construction which DWS will follow as appropriate.

BMPs to be included in the soil erosion control plan that will include, but not be limited to minimizing time of construction sequencing construction; to minimize exposure time of cleared surface area installing and maintaining temporary sediment basins; temporary diversion berms and swales to intercept runoff silt fences; dust fences and slope protection; and applying perennial vegetation for permanent soil stabilization as soon as practicable. The BMPs will be developed in compliance with Chapter 20.08 – Soil Erosion and Sedimentation Control of the Maui County Code.

While the terrain will be locally modified to implement the project, the proposed action is not anticipated to significantly adversely alter topographic characteristics in the vicinity of the project area.

5. Agriculture

a. Existing Conditions

The project area is in the vicinity of land that has been extensively used for agriculture. The area has been highly disturbed and altered due to repeated plowing and grading for pineapple and sugar cultivation. Pineapple and sugar cultivation in the region has ceased. It is noted that Well Site H-1 lies near the upper limits of an old pineapple field while Well Site H-2 lies about 900 feet upslope of an old pineapple field.

The State of Hawai‘i, Department of Agriculture has established three (3) categories of Agricultural Lands of Importance to the State of Hawai‘i (ALISH). The ALISH system classifies lands into “Prime”, “Unique”, and “Other Important Agricultural Land”. The remaining lands are “Unclassified”. Utilizing modern farming methods, “Prime” agricultural lands

have the soil quality, growing season, and moisture supply needed to produce sustained crop yields economically, while “Unique” agricultural lands possess a combination of soil quality, location, growing season, and moisture supply currently used to produce sustained high yields of a specific crop. “Other Important Agricultural Land” includes those which have not been rated as “Prime” or “Unique”. The majority of the project area is located on lands that have been defined as “Other” agricultural lands by the ALISH rating system, with the exception of Well Site L-2, which falls within lands that are “Unclassified” by the ALISH system. However, as discussed above, Well Site L-2 has been removed from consideration. See **Figure 9** and **Figure 10**.

In addition, the University of Hawai‘i, Land Study Bureau (LSB) classifies productivity characteristics on a scale of “A” through “E”, with lands designated as “A” reflecting the highest productivity and “E” representing lands with the lowest productivity. Well Site L-1 is designated as “D” while L-2 and L-3 are designated “E”. Well Sites H-1 and H-2 have been designated “C” by the LSB (Land Study Bureau, 1967). See **Figure 11** and **Figure 12**.

b. Potential Impacts and Mitigation Measures

As mentioned previously, pineapple and sugar cultivation in West Maui has ceased. The proposed exploratory wells will occupy approximately two (2) acres each for Well Site L-1 and Well Site L-2 and approximately one (1) acre each for Well Site L-3, Well Site H-1, and Well Site H-2 on lands that are not cultivated for agriculture. In addition, the sites are not highly productive agricultural lands, as none of the proposed Well Sites are rated higher than “C” by the LSB, and the preferred alternative involved Well Site L-1 and Well Site L-3 located on lands rated “D” and “E”, respectively. The total exploratory well sites encompass approximately six (6) acres in addition to access roads. The total project area is not significant in terms of the region’s vast agricultural areas. The land required for the project is less than one (1) percent of the approximately 3,728 acres that comprise the parcels that are affected by the proposed project. Development of the proposed project will not result in significant adverse impacts to agricultural endeavors in this region.

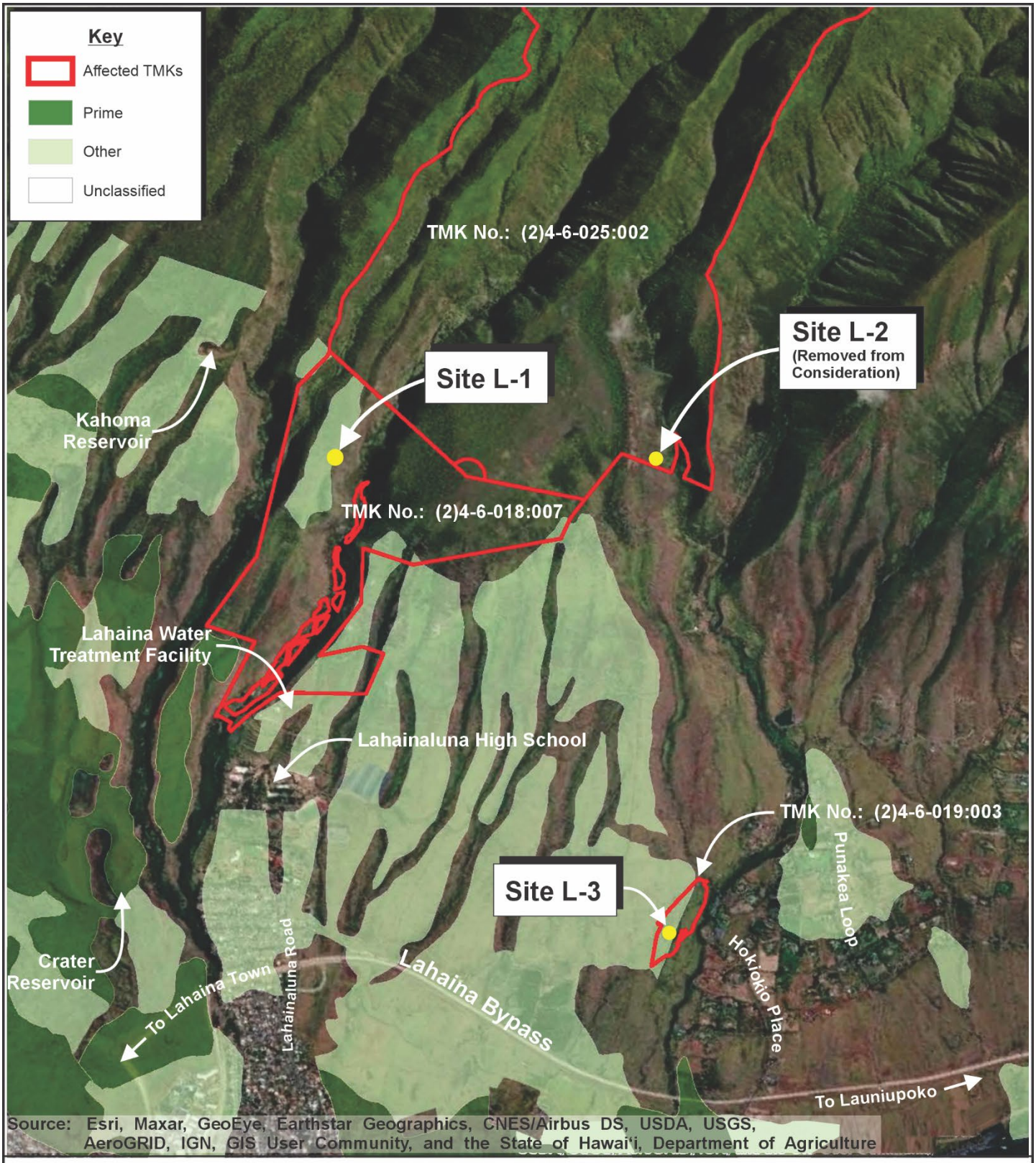


Figure 9

Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Agricultural Lands of Importance to the State of Hawai'i Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 ALISH



Figure 10

Launiupoko Exploratory Wells

Sites H-1 and H-2 Agricultural Lands of Importance to the State of Hawai'i Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 ALISH

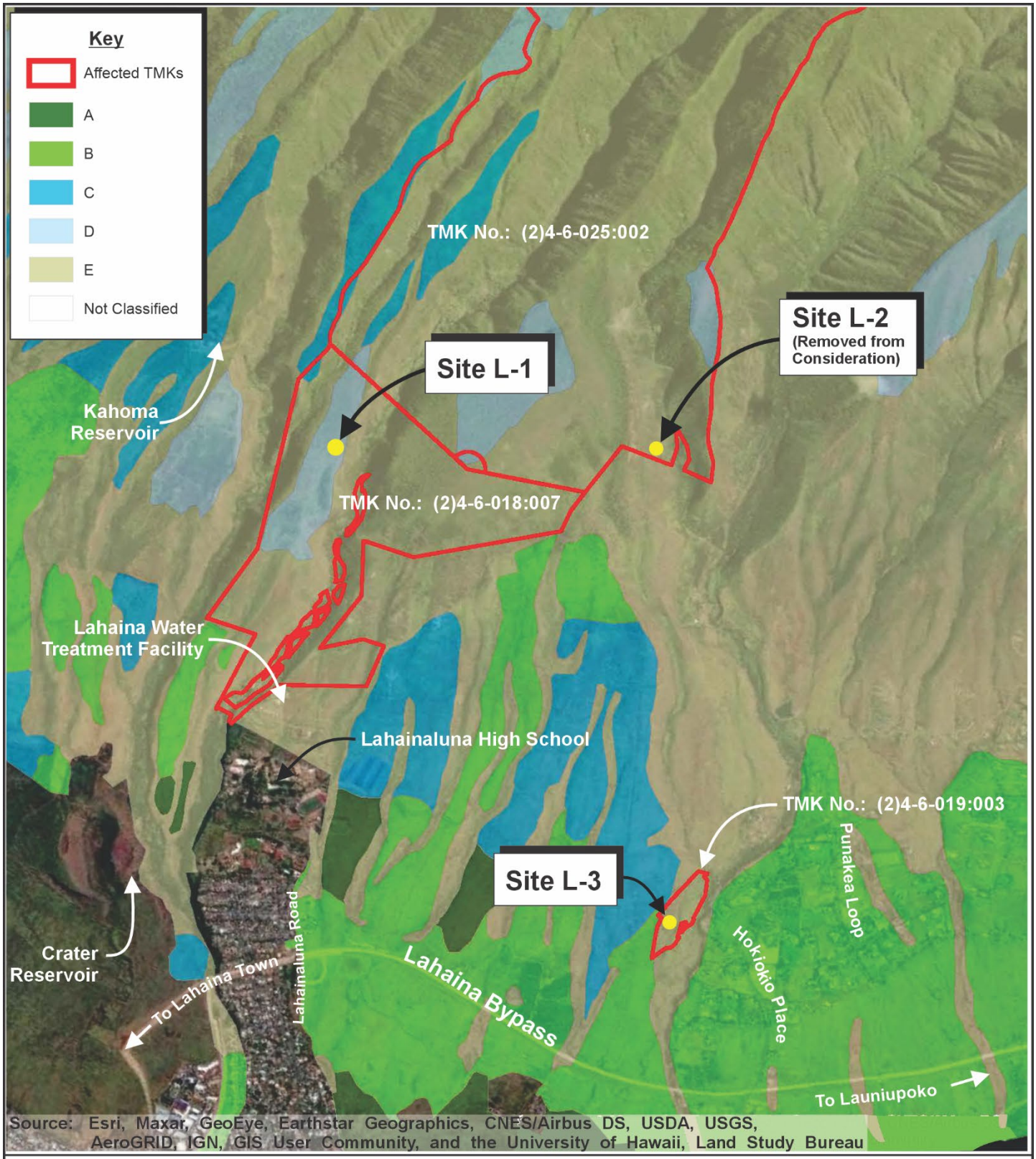


Figure 11 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Land Study Bureau Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 LSB

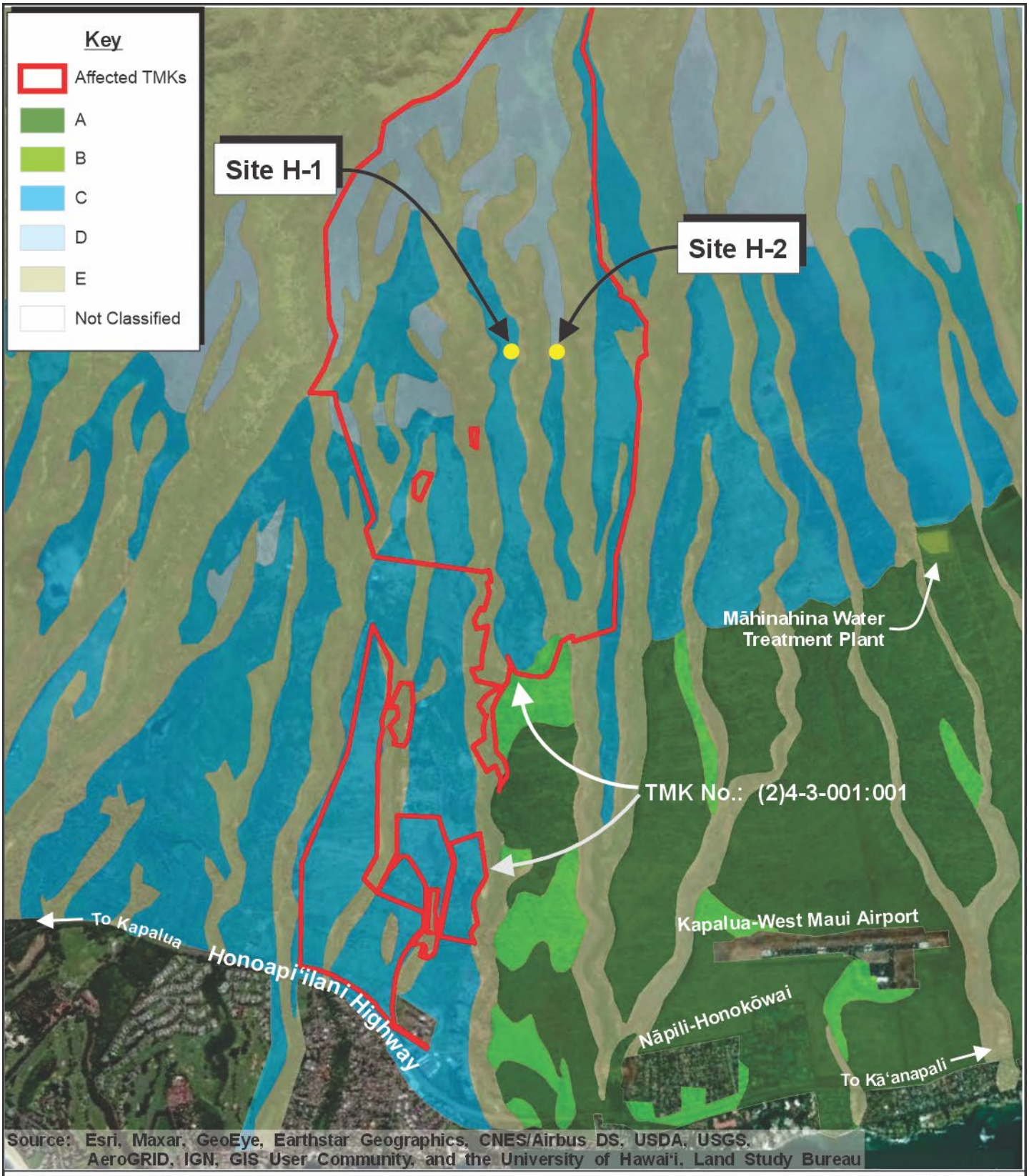


Figure 12

Launiupoko Exploratory Wells

Sites H-1 and H-2

Land Study Bureau Map

0 625 1250 2500 Feet

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 LSB

6. Flood and Tsunami Hazard

a. Existing Conditions

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for this area of the island designates the project area as being within Zone "X" and is not subject to the Flood Hazard District Ordinance, Chapter 19.62 of the Maui County Code. Zone "X" indicates an area of minimal flooding and has no restrictions placed on development (Federal Emergency Management Agency, 2023). Specifically, FEMA describes Flood Zone "X" as areas with minimal flood hazard. Flood insurance purchase is not required in these zones. See **Figure 13** and **Figure 14**.

The project sites are not identified in the Tsunami Flood Zone Evacuation Maps as being located within a tsunami evacuation area. See **Figure 15** and **Figure 16**.

b. Potential Impacts and Mitigation Measures

The proposed project is not located within a Special Flood Hazard Area and is not located within a tsunami evacuation area. No adverse impacts with regard to flood and tsunami hazard parameters are anticipated with the implementation of the project.

7. Wildfire Hazards

a. Existing Conditions

Organizations such as the State Department of Forestry and Wildlife (DOFAW), the Maui Fire Department, and the Hawai‘i Wildfire Management Organization (HWMO) have identified wildfires as an increasingly common hazard to communities and native ecosystems due to dry climatic conditions, non-native invasive species, increased commercial residential development, and more people living in close proximity to wildland areas. In Hawai‘i, wildfire has been correlated to drought conditions; wildfire history data show an increase in ignition and the areas burned during the warmer and drier months of summer (University of Hawai‘i at Mānoa, 2016). The State's Fire Management Program is part of the Watershed Protection and Management Section of DOFAW, which continues to be at the forefront of wildfire and all other risk-management training throughout the State.

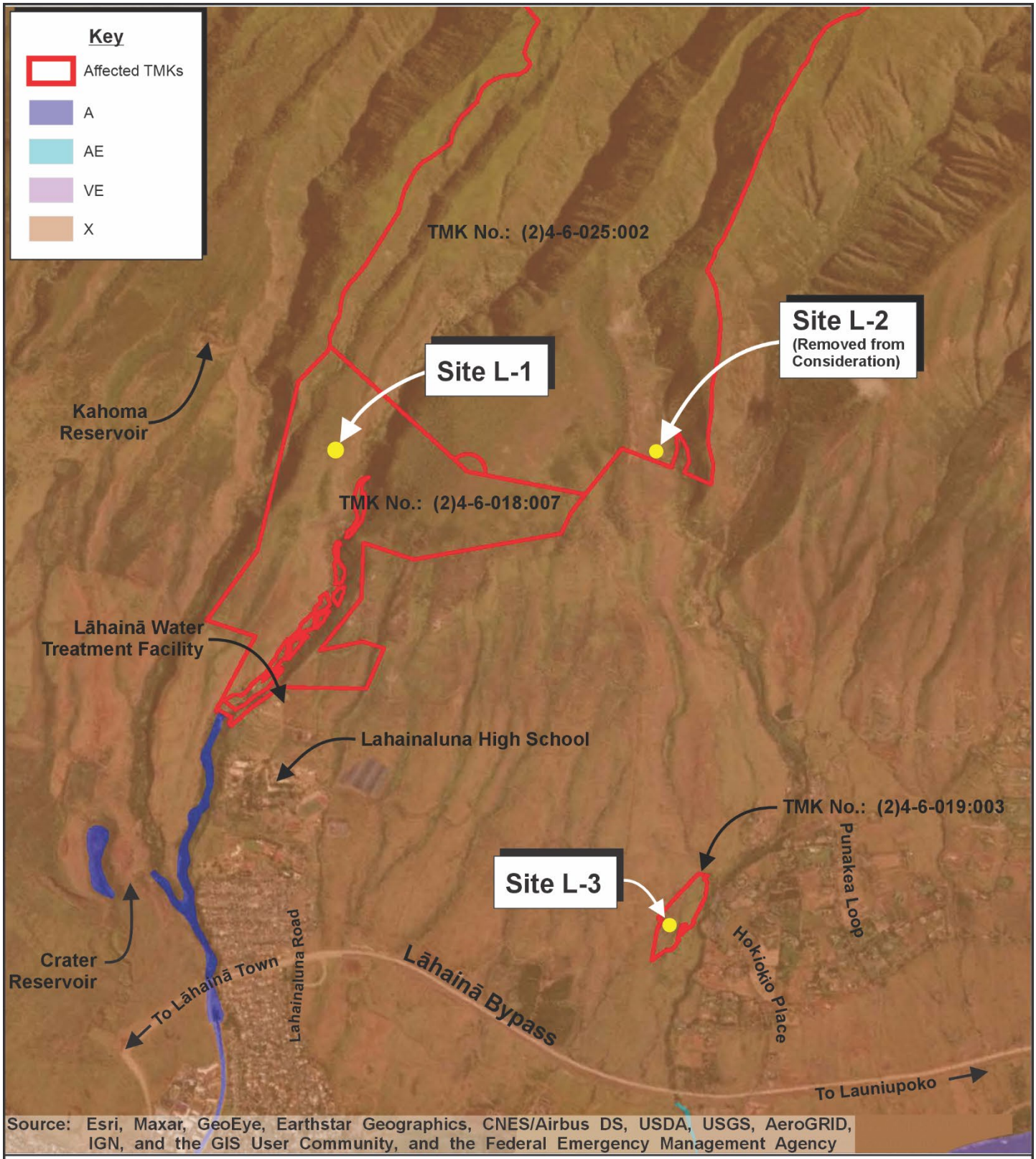


Figure 13 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Flood Insurance Rate Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 FHZ

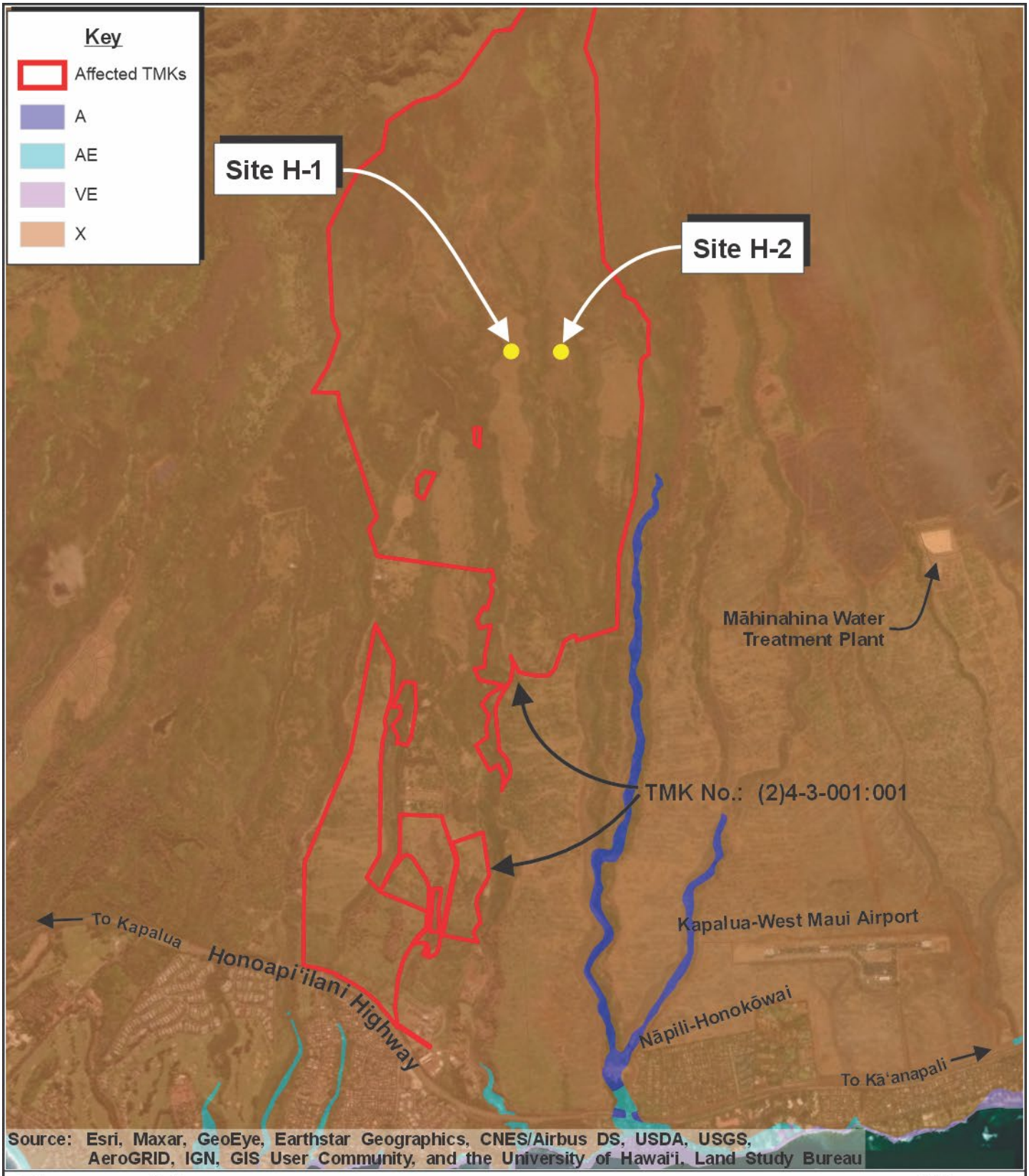


Figure 14

Launiupoko Exploratory Wells
Sites H-1 and H-2
Flood Insurance Rate Map

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 FHZ

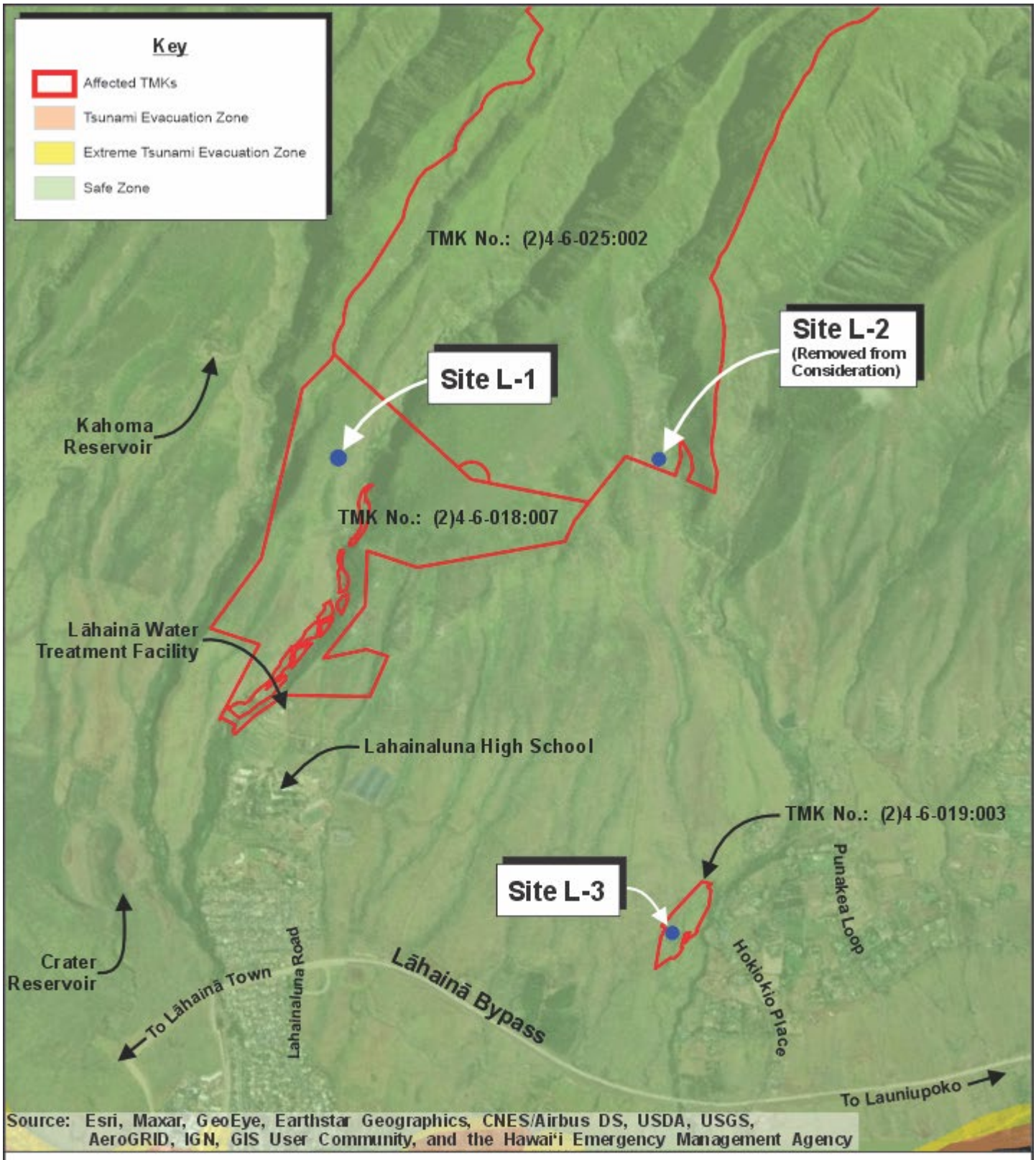


Figure 15

Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Tsunami Evacuation Zones Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 Tsunami

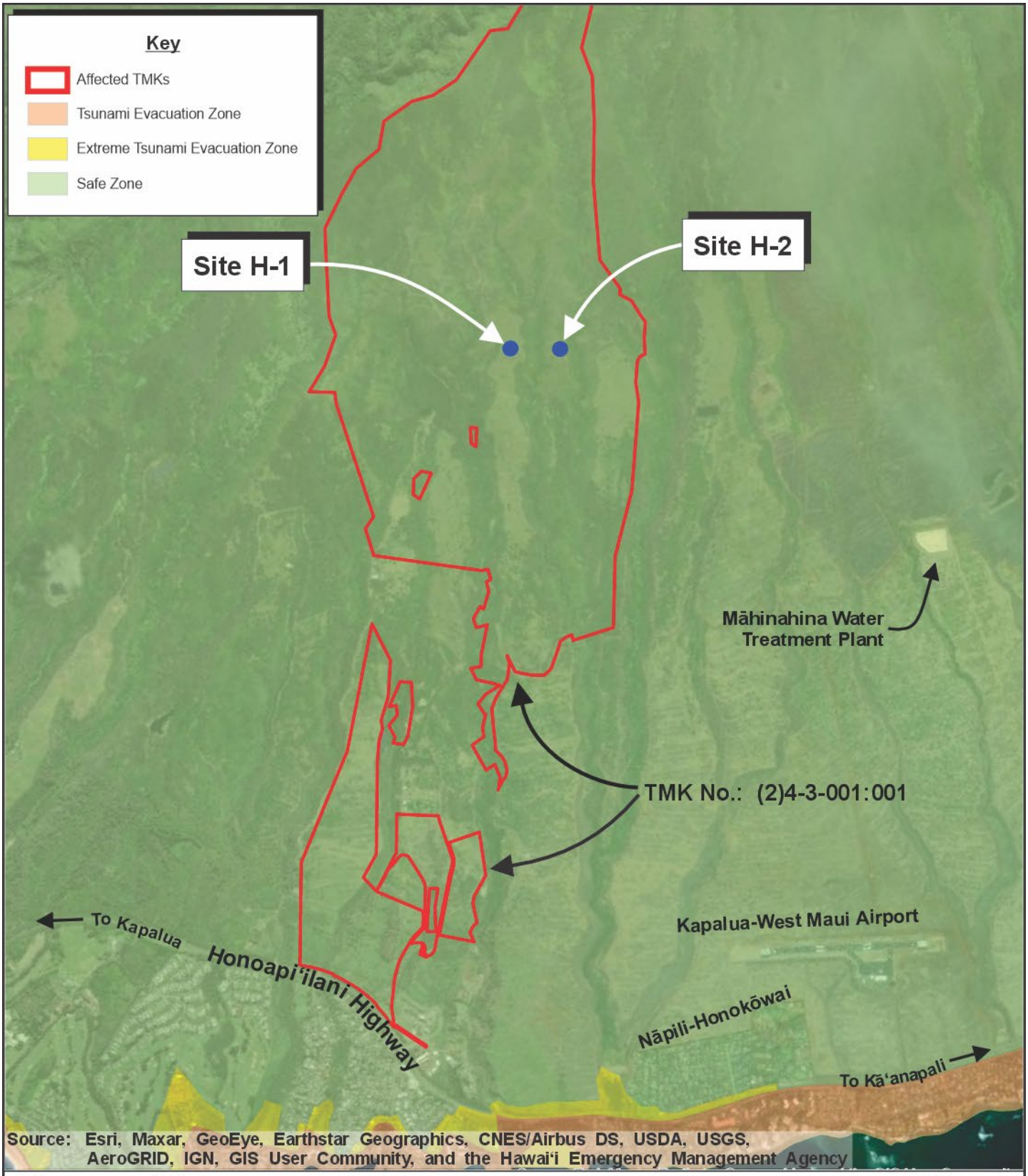


Figure 16

Launiupoko Exploratory Wells
Sites H-1 and H-2
Tsunami Evacuation Zones Map

1250
0 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE\Launiupoko Well Development\Apps\Figs\H1H2 Tsunami

DOFAW has worked in partnership with the HWMO to address wildfire hazards, mitigation, and response efforts. HWMO has worked on developing Community Wildfire Protection Plans (CWPP) across the State. The Western Maui CWPP, finalized in 2014, encompasses the entire western head of the island of Maui. This includes the West Maui Mountains and Mauna Kahālāwai watershed areas, spanning from Wailuku south to Māʻalaea, north and west through Lahaina and Honokōhau, and south and east through Waiheʻe and Waiehu. HWMO staff traveled to every road in the Western Maui CWPP Planning area to assess 35 wildfire hazard characteristics. These 35 maps were combined in each category to comprise five (5) overall risk hazards, which include the following.

- Subdivision Hazard – The overall rating for the subdivision is based on accessibility, density, proximity to wildland areas, and land use.
- Vegetation Hazard – The overall rating for vegetation based on the general amount of fuels and proximity of fuels to subdivisions and homes.
- Building Hazard – The overall rating for buildings based on building design, materials, and utilities placement.
- Fire Environment Hazard – Rates the fire environment by rainfall, wind, slope, topography, seasonal conditions and ignition risk.
- Fire Protection Hazard – Rating based on response time; community planning and ordinances; fire department preparedness; emergency response preparedness; proximity to fire stations; and water access.

While the project site itself is not mapped in the Western Maui CWPP, surrounding areas are designated to have a high overall risk based on the five (5) risk categories listed above.

In November 2022, a wildfire in West Maui destroyed much of the existing vegetation and wildlife at Well Site L-2, Well Site L-3, and the surrounding 2,000-acre area. None of the well sites burned in the August 2023 wildfire.

The USDA Missoula Fire Sciences Laboratory provides the Wildfire Hazard Potential map (WHP) for the United States, which depicts the relative potential for high-intensity wildfire. Within the WHP, areas are mapped in five classes: Very Low, Low, Moderate, High, and Very High. Higher risk classes in the WHP represent locations where wildfire fuels experience a higher probability of torching, crowning, and other forms of extreme fire under conducive weather conditions. The WHP classifies Well Site L-1 as High and Very High, Well Site L-2 as Very High, Well Site L-3 as Moderate

and High, Well Site H-1 as Very Low, and Well Site H-2 as High and Very High. See **Figure 17** and **Figure 18**.

b. Potential Impacts and Mitigation Measures

As an exploratory well project which aims to expand water resource availability, the proposed project does not represent a significant wildfire risk. In recognition of Lahaina's wildfire risk, hazard mitigation measures to reduce vegetative fuel for wildfires will be implemented. These measures include, but are not limited to vegetation control, removal of leaf litter, and creation of fire breaks.

8. Streams and Wetlands

a. Existing Conditions

The Kahoma, Kanahā, and Kauaʻula Streams are major streams that flow alongside Well Site L-1, Well Site L-2, and Well Site L-3. The Kahoma and Kanahā Streams are part of the DWS Hydrologic Unit of Kahoma (6008). The Kahoma Stream diversion is maintained by Kamehameha Schools for agricultural irrigation, and the Kanahā Stream diversion is maintained by the Maui DWS for municipal use. The Kauaʻula Stream is part of the Hydrologic Unit of Kauaʻula and is diverted by the West Maui Land Company for commercial agriculture uses. The Honokōhau Ditch flows north of Well Site H-1 and Well Site H-2, and Mailepai Stream flows south of these sites. The Honokōhau Stream and ditch system provides surface water to various private users as well as the DWS Māhinahina treatment plant which supplies drinking water to West Maui.

As previously mentioned, the CWRM has the responsibility of establishing instream flow standards on a stream-by-stream basis whenever necessary to protect the public's interest in the waters of the State. Interim instream flow standards (IIFS) were defined as the amount of water flowing in each stream (with consideration for the natural variability in stream flow and conditions) at the time the administrative rules governing them were adopted in 1988 and 1989. In 2018, CWRM amended the IIFS for the Kahoma Surface Water Hydrologic Unit, which includes Kahoma Stream and Kanahā Stream.

In addition, three (3) ditches, Paʻupaʻu Ditch, Piʻilani Ditch, and Lahainaluna Ditch, run in a west/east direction in the lower vicinity of the Launiupoko project sites. The Pulepule Gulch is located southeast of the Honolua sites and Kaʻōpala Gulch is northeast of the Honolua sites.

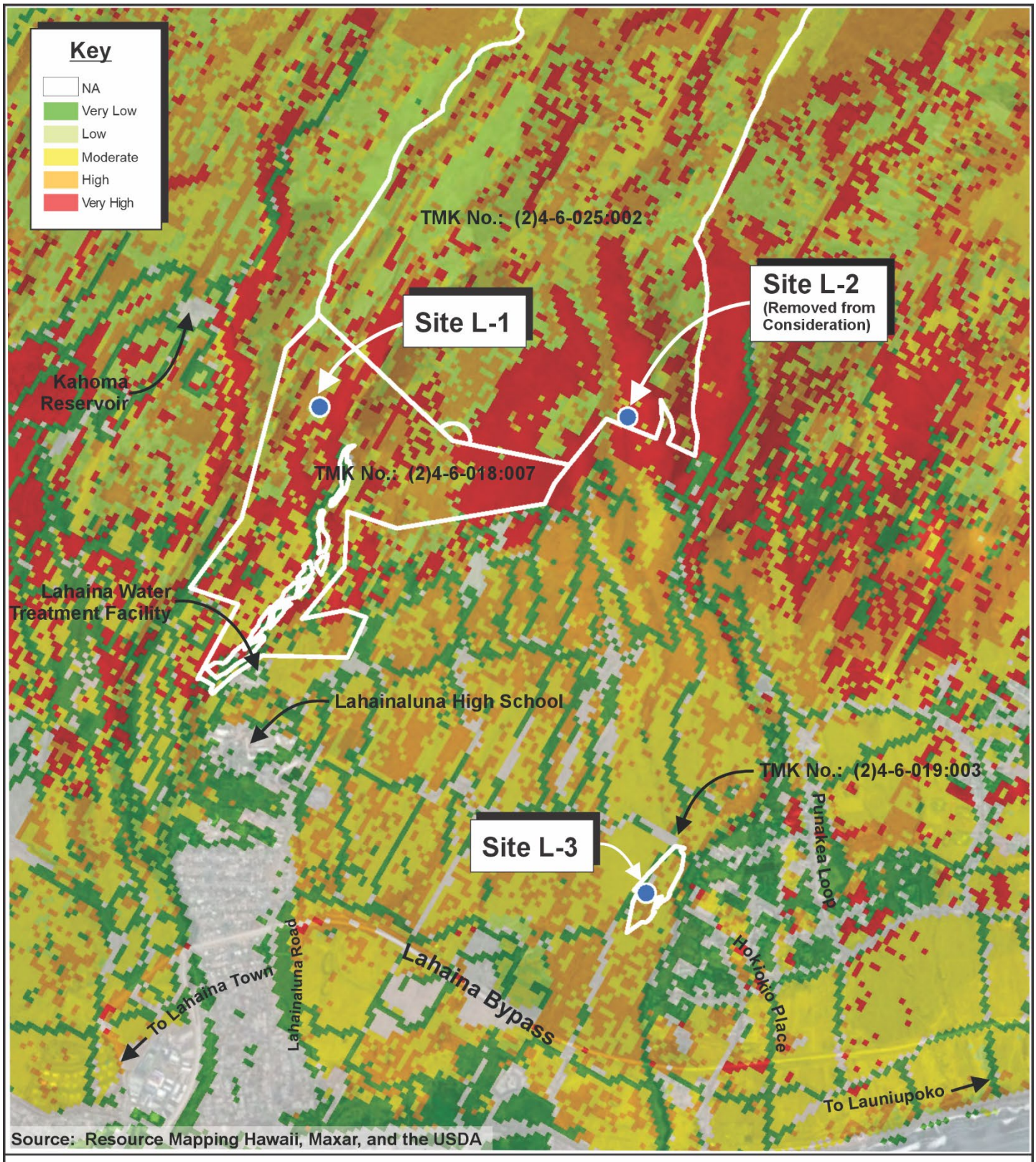


Figure 17 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Wildfire Hazard Potential Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 Wildfire

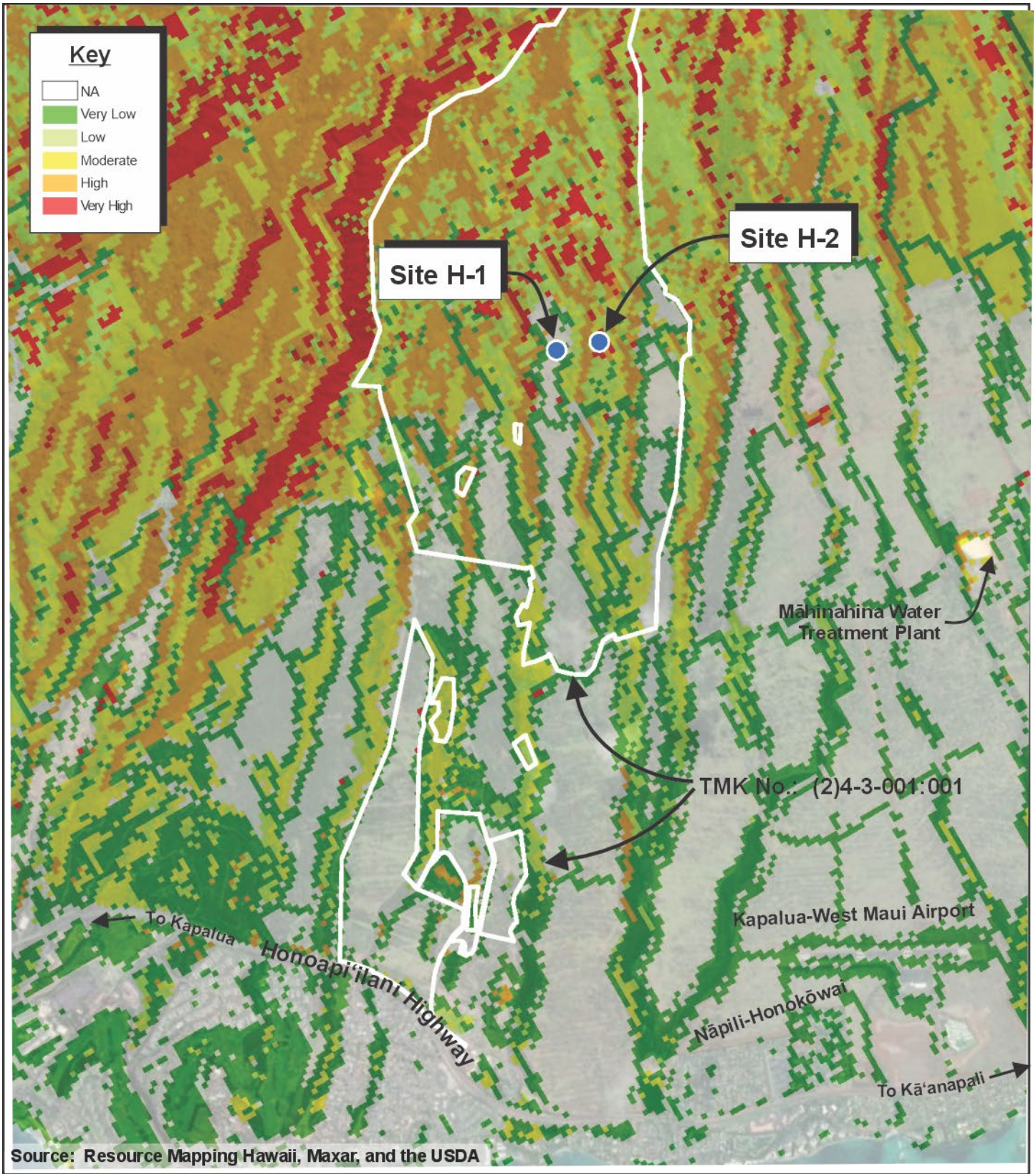


Figure 18

Launiupoko Exploratory Wells

Sites H-1 and H-2

Wildfire Hazard Potential Map

0 1250 Feet

625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 Wildfire

No wetland is located within or in the vicinity of the project sites. See **Figure 19**, **Figure 20**, and **Appendix "C"**.

b. Potential Impacts and Mitigation Measures

As will be discussed later in this EA, the Ka Paʻakai Analysis identified concerns among cultural practitioners and community members that groundwater withdrawals could affect the streamflow of the Kauaʻula Stream, which in turn could impact culturally significant natural resources and cultural practices reliant on the stream. Refer to **Appendix "F-1"**. The PDR notes that the proposed project sites have been evaluated and selected to avoid impacts to the surrounding streams and water sources. The high-level groundwater below the project sites does not feed into the surrounding streams or gulches. In addition, USGS seepage runs have indicated that the Kahoma Stream, Kahana Stream, and Kauaʻula Stream have lost reaches above the stream and ditch intakes, and, therefore, pumping at these high elevations will not impact existing stream flows. Refer to **Appendix "A"**.

During construction activities, stormwater runoff from the sites will be contained and prevented from entering the adjoining ditches and gulches. Measures to mitigate contamination of the water source from stormwater runoff drainage include preventing offsite runoff from entering the production well sites and collecting onsite runoff and conveying it to a drainage basin for disposal.

Furthermore, should the exploratory wells be successful, DWS plans to propose the conversion of the exploratory wells to permanent production wells, which would provide a water source to restore stream flow to Kanahā Stream. As such, significant adverse impacts to the Honokōhau Ditch, nearby gulches, and wetlands are not anticipated with the implementation of the project.

9. Flora and Fauna

a. Existing Conditions

In order to determine the presence or likelihood of plant and animal species within the project sites, a walk-through biological resources survey was conducted for each site by Robert W. Hobdy, Environmental Consultant for Well Sites L-1, L-3, H-1, and H-2 in April 2022, and for Well Site L-2 in December 2022. In addition to documenting the observed plant and animal species, the objectives of the survey were to document the status and abundance of each species; determine the presence or likely occurrence

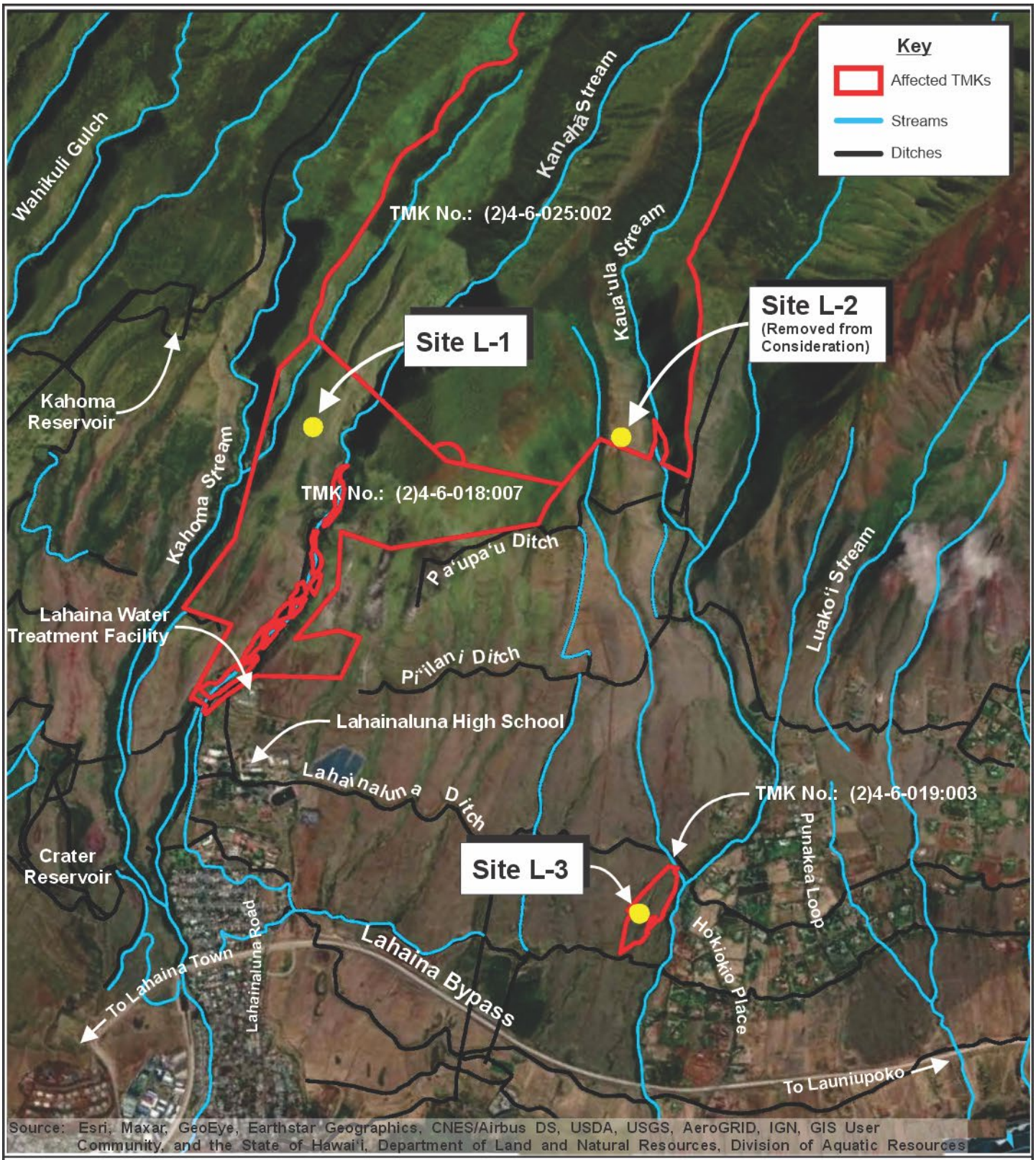


Figure 19 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Streams Map

0 625 1250 2500 Feet

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 Streams

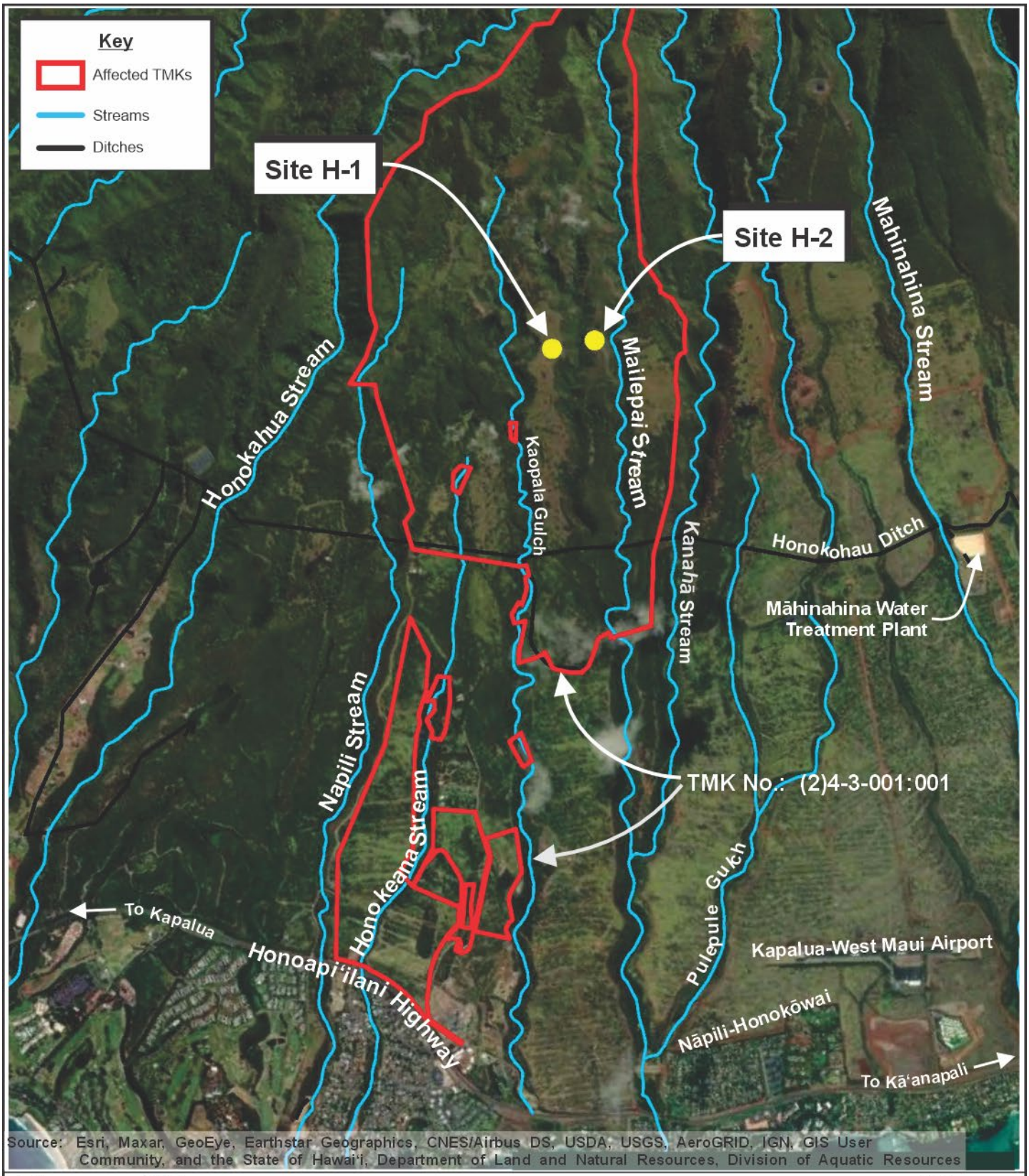


Figure 20

Launiupoko Exploratory Wells

Sites H-1 and H-2
Streams Map

1250
0 Feet
625 2500

MUNEKIYO HIRAGA

Prepared for: County of Maui, Department of Water Supply

FE/Launiupoko Well Development/Applications/Figs/H1H2 Streams

of any native flora and fauna; particularly any that are Federally listed as Threatened or Endangered; and to 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. Surveys for Well Sites L-1, L-3, H-1, and H-2 were conducted in April 2022 and the survey for Well Site L-2 was conducted in December 2022. See **Appendix "C"**. Findings of the biological resources survey are summarized below.

Well Site L-1

There were a total of 34 flora species observed at Well Site L-1, which was dominated by non-native species. One (1) species, Guinea grass (*Megathyrsus maximus*), was abundant, creating a deep grassland. Three (3) other species of common occurrence include the silk oak (*Grevillea robusta*), koa haole (*Leucaena leucocephala*), and ʻaʻaliʻi (*Dodonaea viscosa*). Eight (8) species were uncommon, and 22 species were rare. Eleven (11) native plant species were identified in the project area, including five (5) that are endemic to Hawaiʻi: kīlau (*Pteridium aquilinum subsp. decompositum*), Hawaiian moon flower (*Ipomoea tuboides*), ʻenaʻena (*Pseudognaphalium sandwicensium*), ʻiliahaloʻe (*Santalum elipticum*) and ʻakia (*Wikstroemia oahuensis*). The remaining six (6) species are indigenous to Hawaiʻi as well as to other Pacific Islands: manienieʻula (*Chrysopogon aciculatus*), ʻilima (*Sida fallax*), ʻuhaloa (*Waltheria indica*), ʻūlei (*Osteomeles anthyllidifolia*), pūkiawe (*Leptecophylla tameiameiae*) and ʻaʻaliʻi. These 11 native plant species are all hardy, lowland species that are widespread throughout Hawaiʻi and not of conservation concern. Due to the lack of threatened or endangered fauna species and special habitats, the biological resources survey report does not anticipate impacts to rare or threatened flora species.

In terms of fauna, there were zero mammal species, seven (7) bird species, and six (6) insect species observed. Use of binoculars and listening to fauna vocalizations assisted in identification of fauna species. No mammals or signs of their presence, such as trails, tracks, or scat were found. However, non-native mammals that may occur around Well Site L-1 include feral pigs (*Sus scrofa*), mongoose (*Herpestes auropunctatus*), rats (*Rattus spp*.), mice (*Mus domesticus*), feral cats (*Felis catus*), and axis deer (*Axis axis*). The presence of birds in the area was sparse. One (1) species, the zebra dove (*Geopelia striata*), was uncommon. The other six (6) bird species were of rare occurrence; the cattle egret (*Bubulcus ibis*), the northern cardinal (*Cardinalis cardinalis*), the spotted dove (*Streptopelia chinensis*), the Japanese white-eye (*Zosterops japonicus*), the common myna (*Acridotheres tristis*), and the indigenous koaʻe kea or white-tailed

tropicbird adjacent Kahoma canyon. It is noted that Well Site L-1 is not a suitable habitat for koa‘e kea as they tend to nest on inaccessible ledges and cliffs.

The presence of insects was also sparse, with the exception of the honeybee (*Apis mellifera*), which were observed taking pollen from male ‘a‘ali‘i flowers. Another uncommon species was the indigenous native globe skimmer dragonfly (*Pantala flavescens*). Four (4) other insect species were rare: the big-headed ant (*Pheidole megacephala*), the long-tailed blue butterfly (*Lampides boeticus*), the monarch butterfly (*Danaus plexippus*), and the narrow-winged mantis (*Tenodera angustipennis*).

Well Site L-2

In November 2022, a wildfire in West Maui destroyed much of the existing vegetation and wildlife at Well Site L-2 and the surrounding 2,000-acre area. As the survey for Well Site L-2 occurred in December 2022, plant species that escaped incineration were identified along with recognizable charred remains, and plants beginning to sprout from roots or stumps. The plant inventory, however, was significantly reduced from what it would have been prior to the fire. A total of nine (9) plant species were recorded during the survey. Two (2) species, Guinea grass (*Megathyrsus maximus*) and a‘ali‘i (*Dodonaea viscosa*), were common. Two (2) other species, the forest red gum (*Eucalyptus tereticornis*) and silk oak (*Grevillea robusta*), were uncommon, and five (5) other species were rare. Four (4) of the observed flora species were native Hawaiian plants: the a‘ali‘i, ‘iliahi alo‘e (*Santalum ellipticum*), ‘ūlei (*Osteomeles anthyllidifolia*), and ‘uhaloa (*Waltheria indica*). None of the documented flora species are endangered, threatened, or of any heightened environmental concern. It is noted that none of the well sites were burned in the 2023 Maui wildfires.

Similar to the flora survey, observed fauna species were sparse due to the 2022 wildfire. No mammals were seen. A total of two (2) birds and two (2) insects were detected during the pedestrian survey. A non-native zebra dove (*Geopelia striata*) and a gray francolin (*Francolinus pondicerianus*) were heard calling. In terms of insects, the indigenous native globe skimmer dragonfly (*Pantala flavescens*) was observed but was of uncommon occurrence. The other species, the big-headed ant (*Pheidole megacephala*), was rare. None of the fauna species observed are classified as rare or threatened, and the native globe skimmer dragonfly is widespread in Hawai‘i and elsewhere throughout the world.

Well Site L-3

Similar to Well Site L-2, Well Site L-3 and the surrounding 2,000 acres were decimated by a wildfire in 2018. It is noted that none of the well sites were burned in the 2023 Maui wildfires. A total of 19 fauna species were observed at Well Site L-2 and consisted primarily of non-native species. Buffelgrass (*Cenchrus ciliaris*) was the most abundant throughout the area. Common species included koa haole (*Leucaena leucocephala*) and koali kuahulu (*Merremia aegyptia*). Three (3) indigenous native species were found, including koali kuahulu, ʻuhaloa (*Waltheria indica*), and ʻilima (*Sida fallax*). The remaining 16 species were non-native grasses and shrubs. None of the native plants found in the project are of any heightened environmental concern, and no endangered or threatened plant species are known to occur on or around the project area.

Similar to the other Launiupoko project sites, no mammals were observed during the fauna survey at Well Site L-3. An evening survey was conducted with the use of a bat detector (Batbox III) set to the frequency of 27,000 Hertz, which is the frequency that these bats are known to emit when echo-locating for nocturnal flying insects upon which they prey. No bats were detected with the use of this device. Only one (1) bird species, the non-native zebra dove (*Geopelia striata*), was seen and heard calling at Well Site L-3. Seven (7) non-native insect species were observed. The beet webworm moth (*Spoladea recurvalis*), sleepy orange butterfly (*Eurema niccipe*), and large sulphur butterfly (*Phoebis agarithe*) were of uncommon occurrence, and four (4) other species were of rare occurrence. No native insects were observed.

Well Site H-1

Well Site H-1 is located on former pineapple fields that are now fallow and overgrown with dense grassland and scattered shrubs and small trees. Vegetation at this site is dominated by molasses grass (*Melinis minutiflora*). Four (4) species were uncommon: gold-backed fern (*Pityrogramma austroamericana*), broomsedge (*Andropogon virginicus*), Formosa koa (*Acacia confusa*), and a number of remnant pineapple plants (*Ananas comosus*). Twenty-one species were of rare occurrence, mostly growing along an old field road. A total of three (3) indigenous native plant species were found in small numbers: niʻaniʻau (*Nephrolepis exaltata*), mauʻu laiki (*Paspalum scrobiculatum*), and ʻaʻaliʻi (*Dodonaea viscosa*). These three (3) native species are common in Hawaiʻi and elsewhere in the world and are not of conservation concern. No rare, threatened, or endangered plant species or their habitats were discovered.

There was little animal life observed at Well Site H-1. The presence of one (1) non-native mammal, the mongoose (*Herpestes auropunctatus*), was determined through droppings. Other non-native mammals that may occur in the area include feral pigs (*Sus scrofa*), axis deer (*Axis axis*), feral cats (*Felis catus*), rats (*Rattus spp*.), and mice (*Mus domesticus*). Birdlife was also sparse, with only four (4) non-native species that were of rare occurrence and of no conservation concern. This includes the Japanese bush warbler (*Cettia diphone*), zebra dove (*Geopelia striata*), house finch (*Haemorhous mexicanus*), and the myna bird (*Acridotheres tristis*). Similarly, there were four (4) non-native insects observed that were all of no conservation concern. Insects observed include the big-headed ant (*Pheidole megacephala*), long-tailed blue butterfly (*Lampides boeticus*), monarch butterfly (*Danaus plexippus*), and short-horned grasshopper (*Oedaleus abruptus*). No native animal species or their habitats were discovered during the survey.

Well Site H-2

Well Site H-2 was not formerly used for agricultural production and was, therefore, relatively undisturbed. A total of 42 plant species were recorded during the survey. One (1) native species, the ʻaʻaliʻi (*Dodonea viscosa*), a native shrub or small tree, was abundant throughout the project area. Two (2) grass species, broomsedge (*Andropogon virginicus*) and molasses grass (*Melinis minutiflora*), were common. Fifteen species were uncommon, and 24 species were of rare occurrence. A total of 13 native species were recorded. Three (3) of these species are endemic to Hawaiʻi, meaning they do not naturally occur elsewhere in the world. The endemic, native species observed include kīlau (*Pteridium equilinum subsp. decompositum*), ʻākia (*Wikstroemia oahuensis*), and ʻōhiʻa (*Metrosideros polymorpha var. glaberrima*). Ten of the 13 native species are indigenous, meaning they are native to the Hawaiian Islands and other geographic places, as well. The native, indigenous species recorded at Well Site H-2 include palaʻā (*Odontosoria chinensis*) niʻaniʻau (*Nephrolepis exaltata*), uluhe (*Dicranopteris linearis*), ʻuki (*Machaerina mariscoides subsp. meyenii*), mauʻu laiki (*Paspalum scrobiculatum*), ʻuʻulei (*Osteomeles anthyllidifolia*), alaheʻe (*Psydrax odorata*), pōpolo (*Solanum americanum*), and ʻaʻaliʻi (*Dodonaea viscosa*). The 13 native species are all widespread on all the major islands, and none of them are rare. No endangered or threatened plant species or their habitats were discovered.

In terms of fauna recorded at Well Site H-2, droppings of the small Indian mongoose (*Herpestes auropunctatus*) were discovered, indicating their presence. Non-native mammals not observed, but that may be seen at this

site include feral pigs (*Sus scrofa*), axis deer (*Axis axis*), rats (*Rattus spp.*), mice (*Mus domesticus*), and feral cats (*Felis catus*). Birdlife was quite sparse. Five (5) non-native species were recorded during the survey. The zebra dove (*Geopelia striata*) and common myna (*Acridotheres tristis*) were of uncommon occurrence, and Japanese bush warbler (*Cettia diphone*), hwamei (*Leucodioptron canorum*), and house finch (*Haemorhous mexicanus*) were of rare occurrence. No native birds were seen. A total of five (5) insect species were observed. Two (2) non-native species, the big-headed ant (*Pheidole megacephala*) and the monarch butterfly (*Danaus plexippus*), were uncommon. Of rare occurrence were the long-tailed blue butterfly (*Lampides boeticus*), short-horned grasshopper (*Oedaleus abruptus*), and globe skimmer dragonfly (*Pantala flavescens*). The globe skimmer dragonfly was the only native fauna species observed and is commonly occurring in Hawai‘i and elsewhere in the world.

Critical Habitat

The State of Hawai‘i DLNR-DOFAW was consulted for the project, and they noted that the proposed Well Site L-1 and Well Site L-2 fall within the Maui Lowland Dry Unit 05, which is a critical habitat classified by the U.S. Fish and Wildlife Service (USFWS). See **Figure 21**. In March 2016, the USFWS designated critical habitat for 125 species within Maui Nui, which include the islands of Maui, Lāna‘i, Moloka‘i and Kaho‘olawe. The proposed Well Site L-1 and Well Site L-2 appears to be located within the Lowland Dry Unit 05 critical habitat area, which consists of 3,615 acres of State land, and 43 acres of privately owned land, from Pana‘ewa to Manawainui on the western and southern slopes of West Maui. This unit includes the mixed herb land and shrubland, the moisture regime, canopy, subcanopy, and understory native plant species identified as physical or biological features in the lowland dry ecosystem. The Maui Lowland Dry Unit 05 is known to harbor the following endangered and/or rare plant species: *Asplenium diellaciniatum* (cutleaf island spleenwort), *Bidens campylotheca ssp. pentamera* (ko‘oko‘olau), *Cenchrus agrimonioides* (kamanomano), *Ctenitis squamigera* (pauoa), *Cyanea obtusa* (haha), *Gouania hillebrandii* (hairyfruit chewstick), *Hesperomannia arbuscula* (Maui island aster), *Hibiscus brackenridgei* (ma‘o hau hele or yellow hibiscus), *Kadua coriacea* (kio‘ele), *Lysimachia lydgatei* (woodland ma‘oloa), *Remya mauiensis* (Maui remya), *Santalum haleakalae var. lanaiense* (‘iliahi or Lāna‘i sandalwood), *Schiedea salicaria* (royal schiedea), *Spermolepis hawaiiensis* (Hawai‘i scaleseed), *Tetramolopium capillare* (pamakani), and *Tetramolopium remyi* (pamakani variartion). The USFWS defines critical habitat as the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are

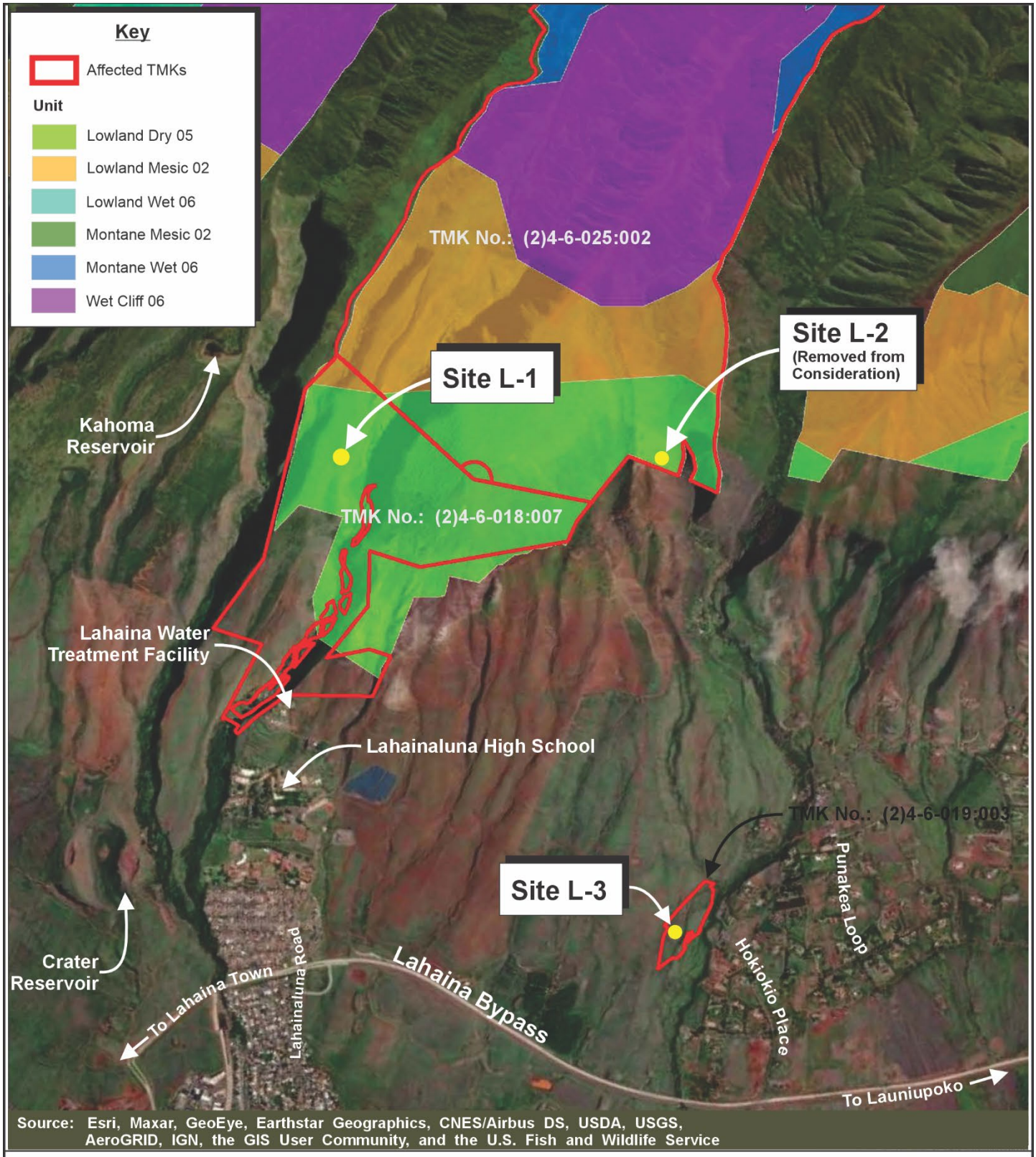


Figure 21 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Critical Habitat Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figures/L1L2L3CritHab

essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing, but are essential to its conservation. None of the 2022 surveys prepared by Robert W. Hobdy surveys identified any of the endangered and/or rare plant species listed in the USFWS Lowland Dry Unit 05 critical habitat area.

b. Potential Impacts and Mitigation Measures

The survey reports concluded that of the native and non-native plants and animal species observed in the proposed project area, none are federally endangered or threatened species, and none carry special protections or concerns.

The project will include implementing mitigation measures to avoid and minimize adverse impacts on threatened and endangered species as recommended by the biological resources survey report. See **Table 5**.

Table 5. Mitigation Measures for Threatened and Endangered Species

Endangered or Threatened Species	Mitigation Measures
Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*)	The construction plans for the project will include notes that woody plants greater than 15 feet tall will not be removed or trimmed during the Hawaiian hoary bat breeding season (June 1 to September 15). While barbed wire is needed to secure the area to protect public health and safety, use will be limited to the extent practicable.
Hawaiian Stilt (*Himantopus mexicanus knudseni*)	Applicable BMPs will be incorporated regarding work in aquatic environments into the project design. If a nest or active brood is found, a 100-foot buffer will be established and maintained around all active nests until chicks/ducklings have fledged and the USFWS will be contacted for further guidance.
Hawaiian goose (*Branta sandvicensis*)	If a Hawaiian goose appears within 100 feet of ongoing construction work, all activity will be temporarily suspended until the bird moves off to a safe distance of its own volition. Moreover, if any number of Hawaiian geese are observed loafing or foraging within the area of the proposed project during the Hawaiian goose breeding season (October through April), a biologist familiar with the nesting behavior of the Hawaiian goose will survey in and around the proposed construction footprint prior to the resumption of any work, or after any subsequent delay of work of three (3) or more days (during which the birds may attempt to nest). If a nest is discovered within a radius of 150 feet of proposed construction work, or a previously undiscovered nest is found within said radius after

Endangered or Threatened Species	Mitigation Measures
	work begins, all work will cease immediately and the USFWS will be contacted for further guidance.
Seabirds (Hawaiian petrel) (*Pterodroma sandwichensis*) and Threatened Newell's shearwater (*Puffinus auricularis newelli*))	Should any night work occur that requires artificial illumination for the project, such work will be avoided during the seabird fledging seasons (approximately September 1 through December 15). Outdoor lights will be shielded and directed downwards to avoid upward directed accent lighting in order to minimize impacts to seabirds.
Source: Robert W. Hobdy, 2022	

The USFWS notes that critical habitat designations do not affect activities by private landowners or non-federal agencies if there is no federal nexus, such as federal funding or permits. Critical habitat does not prevent all development or other activities that occur in a designated area. However, it signifies a habitat which may be important to a species conservation and recovery and raises awareness of the habitat needs of endangered species.

As discussed above, Well Site L-2 is located within the Pana'ewa section of the West Maui Forest Reserve. Per Chapter 13-209-4 (6) of the HAR, drilling of an exploratory well is not permitted within the Forest Reserve. As such, Well Site L-2 has been removed from consideration as a potential well site.

Although not observed during the biological resources survey, if listed flora or fauna species are encountered, construction will stop and the DOFAW will be contacted for guidance. With implementation of the aforementioned mitigation measures, the proposed project is not expected to result in any adverse impacts to the flora and fauna resources in the region.

10. Air Quality and Noise

a. Existing Conditions

The project area in general does not experience adverse air quality conditions. Airborne pollutants that do exist can largely be attributed to aircraft arriving and departing from the Kapalua West Maui Airport and automobile exhaust from Honoapi'ilani Highway, which is about two (2) to three (3) miles makai of the project sites. These sources, however, are intermittent, and prevailing winds quickly disperse the particulates generated by these temporary sources. The cessation of large-scale agriculture on the surrounding agricultural lands mauka of Honoapi'ilani

Highway and the slopes of the West Maui Mountains may contribute to temporary adverse air quality conditions from airborne dust due to wind and erosion.

In response to air quality impacts from the August 2023 wildfires, the U.S. Environmental Protection Agency and State of Hawai‘i Department of Health has established 51 real-time air quality monitors in Lahaina to measure air quality and chemical hazards. These real-time monitors measure PM 2.5, particulate matter that is 0.0025 millimeters and smaller in size (about 30 times smaller than the diameter of a human hair) that can be a component of ash, dust, smoke, and air pollution. Air quality in the region was determined to be “good” (U.S. Environmental Protection Agency, 2025). The EPA and U.S. Army Corps of Engineers (USACE) are assisting with the removal of ash and fire-damaged material removal.

In general, noise is attributable to traffic on Honoapi‘ilani Highway and local roadways and flight activities at the Kapalua Airport.

b. <u>Potential Impacts and Mitigation Measures</u>

In the short term, construction related activities will be the primary source of airborne pollutants and ambient noise. Noise from construction equipment and other vehicles involved in construction activities may temporarily affect noise levels within the immediate vicinity. Proper maintenance of construction equipment and vehicles and use of equipment mufflers or other noise attenuating equipment may also be utilized to reduce noise levels. An application for a Community Noise Permit for construction activities will be submitted to the DOH for review and approval, as applicable. Upon completion, the proposed project is not expected to be a source of long-term adverse noise conditions.

Dust generated during construction, especially from earth-moving operations, such as excavating, trenching, and filling, may generate fugitive dust and result in a temporary decrease in ambient air quality. A program of BMPs will be implemented during construction to mitigate potential for dust-related impacts, including but not limited to, utilizing dust barriers, water wagons and/or sprinklers to control dust, and watering graded areas upon the completion of daily construction activities. On a long-term basis, the proposed project is not anticipated to generate adverse air quality impacts.

11. Greenhouse Gas Emissions

a. Existing Conditions

Greenhouse gases (GHG) (carbon dioxide, methane, nitrous oxide, and fluorinated gases) trap heat in the Earth's atmosphere. In the context of climate and ocean warming, increases in levels of atmospheric GHG have been attributed to human activity (IPCC, 2023). Within the State of Hawai'i, the energy sector (including fossil fuel burning to produce electricity, transportation, waste incineration, and natural gas systems) is identified as the source of 88 percent of GHG emissions (State DOH, 2019). Other sources of GHG emissions include industrial facilities, agriculture and forestry, and waste treatment such as landfills, composting, and wastewater treatment.

The Federal Greenhouse Gas Reporting Program (40 Code of Federal Regulations Part 98) requires mandatory reporting of GHG emissions from sources that emit 25,000 metric tons or more of carbon dioxide equivalent (CO2 EQ) per year in the United States. Categories of use which are generally associated with this level of reporting include power plants, petroleum and natural gas systems, refineries, and other heavy manufacturing processes. On Maui, the facilities operating at or above the 25,000 metric ton level include Maui Electric Company's (MECO) Kahului Power Plant, Mā'alaea Power Plant, Hawaiian Commercial and Sugar Company, and the Central Maui Landfill (U.S. Environmental Protection Agency, 2017).

As described above, the project area in general does not experience adverse air quality conditions. Airborne pollutants that do exist can largely be attributed to aircraft arriving and departing from the Kapalua West Maui Airport and automobile exhaust from Honoapi'ilani Highway, which is about two (2) to three (3) miles makai of the project site. These sources, however, are intermittent, and prevailing winds quickly disperse the particulates generated by these temporary sources.

b. Potential Impacts and Mitigation Measures

While construction equipment and increased vehicular traffic associated with the project may temporarily increase greenhouse gas emissions, the proposed drilling of four (4) new exploratory wells is not anticipated to increase emissions in the long term. Based on the foregoing, the proposed project is not anticipated to result in significant greenhouse gas emissions.

12. Historical and Archaeological Resources

a. Existing Conditions

An Archaeological Literature Review and Field Inspection (LRFI) was conducted in February 2023 by Scientific Consultant Servcies, Inc. (SCS) for each of the five (5) sites evaluated and considered for exploratory wells in this EA. See **Appendix "D"**. The LRFI was carried out in order to assess the presence or absence of surface-level historic properties and to determine the potential for subsurface cultural deposits. Findings of the LRFI report were informed by historic research, previous archaeological studies in the project vicinity, and field inspections. Subsequently in November 2024, an Archaeological Field Inspection (AFI) was conducted by SCS for the relocated Well Site L-3. As previously mentioned, Well Site L-3 was relocated approximately 400 feet downslope from the originally identified location due to archaeological features in the vicinity of the original location. See **Appendix "E"**.

Traditionally, the islands of Hawai‘i were classified into mokupuni and further subdivided into moku or regions. Within each moku are tracts of self-sustaining lands that run mauka to makai (land to sea), which are referred to as ahupua‘a. All potential exploratory well sites are located in the mokupuni of Maui. Well Sites H-1 and H-2 are located within the moku of Kā‘anapali and within the ahupua‘a of ‘Alaeloa. All Launiupoko sites are located within the Lahaina moku. Well Site L-1 is in the Pana‘ewa ahupua‘a, Well Site L-2 is in the Mākila ahupua‘a, and Well Site L-3 is within the Waine‘e ahupua‘a.

The moku of Kā‘anapali encompasses five (5) major stream valleys: Honokōwai, Kahana, Honokahua, Honolua, and Honokōhau. In the pre-contact period, these valleys were known to include extensive lo‘i kalo systems for traditional kalo (taro) cultivation. Water from these streams flows to six (6) bays in West Maui: Honokahua, Honokeana, Honokōhau, Honokōwai, Honolua, and Hononana. These bays are collectively known as "Hono a Pi‘ilani", which translates to "the bays [acquired] by [Chief] Pi‘ilani."

The moku of Lahaina had relatively dry conditions compared to the windward side of the West Maui Mountains. The Lahaina district served as the chiefly center of the island and was formerly the capital of the Hawaiian Kingdom before it was moved to Honolulu in 1850. Lahaina was valued for its abundant resources and favorable location to the islands of Moloka‘i and Lāna‘i.

The Māhele of 1848 divided the lands between the king, the chiefs, and the government. The subsequently awarded parcels were called Land Commission Awards (LCAs). Documented LCAs are detailed in the LRFI report. Once lands were made available, the maka'āinana (common people) were able to claim the plots on which they had been living and cultivating through the Kuleana Act of 1850.

Following Western contact and influence, Lahaina became the center of commercial whaling in the Pacific until the mid-1800s. Lahaina habor was also frequented by voyagers working for the fur or sandalwood trade. Following the decline of the whaling industry, sugar cane became the primary economic driver in West Maui. Pioneer Mill Company, founded in 1859, became the largest and most successful sugar mill company, cultivating sugar cane throughout Lahaina and Kā'anapali. In addition to sugar, ranching and pineapple production were also prominent industries in West Maui. James Campbell, who was one of the founding members of Pioneer Mill Company, also established Honolua Ranch for cattle ranching. In 1904, Honolua Ranch built the Honokōhau Ditch system which is an extensive irrigation system. Several pineapple canneries were established, with the largest cannery located in Lahaina and operated by MLP. In the 1960s, the commercial agriculture industry began to decline in favor of toursim as resorts and golf courses replaced some of the former ranch and agricultural lands.

According to the LRFI report, archaeological work in the vicinity of the current project area has revealed evidence of habitation and agiriculture. Due to decades of activity associated with cattle ranching and agriclture, any Pre-Contact historic properties in the area are anticipated to be heavily disturbed. Post-Contact historic properties are anticipated to be associated with the agricutlural industry.

Potential Impacts and Mitigation Measures

The archaeological field inspection for the February 2023 LRFI was conducted on February 25, 2022, April 4, 2022, April 19, 2022, and December 14, 2022 by SCS. Field methods consisted of a one-hundred percent pedestrian survey of Well Sites L-1, L-3 (original location), H-1, and H-2. There was difficulty accessing Well Site L-2 since it is located on a narrow ridge of the West Maui Forest Reserve with rough terrain and a six-foot animal control fence. As such, the site inspection for Well Site L-2 was conducted via aerial drone. Field inspections of Well Sites L-1, H-1, and H-2 did not result in the identification of historic properties.

A total of seven (7) potential historic sites were observed during the field survey, with one (1) of the potentially historic sites located at Well Site L-2 and the remaining six (6) sites documented at Well Site L-3 (original location). The sites documented in the LRFI are listed in **Table 6**, below.

Table 6. Potential Historic Sites

Well Site	Type of Site	Description
L-2	Ditch	• Identified as Paupau Ditch on a 1983 United States Geological Survey (USGS) Lahaina Quadrangle map • Received irrigation water from the Kaua'ula siphon
L-3 (Original Location)	Terrace	• 3 to 4 course loosely stacked boulders, running in a general North to South orientation, parallel with existing slope • Measures 53 centimeters (cm) high by 5 m long
L-3 (Original Location)	Mound or Push pile	• Amorphus shape, loosely heaped large cobbles and small boulders • Measures 75 cm high
L-3 (Original Location)	Mound or Push pile	• Poorly constructed, loosely stacked small boulders • Measures 70 cm high
L-3 (Original Location)	Retaining Wall	• Constructed of medium to large boulders stacked 5 to 7 course high • Acts as road buttress for main access road • Measures 1.8 m high
L-3 (Original Location)	Concrete Irrigation Ditch	• Measures 60 cm deep by 8 m long
L-3 (Original Location)	Culvert	• Constructed of concrete pipe • Associated with the access road • 24 inches (60 cm) in diameter
Source: Scientific Consultant Services		

Due to the observance of multiple historic properties, the LRFI report recommended that an archaeological inventory survey (AIS) be conducted for Well Site L-3 (original location). However, due to the presence of multiple archaeological features, Well Site L-3 was relocated 400 feet downslope. The 2024 AFI prepared for Well Site L-3 identified no historic properties within the relocated Well Site L-3 proposed by the project. As such, the 2024 AFI recommends archaeological monitoring for Well Site L-3 during ground disturbing activity. Archaeological monitoring is recommended for Well Site L-2. However, as discussed above, Well Site

L-2 has been removed from consideration. The LRFI report and AFI report will be submitted to the State Historic Preservation Division (SHPD) for consultation. The project will comply with the recommendations of the SHPD for appropriate mitigation measures prior to and during construction.

13. Cultural Resources

a. Existing Conditions

A Cultural Impact Assessment (CIA) was prepared by ʻĀina Archaeology in May 2024 to document traditional cultural practices within the study area and identify any potential effects on these practices that may occur during, or as a result of the implementation of the proposed project. See **Appendix "F"**. To assess the presence or absence of direct and indirect effects of the project on the traditional cultural practices and resources within the project's vicinity, traditional land uses and access to resources were researched and considered. The region of influence studied includes the three (3) ahupuaʻa, the traditional boundaries of Waineʻe and Panaʻewa Ahupuaʻa in Lahaina Moku and Mailepai Ahupuaʻa in Kāʻanapali Moku. The footprints of each well site are identified as the project site. As Well Site L-2 was removed from consideration, it is not assessed in the CIA.

Research included testimony for Kuleana claims presented before the Land Commission during the Māhele ʻĀina and other background research and consultation. Results of the research concluded that settlement and land use within Lahaina and Kāʻanapali Moku functioned in the typical traditional sense, with a focus on freshwater resources to support agricultural disciplines and marine resource gathering.

Results of the research, including archival research and consultation, detail that within the Lāhaina and Kāʻanapali Moku, settlement and land use functioned in the "*typical traditional sense, with a focus on freshwater resources to support agricultural disciplines and marine resource gathering*". See **Appendix "F"**.

b. Potential Impacts and Mitigation Measures

As part of the CIA, ʻĀina Archaeology attempted to identify and contact individuals with knowledge of traditional cultural practices in the vicinity of the project site. Government agencies, advisory councils, local community organizations, traditional cultural practitioners, and kamaʻāina and kupuna with generational ties to the proposed project area were contacted with follow up attempts. Community outreach letters were sent to 61 individuals or groups with responses or consultations from 28 respondents.

Consultation conducted during the CIA identified the cultural, historic, and natural resources where cultural practices (including traditional and customary native Hawaiian rights) are being exercised in the ahupua‘a of Waine‘e, Pana‘ewa, and Mailepai. A group interview was conducted at Nā Aikāne o Mau and two site visits were conducted with community members and staff of ‘Āina Archaeology to Kā‘anapali Moku and to the original location of Well Site L-3 in Lahaina Moku.

Freshwater, or “wai”, is described as crucial to the traditional cultural practices and resources found in the area. Local residents habitually gather wai from the piko of Kaua‘ula and Kahoma Rivers for ceremonies. Access to these watercourses and other ceremonial sites are highly valued aspects of life for these residents. Customary ceremonies and spiritual practices take place at the Pa’upa’u Heiau and at the grave of David Malo, often facilitated by Ka Papa Kanaka o Pu’upa’u Heiau, the group of people dedicated to maintaining Pa’upa’u Heiau. A number of petroglyph sites were identified at, and in the vicinity of, Well Site L-3 (original location).

Regarding Well Site L-3, a group interview conducted on March 21, 2023 expressed consensus that Well Site L-3 is likely to draw salt water due to low elevation, thus defeating the purpose of the well. In addition, a large rock described to be as large as a school bus and covered in petroglyphs was identified by one (1) interviewee, who was simultaneously concerned about the CIA reporting information regarding the petroglyph site for fear of public misuse of the site. The interviewee recommended a preservation buffer around the petroglyph site to ensure no additional negative impacts.

On May 7, 2024, a site visit to Well Site L-3 was conducted with ‘Āina Archaeology, the cultural informants, Scientific Consultant Services, DWS, and Fukumoto Engineering. During the site visit, a large boulder with petroglyphs was confirmed to be located in the middle of the original L-3 well site. Well Site L-3 has since been relocated approximately 400 feet downslope, at an elevation of approximately 330 feet above sea level, to avoid the petroglyph site.

Two (2) informants shared apprehension with proposed to Well Site L-1 due to the likely need to bulldoze the alignment of the proposed access road and, in the process, the potential to disturb archaeological features. Additional concerns expressed included frequent hunting in the area, potential disturbance of cow trails and uluhe fern, and the establishment of County access through Kuleana lands. One (1) informant noted the presence of a women’s heiau located mauka in the ahupua‘a of Well Site

L-3. Continued access to this heiau for cultural practitioners and community members was a concern of the informant.

The CIA provided an analysis of potential effects to currently known traditional and customary practices within and adjacent to the proposed footprint. To address these potential effects, the CIA includes recommendations for managing potential impacts to ongoing practices or protecting the integrity of traditional cultural resources that may be present within and adjacent to the project area, should traditional cultural practices that were once carried out in the area be re-established. To preserve and properly manage the cultural resources and customary practices of the land, the CIA recommends the following:

- Assess Existing Wells for Viability
    - The exploration current non-operating and/or undocumented wells in the Launiupoko and Honolua Aquifers as alternative sites to the proposed wells is strongly recommended.
- Establish and Prioritize Community Involvement
    - Coordinate an advisory board made up of Lahaina and Kā‘anapali community leaders and residents of the Waine’e, Pana‘ewa, and Mailepai Ahupua‘a to monitor the progress of the proposed exploratory well development and facilitate community consultation. The board would ensure that people in these areas who have personal connections to these places and resources can work alongside project managers.
    - Conduct public community meetings to gather and assess comments and concerns regarding the project.
    - Consider establishing a public-private partnership between the County of Maui and the communities of the project areas to improve accountability for the impacts the wells may have on the land and its resources.
- Protect Natural and Cultural Resources
    - Outline and execute BMPs to minimize erosion and sediment or lubricant release from project activities into streams and the ocean. BMPs should also address the threat of seeds of invasive plants being carried into project areas by vehicles and equipment. BMPs should be with the advisory board and implemented with ongoing monitoring throughout the project.
    - Restore the native plants of the area by planting native lā’au in the project area where it is possible to increase access to gathering materials for cultural practices. Recommended plants include ‘ōhi‘a, ‘a‘ali‘i, and ‘iliahi.

- Ensure Kupaʻāina Access and Establish Security Measures
    - Ensure safe access is maintained for cultural practitioners who regularly partake in ceremony and spiritual practices at the Paʻupaʻu Heiau and David Malo's grave, mauka of the L-3 site area. Especially consider access to Ka Papa Kanaka o Paʻupaʻu Heiau, the group dedicated to maintaining Paʻupaʻu Heiau.
    - Ensure that any access roads are kept secure with a locked gate to prevent trespassers such as the general public and dirt bike riders who contribute to the erosion of the natural environment.
    - Due to the high risk of potential fires, create firebreaks and a plan to mitigate fire risks on an ongoing basis.

The DWS will implement the recommendations of the CIA. Reports prepared by Fukumoto Engineering (FE) and Tom Nance Water Resource Engineering (TNWRE) included a comprehensive inventory of existing wells in the Launiupoko and Honolua Aquifers based on records from the State Commission on Water Resource Management (CWRM). Refer to Figure 8 of **Appendix "A"** and **Appendix "B"**. Although the CIA includes a recommendation to explore any current non-operating and/or undocumented wells in the Launiupoko and Honolua Aquifers for alternative sites to the proposed wells, DWS will not pursue this recommendation since it is unlikely that such non-operating and/or undocumented wells exist. Additionally, if non-operating or undocumented wells exist, they are unlikely to meet current CWRM and DWS standards for drinking water well construction, and the costs to retrofit them to current standards would be high. The DWS will continue to engage with the community regarding the proposed exploratory wells and convene an advisory board to facilitate ongoing consultation. BMPs will be implemented, and access will be maintained.

In addition the CIA, a Ka Paʻakai Analysis was prepared by SWCA Environmental Consultants in support of the water use permits for Well Site L-1 and Well Site L-3. See **Appendix "F-1"**. The Ka Paʻakai Analysis and consultation process is designed to identify Native Hawaiian cultural, historical, and natural resources and propose feasible actions to protect against potential impacts to Native Hawaiian customary and traditional rights. The Ka Paʻakai Analysis found that there are concerns among some Native Hawaiian cultural practitioners regarding the proposed Maui County wells. These individuals express apprehension that the new wells may impose an additional strain on the fresh water resources within the Launiupoko Aquifer System. It is their opinion that such strain could potentially exacerbate the scarcity of fresh water, thereby impacting the vitality of ongoing traditional and customary Native Hawaiian practices. These cultural practitioners and community members hold the opinion that

existing wells have reached their capacity, and they are worried that additional groundwater withdrawals could affect the streamflow of Kaua‘ula Stream, which in turn could impact several culturally significant natural resources and cultural practices reliant upon the stream. They also disagree with the sustainable yield limits set by the CWRM and observed by the DWS.

During community consultation, specific concerns emerged regarding the location of the planned Well Site L-1 and Well Site L-3. One (1) informant noted that the location of the planned Well Site L-3 is near the existing Lahaina Shaft well, which they claim has pumped up brackish water. They expressed concern that this suggests, in their opinion, that current groundwater withdrawals in this area have already surpassed sustainable yield. The DWS however, has indicated that brackish quality in wells close to the shoreline is normal and does not indicate withdrawals exceeding sustainable yield. Additionally, spreading withdrawals rather than concentrated pumpage at the four (4) existing DWS wells in the Launiupoko Aquifer System may have a positive or neutral impact on freshwater discharge to the coast and streams. DWS further clarified that the Lahaina Shaft well consists of two (2) separate wells (State Well No. 6-5240-002 and State Well No. 6-5240-003) constructed by Pioneer Mill Company to provide irrigation water for sugar cane cultivation. These wells are located about 2,800 feet from the ocean at an elevation of about 40 feet above mean sea level. In comparison, Well Site L-3 is located about 5,800 feet from the ocean at an elevation of about 330 feet above mean sea level. DWS also noted that the distance between the Lahaina Shaft well and Well Site L-3 is about 4,600 feet. Another informant noted that Well Site L-1 is near a natural spring known to them. They are opposed to the location of Well Site L-1, as they are concerned that the planned well may have adverse effects on the spring and subsequent downstream water use.

The differing perspectives between cultural practitioners and the DWS highlight the need for a balanced approach to water resource management that integrates a nuanced understanding and education of Native Hawaiian holistic perspectives with the hydrologically informed technical viewpoint of the DWS rooted in public data and guidance from the CWRM.

Given the potential for additional water withdrawal from the Launiupoko aquifer, the DWS has agreed to undertake a number of feasible actions to mitigate the potential impacts of new groundwater withdrawal from the planned Well Site L-1 and Well Site L-3. These include employing a mauka-to-makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality;

developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members. These measures aim to maintain and potentially increase the availability of fresh water for traditional and customary practices.

14. Scenic and Open Space Resources

a. Existing Conditions

The project sites are located on the slopes of the West Maui Mountains and the West Maui Forest Reserve, surrounded by vacant, former agricultural lands. Approximately one (1) to three (3) miles from the project area is Honoapi‘ilani Highway. This highway is West Maui’s principal access route to the central and southern areas of Wailuku, Kahului, and Kīhei. Open space resources in the region seen from public roadways and facilities include the vast expanse of vacant agricultural lands that lie between the mountains and the existing urbanized coastal areas that include Lahaina Town and Kā‘anapali.

b. Potential Impacts and Mitigation Measures

The proposed project involves the development of four (4) exploratory wells and access roads. The project will be compatible with the surrounding land uses and will not impede scenic views or significantly alter surrounding open spaces. As the project is upland and east of Honoapi‘ilani Highway, views from this major roadway are not expected to be adversely impacted. The project will comply with the development standards for the “Agricultural” and “Interim” zoning districts. The project is not expected to have significant adverse impacts on scenic and open space resources.

15. Traditional Beach and Mountain Access

a. Existing Conditions

Existing dirt and gravel roads provide access to Well Sites L-1 and L-3, which are both located within the Launiupoko Aquifer. Well Site L-1 is located on State-owned Lahainaluna School lands at 1,700 feet elevation atop a remote ridge between Halonā Gulch and Kanahā Gulch. Well Site L-3 is located to the north of Kaua’ula Stream on a 16.6-acre parcel of land at an elevation of 330 feet. Well Site L-2 is located within a 2,013-acre parcel along the Kaua‘ula Stream.

Well Site H-1 is located at 1,240 feet elevation atop a ridge between Malilepai Gulch and Kaʻōpala Gulch on lands previously used for commercial pineapple cultivation more than 20 years ago. Well Site H-2 is located at 1,260 feet elevation in upper Mailepai on a ridge on a relatively undisturbed site.

Local residents habitually gather wai from the piko of Kauaʻula and Kahoma Rivers for ceremonies. Access to these water sources and other ceremonial sites are highly valued aspects of life for these local residents. See **Appendix "F"**.

b. <u>Potential Impacts and Proposed Mitigation Measures</u>

New access roads would be constructed for the exploratory well sites and would be graded and surfaced with gravel. During a group interview conducted on March 21, 2023, cultural informants expressed concern of a roadway constructed to Well Site L-2 and how the County may minimize general access from the public, which may have the potential to negatively impact traditional cultural practices and resources. The potential for an easement was feared to invite additional unwanted users, including hikers, cyclists, and motorcyclists, who informants describe as daily trespassers in the area and on their properties. These users are also thought to have the potential to introduce invasive plant species and contaminate water. While Well Site L-2 has been removed from consideration, universal concern was expressed for unfettered access by members of the public while ensuring enduring access in this area to freshwater and related resources for culturally significant proceedings and gathering practices.

Additional concern was expressed regarding the potential for risk of wildland fires associated with more people accessing mauka lands. Combustion of motorized vehicles and other uses introduced by visitors have the potential to ignite dry vegetation in these lands. Signage for "high potential risk of fires" and "do not trespass" were cited as desired deterring features for potential fire provoking users.

To ensure Kupaʻāina access, limit access by trespassers, mitigate negative impacts to natural resources and cultural sites, consider the risk of fires, and establish security measures to the mauka regions of Panaʻewa, Waineʻe, and Mailepai ahupuaʻa, the May 2024 CIA recommends the following:

1. Ensure safe access is maintained for cultural practitioners who regularly partake in ceremony and spiritual practices at the Paʻupaʻu Heiau and David Malo's grave, mauka of the L-3 site area.

Especially consider access to Ka Papa Kanaka o Paʻupaʻu Heiau, the group dedicated to maintaining Paʻupaʻu Heiau.

2. Ensure that any access roads are kept secure with a locked gate to prevent trespassers such as the general public and dirt bike riders who contribute to the erosion of the natural environment.

3. Due to the high risk of potential fires, create fire breaks and a plan to mitigate fire risks on an ongoing basis.

The DWS will implement the recommendations of the CIA.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Land Use and Community Character

a. Existing Conditions

The project area is located mauka of the Honoapiʻilani Highway and on lands that occupy the higher elevation areas at the base of the West Maui Mountains. Surrounding lands are characterized by fallow agricultural land and natural open space. Urbanized lands occupy the coastal plain below Honoapiʻilani Highway and include the communities of Lahaina, Kāʻanapali, Honokōwai, Kahana, Nāpili, and Kapalua. Lahaina Town has historically been the commercial center of the West Maui region. However, the August 2023 wildfires that devastated Lahaina have significantly impacted the landscape and community character of Lahaina town.

The Kapalua West Maui Airport at Māhinahina, owned by the State of Hawaiʻi, Department of Transportation (HDOT), connects West Maui to Oʻahu and other neighboring islands.

Diversified agriculture occupies a portion of the land in the West Maui region. The Pioneer Mill and MLP's vacant agricultural fields and State-owned open spaces span the slopes of the West Maui Mountains.

b. Potential Impacts and Mitigation Measures

The proposed project is consistent with existing surrounding former agricultural land uses and open space and is not of a scale to significantly impact the regional setting of the area. This project provides an efficient and beneficial use of vacant land within the area as a viable groundwater source to allow for stream-flow restoration in West Maui.

2. Population

a. Existing Conditions

According to the 2020 U.S. Census, the population of Maui County was 164,754, an increase of 6.4 percent since 2010, when the County had a population of 154,834 (U.S. Census Bureau, 2020). It is noted, however, that population growth over the past decade has been uneven, with stronger growth in the early part of the decade.

The 2020 U.S. Census reported the population within the Lahaina Census Designated Place (CDP) as 12,702. This was an increase of 8.5 percent over the previous decade, as the population in 2010 was reported as 11,704. In a 2024 report, prepared by the Economic Research Organization at the University of Hawai‘i, it is noted that the Census Bureau reported that the State of Hawai‘i as a whole experienced steady population decline, with 23,000 fewer residents in the second quarter of 2022 compared with the last quarter of 2023. While this decline was primarily on O‘ahu, Maui County experienced a similar but less pronounced trend, losing a net of 600 residents in the same period (University of Hawai‘i Economic Research Organization, 2024). The 2023 Maui wildfires have exacerbated this decline.

b. Potential Impacts and Mitigation Measures

The proposed Launiupoko Exploratory Wells Project will assess the yield and water quality of groundwater sources from exploratory wells to determine if they are suitable for conversion to permanent production wells. The proposed action will not adversely impact the regional population.

3. Economy and Labor Force

a. Existing Conditions

The closure of the Pioneer Mill in 1999 marked the end of sugar cane cultivation in West Maui. In December 2009, the MLP ceased larger scale pineapple cultivation. The cessation of these two (2) major plantation crops ended large scale plantation-style agriculture in the West Maui region. The largest agriculture operation in West Maui today is the 300-acre Kā‘anapali Coffee Farm.

The economy of Maui is heavily dependent upon the visitor industry. West Maui is historically one of the State’s major resort destination areas. Major hotels in this region include the Hyatt Regency Maui, Maui Marriott Resort

and Ocean Club, Westin Maui, the Sheraton Maui, Westin Ka‘anapali Ocean Resort, Honua Kai, the Montage at Kapalua Bay, and the Ritz-Carlton, Kapalua. Prior to the recent wildfires, the historic Lahaina Town and Front Street were a primary tourist attraction for shopping, dining, and entertainment. The destruction and recovery of Front Street and Lahaina Town is expected to have long lasting impacts to the economy of Maui.

Maui, similar to the rest of the State, began to see positive economic recovery following the effects of the COVID-19 pandemic. Between the decline of the pandemic and 2023, the unemployment rate was similar to prepandemic levels. However, the August 2023 wildfires significantly impacted the Maui economy. While Maui's annual unemployment rate is projected to average 3.7 percent in 2025, it is projected to increase to four (4) percent in 2027. Employment is expected to recover to pre-fire levels in 2029 (University of Hawai‘i Economic Research Organization, 2024).

b. Potential Impacts and Mitigation Measures

The proposed exploratory well project will provide short-term construction-related employment and services as expenditures are made during the construction of the project. In the long term, the project will identify the yield and quality of potential groundwater sources in the West Maui region, with the potential to convert four (4) exploratory wells to production wells. As such, the proposed project is anticipated to provide a positive short-term impact to the local economy and labor force.

C. PUBLIC SERVICES

1. Solid Waste Disposal

a. Existing Conditions

The Central Maui Landfill accepts residential and commercial waste from private collection companies (Department of Environmental Management, 2009). A private waste disposal service will be contracted by the County to transport waste from this facility to the Central Maui Landfill.

b. Potential Impacts and Mitigation Measures

During construction, solid waste will consist mainly of vegetation or green waste to be removed during grading and grubbing. Prior to project construction, a solid waste management plan will be coordinated with the County's Department of Environmental Management (DEM). After project completion, the proposed project is not anticipated to generate solid waste.

The proposed project is not anticipated to affect the service capabilities of County or private waste collection operations and disposal facilities.

2. Medical Facilities

a. Existing Conditions

The only major medical facility on the island is Maui Memorial Medical Center, located approximately 25 miles from Lahaina, midway between Wailuku and Kahului. The 219-bed facility provides general, acute, and emergency care services. Emergency ambulance services are located at the Lahaina Comprehensive Health Center at the Lahaina Civic Center Complex and in Nāpili at the Nāpili Fire Station.

In addition, medical services are offered by the Maui Medical Group, which was temporarily relocated to the Napili Plaza Shopping Center while their office is repaired due to damage from the August 2023 wildfires.

b. Potential Impacts and Mitigation Measures

As the proposed project is limited to the construction of DWS exploratory wells and access roads, it will not adversely impact or affect the existing service area for emergency medical services.

3. Police and Fire Protection

a. Existing Conditions

The project area is within the Maui Police Department's Lahaina District service area. The Department's Lahaina Station is located in the Lahaina Civic Center complex at Wahikuli, approximately four (4) miles southwest of the project area. The Lahaina Patrol is composed of approximately 32 full-time personnel, including management-level officers and field officers (County of Maui, Police Department, 2020). Additional personnel consist of public safety aides and administrative support staff.

Fire prevention, suppression, and protection services for the Lahaina District are provided by the Department of Fire and Public Safety's Lahaina Fire Station, in the Lahaina Civic Center, and the Nāpili Fire Station, located north of the project area in Nāpili. The Lahaina Fire Station includes an engine and a ladder company and is staffed by approximately 32 full-time personnel. The Nāpili Fire Station consists of an engine company composed of 12 full-time firefighting personnel (County of Maui,

Department of Fire and Public Safety, 2024). All firefighting personnel are first responders trained to provide emergency medical care.

b. Potential Impacts and Mitigation Measures

The proposed exploratory wells is limited in scope to the construction of exploratory wells and related improvements and will not increase demands upon police or fire services. As previously mentioned, wildfire mitigation measures will be implemented to reduce vegetative fuel for wildfires, including vegetation control, removal of leaf litter, and creation of fire breaks.

4. Schools

a. Existing Conditions

The West Maui area is served by four (4) public schools operated by the State of Hawai‘i, Department of Education (DOE): Lahainaluna High School, Lahaina Intermediate School, Princess Nāhi‘ena‘ena Elementary School, and King Kamehameha Elementary III Elementary School. King Kamehameha III Elementary School was sadly devastated by the August 2023 wildfires. A temporary campus for the King Kamehameha III Elementary School opened for students in April 2024 and is planned to operate for up to five (5) years while plans for a permanent replacement facility are completed (State of Hawai‘i, Department of Education, 2024). The region is also served by privately operated pre-elementary and elementary schools, such as Sacred Hearts Elementary School and Maui Preparatory Academy, the latter of which serves students through high school. The enrollments in the four (4) public schools have grown significantly in concert with the growth of residential development in the area. However, enrollment at Lahaina schools has declined significantly from where it was before the 2023 wildfires.

University of Hawai‘i Maui College (UHMC), located in Kahului, is a part of the University of Hawai‘i system. UHMC is the primary higher education institution serving Maui.

b. Potential Impacts and Mitigation Measures

The proposed project is limited in scope to the construction of exploratory wells and related improvements and is not anticipated to impact regional education facilities.

5. Recreational Facilities

a. Existing Conditions

West Maui has numerous recreational facilities offering diverse opportunities for the region's residents. These facilities include several County and State parks and beach parks. Approximately one-third of the County parks are situated along the shoreline and offer excellent swimming, diving, and snorkeling areas. In addition, Kāʻanapali and Kapalua Resorts operate world-class golf courses available for public use.

Recreational facilities in Lahaina town include the Lahaina Aquatic Center, the West Maui Youth Center, the Lahaina Recreation Center, and the Lahaina Civic Center. The Lahaina Aquatic Center contains an Olympic-size swimming pool, a children's wading pool, a paved parking lot, and office and storage space, as well as shower, restroom, and changing room facilities. The 15-acre addition to the Lahaina Recreation Center includes fields, parking, and washroom facilities. The West Maui Youth Center has a building for youth activities, as well as paved parking, an outdoor playground, and a basketball court. The Lahaina Recreation Center has baseball fields and other playfields for soccer and football, as well as restrooms and paved parking facilities. The Lahaina Civic Center includes a gymnasium, amphitheater, and tennis courts complex, as well as restrooms and paved parking facilities.

The clear ocean waters and well-developed reef systems along the Lahaina and Kāʻanapali coastlines offer many recreational opportunities for residents and visitors. Fishing, by shore casting and netting, is practiced in the waters near the outlet of Kauaʻula Stream and Makila Point. Edible seaweed collecting, octopus diving, and spearfishing occur on the adjacent reef flat fronting Kāʻanapali. During periods of wave activity, the West Maui coastline is a good location for surfing.

b. Potential Impacts and Mitigation Measures

As the proposed project is limited in scope to the construction of four (4) exploratory wells and related improvements and is located a distance away from urbanized and developed areas, as well as the coastline, it is not anticipated to adversely impact recreational facilities or opportunities in the West Maui region.

6. Airports

a. Existing Conditions

The Kapalua Airport (JHM) is one (1) of three (3) airports on Maui owned and operated by the HDOT. The airport was formerly a private facility until it was acquired by the State in 1993. JHM is a regional airport consisting of a single runway, terminal facilities, and support facilities. JHM offers inter-island flights served by commercial propeller air carriers and commuter aircraft only and does not offer domestic or international flights.

b. Potential Impacts and Proposed Mitigation

As the proposed project is limited in scope to the construction of four (4) exploratory wells and related improvements, the project is considered compatible with normal airport operations, including aircraft landing and takeoff, at the Kapalua West Maui Airport. The proposed structures will not have reflective surfaces, and as such, will not result in glint and glare hazards.

The finished heights of the proposed improvements are not expected to be an obstruction to aircraft flying in and out of Kapalua West Maui Airport. The DWS will consult with the State of Hawai‘i, Department of Transportation, Airport Division, and Maui Airports District Manager as the project moves forward.

D. INFRASTRUCTURE

1. Roadways

a. Existing Conditions

Major roadways in the project vicinity include Honoapi‘ilani Highway, Lahaina Bypass Road, and Lahainaluna Road, ranging between approximately 0.25 to 1.25 miles from the proposed well sites.

b. Potential Impacts and Proposed Mitigation

The project area is located in a remote location and is removed from urbanized areas. As the proposed project is limited in scope to the construction of exploratory wells and related improvements, significant traffic impacts during construction of the project are not anticipated. Existing dirt and gravel access roads servicing the area will be used, and when necessary, new access roads will be graded and surfaced with

gravel. Following completion of construction, the project will not be a significant traffic generator.

2. Water System

a. Existing Conditions

A significant portion of the West Maui region is served by DWS's West Maui Water System, including the coastal areas from Launiupoko to Kā`anapali and from Honokōwai to Nāpili. DWS's West Maui Water System consists of both surface water sources and ground water sources to provide fire protection and potable water to its customers. The Honokōhau Ditch, a concrete-lined irrigation ditch located within the project area, brings surface water into the Māhinahina Surface Water Treatment Plant (SWTP) from a diversion of Honokōhau Stream.

The Māhinahina SWTP is located within the Honokōwai area. Finished treated water from the Māhinahina SWTP is stored in a tank at the plant site and feeds water to the 2.0-million-gallon (MG) Honokōwai tank located approximately one (1) mile west of the Māhinahina SWTP. The Honokōwai tank provides water to the DWS water system, which serves the northern and southern regions of West Maui.

The Lahaina SWTP is located above Lahainaluna High School within the Launiupoko Area. The Kanahā Stream is the surface water source for the Lahaina SWTP. Finished treated water from the Lahaina SWTP is stored in a tank onsite and conveyed into various distribution tanks within the Lahaina area.

Private wells in the Launiupoko Aquifer System and Honolua Aquifer System are operated by Launiupoko Water Company, Lauiniupoko Irrigation Company, and Kapalua Water Company. Refer to **Appendix "A"**.

b. Potential Impacts and Mitigation Measures

The proposed project will construct four (4) exploratory wells to test and evaluate additional groundwater sources to replace 1.55 mgd of surface water to be released into the Kanahā Stream. As described above, the DWS acknowledges that stream flow restoration of Kanahā Stream is necessary to support traditional and customary Native Hawaiian practices and water rights. In order to restore stream flow to Kanahā Stream, the DWS is seeking a new water source. If the exploratory wells are determined to be viable and converted to production wells, impacts to the DWS water

system will be beneficial by replacing the source of water that will be lost due to the CWRM directive to release 1.55 mgd into the Kanahā Stream.

3. Wastewater System

a. Existing Conditions

The DEM Wastewater Reclamation Division (WWRD) provides wastewater service for the West Maui region.

Wastewater from the Kāʻanapali and Lahaina areas is treated at the County's Lahaina Wastewater Reclamation Facility (LWRF) located approximately three (3) miles south of the project area on the east (mauka) side of Honoapiʻilani Highway. The LWRF's total treatment capacity is 9.0 mgd.

b. Potential Impacts and Mitigation Measures

The proposed project scope of work is limited to the construction of exploratory wells and related improvements. As such, the project is not anticipated to impact regional wastewater treatment facilities or the related collection system.

4. Drainage

a. Existing Conditions

The entire project area is located in Flood Zone X, an area of minimal flooding. Well Sites L-1 and L-2 are on mountainous terrain with 20 percent slopes. Well Sites L-3, H-1, and H-2 are on terrain with ground slopes ranging from 12 to 16 percent. Stormwater runoff flows downslope into the surrounding open space and fallow fields following the existing topographic conditions.

b. Potential Impacts and Mitigation Measures

A drainage sump will be installed at each exploratory well site to help control runoff. All proposed drainage improvements will conform to County standards and will be coordinated with the Department of Public Works to ensure there are no significant adverse effects on existing downstream properties.

Based on the foregoing, the proposed project is not anticipated to adversely impact drainage conditions at the project area.

5. Electrical, Telephone, and Cable Television (CATV) Services

a. Existing Conditions

Electrical, telephone, and CATV service to the West Maui region is provided by MECO, Hawaiian Telcom, and Spectrum, respectively.

b. Potential Impacts and Mitigation Measures

As the proposed project is limited in scope to the construction of exploratory wells and related improvements, the proposed project is not anticipated to have significant impacts to electrical, telephone, or cable TV services.

E. CUMULATIVE AND SECONDARY IMPACTS

Pursuant to the Hawai'i Administrative Rules, Chapter 200, Section 11-200.1-2, entitled Environmental Impact Statement Rules, a cumulative impact means:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

A key element in understanding the requirement for assessing cumulative impacts, therefore, is the need to recognize what constitutes "reasonably foreseeable actions".

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project.

The proposed Launiupoko Exploratory Wells project involves the construction of four (4) exploratory wells which will be drilled, cased, and tested. The purpose of the proposed project is to test results from the proposed exploratory wells to determine whether the well sites are suitable for conversion to permanent production wells. If the test results are successful, a separate EA will be prepared to identify environmental impacts and mitigation measures for the construction of permanent production wells.

With respect to larger and foreseeable actions, if potential future production wells are successful there would be an additional 1.55 mgd drawn from either the Launiupoko Aquifer or the Honolua Aquifer. Water pumped from these wells would replace 1.55 mgd to the Kanahā Stream, which would increase the mgd that is pumped from the selected

aquifer. The Honolua Aquifer has a sustainable yield of eight (8) mgd and Launiupoko Aquifer has a sustainable yield of seven (7) mgd as established by the CWRM. While pumpage from the Launiupoko Aquifer has decreased significantly since Pioneer Mill Company ceased sugar cultivation operations in 1999, water usage has increased since 2018 to meet interim stream flow standards established by CWRM for the Kaua‘ula Stream. Nevertheless, the Preliminary Design Report indicates that even with the prospect of greater groundwater use for irrigation based on CWRM’s restriction of surface water use, there will still be a substantial unused amount that could accommodate new wells. Refer to **Appendix “A”**. It is noted that according to the CWRM Findings of Fact Report prepared in June 2022 for the Lahaina surface and groundwater management area designation, existing and authorized planned withdrawals exceed the sustainable yield for the Launiupoko Aquifer (State of Hawai‘i, CWRM, 2022). In response to the June 2022 CWRM Findings of Fact Report, Tom Nance Water Resource Engineering provided an updated assessment of the capacity of Launiupoko Aquifer. In the 2025 memo, the hydrogeologist indicated that the total existing and authorized use from the Launiupoko Aquifer is 5.31 mgd. Using the current sustainable yield of seven (7) mgd, the memorandum concludes that 1.69 mgd of water supply remains uncommitted. Refer to **Appendix “B”**.

In addition, planned water users from the Launiupoko aquifer are included as planned uses in the CWRM’s 2019 Water Resource Protection Plan. Neither the project nor the construction of production wells would increase the amount of water allocated for any uses, nor could it allow pumping to exceed sustainable yield. As the CWRM has administrative control over pumping in the Lahaina Aquifer Sector Area (ASA), it is required by law to limit withdrawals below sustainable yield and is obligated to provide for the reservations allocated to users, within that limit. As such, pumping of the potential production wells resulting from successful results of the proposed exploratory wells would not cause the Launiupoko aquifer to be pumped beyond sustainable yield, which may lead to adverse environmental impacts. This limitation on the DWS and pumping from production wells will be enforced in part upon issuance of a Ground Water Use Permit from the CWRM for the future production wells, which must take place prior to any water withdrawal from the aquifer (State of Hawai‘i, CWRM 2022).

Water production from Well Site H-1 and Well Site H-2 is expected to be within the Honolua Aquifer sustainable yield. As such, it is anticipated that both aquifers have the capacity to produce 1.55 mgd to restore stream flow to the Kanahā Stream and allow for instream uses. If the exploratory wells are found to be successful, a separate EA will be prepared for converting the exploratory wells into production wells to produce 1.55 mgd needed to restore stream flow to the Kanahā Stream. Beneficial instream uses can include the maintenance of fish and wildlife habitats, outdoor recreational activities, the maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, the maintenance of water quality, the conveyance of irrigation and domestic

water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights (Commission on Water Resource Management, 2018).

The purpose of the proposed project is to test, evaluate, and identify potential groundwater sources. The proposed action is in consonance with the County General Plan and the Maui Island WUDP and is not considered to have significant adverse cumulative or secondary impacts.

RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

III

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICTS

Pursuant to Chapter 205, Hawai'i Revised Statutes (HRS), all lands in the State have been placed into one (1) of four (4) major land use districts by the State Land Use Commission. These land use districts are designated "Urban", "Rural", "Agricultural", and "Conservation". Well Sites L-3, H-1, and H-2 are located within the "Agricultural" District. See **Figure 22** and **Figure 23**.

The "Agricultural" District includes activities or uses as characterized by the cultivation of crops, crops for bioenergy, orchards, forage, and forestry, including aquaculture, commercial agriculture, agricultural tourism, parks, and recreation. According to Chapter 205-4.5, permissible uses within the "Agricultural" District include *"public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, treatment plants, corporation yards, or other similar structures"*. In this regard, Well Sites L-3, H-1, and H-2 of the proposed project are consistent with the "Agricultural" district designation.

Project Well Sites L-1 and L-2 are located within the "Conservation" district, specifically within the "Resource" subdistrict. Through consultation with the State of Hawai'i, Office of Conservation and Coastal Lands (OCCL), it has been confirmed that exploratory test wells, access roads and fencing are identified land uses in the Conservation District per Chapter 13-5-22 of the Hawai'i Administrative Rules (HAR) as the land use (D-3) "Water Systems". Prior to initiation of work within the Conservation District, a Conservation District Use Application (CDUA) will be submitted to the OCCL, and a Conservation District Use Permit (CDUP) will be obtained from the Board of Land and Natural Resources (BLNR). Should construction of a permanent well be proposed, a separate CDUP will be required in addition.

An exploratory well at Well Site L-1 has been assessed based on the evaluation criteria for the Conservation District, pursuant to Section 13-5-30(c), HAR. As noted earlier, Well Site L-2 has been removed from consideration.

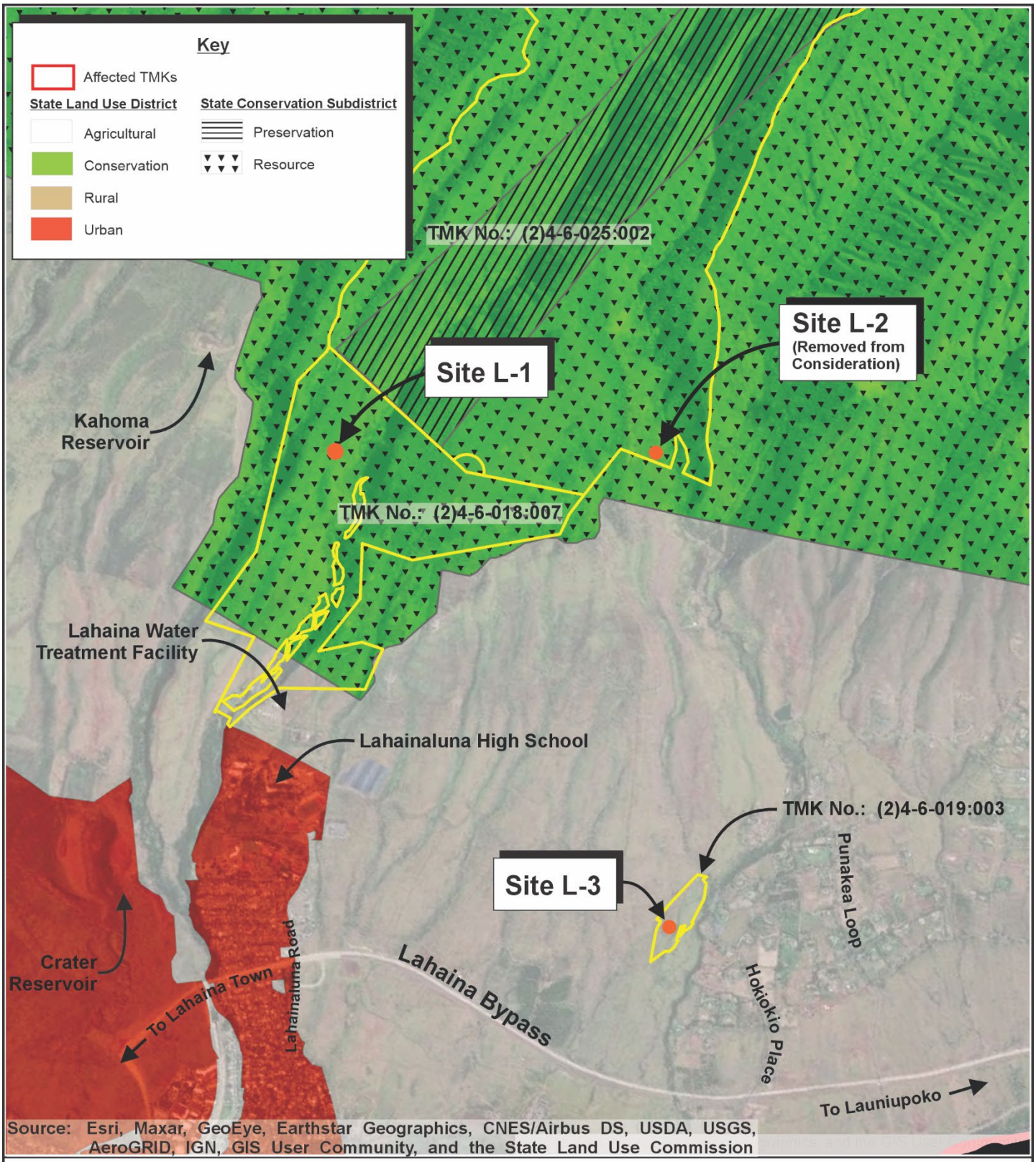


Figure 22

Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
State Land Use Districts and Conservation District Subzones Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 SLUD

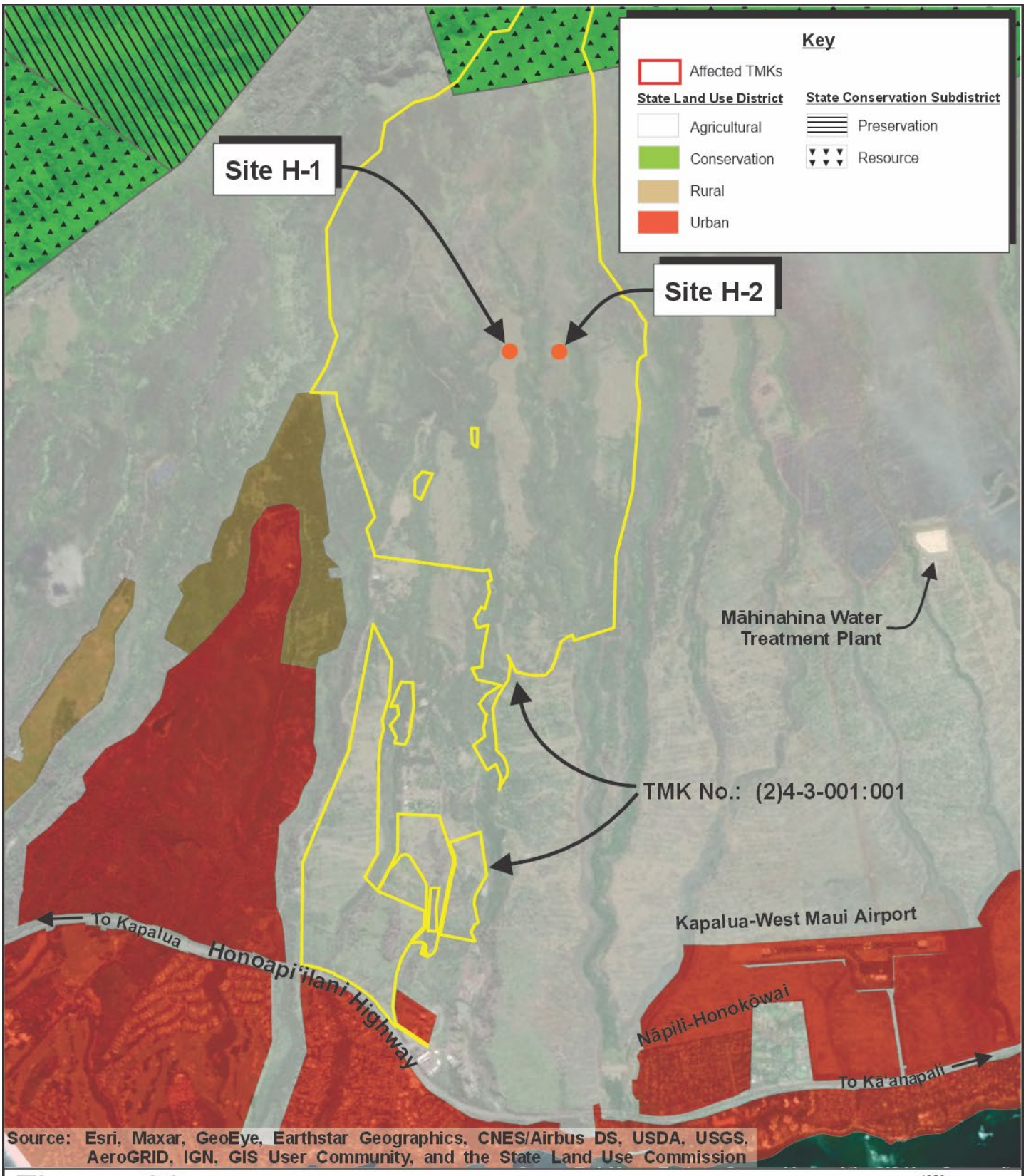


Figure 23

Launiupoko Exploratory Wells
Sites H-1 and H-2
State Land Use Districts and Conservation District Subzones Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 SLUD

1. **The proposed land use is consistent with the purpose of the conservation district;**

The overall purpose of the Conservation District is to conserve, protect, and preserve important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. Well Site L-1 of the proposed project will enable sustained water use for West Maui while ensuring that the interim instream flow standards (IIFS) for the Kahoma Surface Water Hydrologic Unit, which includes Kahoma Stream and Kanahā Stream, will be met.

2. **The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;**

Well Site L-1 is located within the Resource Subdistrict of the Conservation District. According to Section 13-5-13, HAR, the Resourse Subzone's objective is to ensure, with proper management, the sustainable use of the natural resources of those areas. As described above, the project proposes the construction of exploratory wells, including Well Site L-1 in the Resource Subzone for the purpose of determining potential water yield and water quality. As such, the proposed project is consistent with the objectives of the Resource Subzone.

3. **The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management", where applicable;**

The proposed project complies with the provisions and guidelines of Chapter 205A, HRS. Detailed analysis is included in Section G of this Chapter.

4. **The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region;**

Evaluation of impacts and identification of mitigation measures is conducted through this Chapter 343 HRS, EA process. Implementation of the proposed project will produce potential short-term impacts, including dust, greenhouse gas emissions, and erosion due to construction and related vehicle activity in the project's vicinity, and increased noise due to the construction-related operations. Construction BMPs will be implemented to mitigate these impacts. From a long-term perspective, the project will allow DWS to provide necessary water for West Maui while continuing to meet IIFS for the Kahoma Surface Water Hydrologic Unit. In the long term, the proposed project is not anticipated to cause substantial adverse impact to existing natural resources within the surrounding area, community, or region.

5. The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

The proposed project involves the construction of four (4) exploratory wells to be drilled, cased, and tested in the Lahaina District of West Maui in order to determine potential water yield and water quality. If warranted following initial test results, well boreholes may be reamed and the well(s) will be cased and full-scale pump tests will be conducted. Related site improvements include the construction of a gently sloping pad and a chain-link security fence around the well sites. The wells will impose minimal visual and spatial impact on the surrounding environment while providing necessary exploratory wells and associated data. The proposed well sites are not located near an urban area, are not located on Prime or Unique farmland and are rated no higher than "C" by the LSB for agricultural productivity potential. As such, the proposed project is compatible with the locality and surrounding areas.

6. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

One (1) of the objectives of the proposed project is to ensure IIFS for the Kahoma Surface Water Hydrologic Unit, including Kahoma Stream and Kanahā Stream, are maintained. New development is limited to exploratory wells, site security in the form of chain link fences, and maintenance of access roadways. The proposed project will be compatible with surrounding land uses and will not impede scenic views or significantly alter the surrounding open spaces. The project area is located upslope of urban areas and proposes minimal visual massing for the proposed exploratory wells, and will therefore, not impede open space views. The natural beauty and open space of the Lahaina District of West Maui will continue to be preserved. As such, the proposed project is in alignment with this criterion.

7. Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and

If the exploratory wells are determined to be viable sources of water and are located on private lands, DWS may work with the property owner to subdivide and purchase the approximately 1-acre portion of the parcel upon which the well would be located. The subdivision of the land would not increase the intensity of land uses in the Conservation District.

8. **The proposed land use will not be materially detrimental to the public health, safety, and welfare.**

As noted previously, part of the purpose of the proposed project to ensure continued maintenance of IIFS for the Kahoma Surface Water Hydrologic Unit, including Kahoma Stream and Kanahā Stream, to support traditional and customary Native Hawaiian practices and water rights. As the project is limited to the construction of exploratory wells and related improvements, the proposed project will not adversely impact public health, safety, and welfare.

B. HAWAIʻI STATE PLAN

Chapter 226, HRS, also known as the Hawaiʻi State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The Plan consists of three (3) parts. Part I includes the Overall Theme, Goals, Objectives, and Policies; Part II includes Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Part II of the State Plan covers its administrative structure and implementation process.

The overall theme of the Hawaiʻi State Plan is governed by the following general principles.

1. Individual and family self-sufficiency

2. Social and economic mobility

3. Community or social well-being

In consonance with the foregoing principles, the Hawaiʻi State Plan identifies three (3) clarifying goals:

1. A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaiʻi'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 Hawaiʻi, that nourishes a sense of community responsibility, of caring, and of participation in community life.

This section of the environmental assessment examines the applicability of the proposed action as it relates to the objectives, policies, and priority guidelines of the Hawai‘i State Plan, as set forth in HRS Sections 226-5 through 226-27.

The table below summarizes the relationship between the proposed action and the goals of the Hawai‘i State Plan. The relationship between the action and the goals are categorized into the following groups. More detailed analysis and discussion, including the methodology used, is presented in **Appendix "G"**.

1. **Directly applicable**: the action and its potential effects directly advances or promotes the objective, policy or priority guideline.

2. **Indirectly applicable**: the action and its potential effects indirectly supports or advances the objective, policy or priority guideline.

3. **Not applicable**: the action and its potential effects have no direct or indirect relationship to the objectives and policies of the Hawai‘i State Plan.

In general, a proposed action's applicability to the objectives, policies, and priority guidelines of the Hawai`i State Plan is judged on the basis of the action's direct or indirect relationship to the respective objectives, policies, and priority directions. It is recognized that the categorization of "applicability" is subject to interpretation and should be appropriately considered in the context of local and regional conditions. The analysis presented in **Table 7** and summarized below focuses on key elements of the proposed action's relationship to the Hawai‘i State Plan. Detailed discussion on the applicability of the proposed action to each goal and related objectives, policies, and implementing actions of the Hawai‘i State Plan is provided in **Appendix "G"**.

Table 7. Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies (HRS 226-1 to 226-27)

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 ensure, for the present and future generations, those elements of choice and mobility that ensure 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.			

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
Chapter 226-5 Objective and Policies for Population			
Objective:			
(a) 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.		✓	
Chapter 226-6 Objectives and policies for the economy – – in general			
Objectives:			
(a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.		✓	
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.		✓	
Chapter 226-7 Objectives and policies for the economy – – agriculture.			
Objectives:			
(a) 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.			✓
Chapter 226-8 Objective and policies for the economy – – visitor industry.			
Objective:			
(a) 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.			✓
Chapter 226-9 Objective and policies for the economy – – federal expenditures.			
Objective:			
(a) 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.			✓

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
Chapter 226-10 Objective and policies for the economy – – potential growth and innovative activities.			
Objective:			
(a) 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.			✓
Chapter 226-10.5 Objectives and policies for the economy – – information industry.			
Objective:			
(a) 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.			✓
Chapter 226-11 Objectives and policies for the physical environment – – land based, shoreline, and marine resources.			
Objectives:			
(a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.	✓		
(2) Effective protection of Hawaii's unique and fragile environmental resources.	✓		
Chapter 226-12 Objective and policies for the physical environment – – scenic, natural beauty, and historic resources.			
Objective: (a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.		✓	
Chapter 226-13 Objectives and policies for the physical environment – – land, air, and water quality.			
Objectives:			
(a) 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.		✓	

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
(2) Greater public awareness and appreciation of Hawaii's environmental resources.		✓	
Chapter 226-14 Objective and policies for facility systems – – in general.			
Objective:			
(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, sustainable development, climate change adaptation, sea level rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.		✓	
Chapter 226-15 Objectives and policies for facility systems – – solid and liquid waste.			
Objectives:			
(a) 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.			✓
Chapter 226-16 Objective and policies for facility systems – – water.			
Objective:			
(a) 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.	✓		
Chapter 226-17 Objectives and policies for facility systems – – transportation.			
Objectives:			
(a) 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.			✓
Chapter 226-18 Objectives and policies for facility systems – – energy.			
Objectives:			
(a) 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:			

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
(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.			✓
Chapter 226-18.5 Objectives and policies for facility systems – – telecommunications.			
Objective:			
(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.			✓
Chapter 226-19 Objectives and policies for socio-cultural advancement – – housing.			
Objectives:			
(a) 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.			✓
Chapter 226-20 Objectives and policies for socio-cultural advancement – – health.			
Objectives:			
(a) 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.			✓

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
(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.			✓
Chapter 226-21 Objectives and policies for Socio-cultural advancement – – education.			
Objective:			
(a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.			✓
Chapter 226-22 Objective and policies for socio-cultural advancement – – social services.			
Objective:			
(a) 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.			✓
Chapter 226-23 Objective and policies for socio-cultural advancement – – leisure.			
Objective:			
(a) 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.			✓
Chapter 226-24 Objective and policies for socio-cultural advancement – – individual rights and personal well-being.			
Objective:			
(a) 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.			✓
Chapter 226-25 Objective and policies for socio-cultural advancement – – culture.			
Objective:			
(a) 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.		✓	

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
Chapter 226-26 Objectives and policies for socio-cultural advancement – – public safety.			
Objectives:			
(a) 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.			✓
Chapter 226-27 Objectives and policies for socio-cultural advancement – – government.			
Objectives:			
(a) 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.			✓

The proposed project involves the construction of four (4) exploratory wells at two (2) sites within the Launiupoko Aquifer. An additional site in Launiupoko and two (2) sites in the Honolua Aquifer were evaluated as alternative exploratory well sites. The purpose of the exploratory wells is to identify viable water sources to ensure adequate water resources are available in the West Maui region to satisfy IIFS for the Kahoma Surface Water Hydrologic Unit, which includes Kahoma Stream and Kanahā Stream, while supporting traditional and customary Native Hawaiian practices and water rights. The proposed action is most directly applicable to the State's objectives and policies for facility systems with regard to the provision of an adequate supply of water to accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities. The proposed exploratory wells represent planning for the development of water resources through evaluation of multiple well sites to ensure adequate availability and water quality. Additionally, the proposed project promotes the State's objectives and policies for the physical environment through testing and evaluation of the exploratory wells to ensure compatibility between facilities and natural resources. Exploratory testing will be conducted to evaluate water quality, flows, and potential impacts to Kanahā and Kahoma streams. A separate EA process would be carried out should the exploratory testing be successful for the conversion of the exploratory wells to production wells.

Indirectly, the proposed action is applicable to the State's objectives and policies for ensuring the availability of natural resources to support the State's growing population through development of water resources to address water demand. Design and construction efforts are anticipated to have positive economic impacts for construction companies and material suppliers. Furthermore, cultural and archaeological investigations have been conducted through site visits, preparation of a CIA, and consultation with the State Historic Preservation Division (SHPD).

PRIORITY GUIDELINES

"Priority guidelines" means those guidelines which shall take precedence when addressing areas of statewide concern. This section addresses applicability criteria to the priority guidelines set forth in HRS 226-103.

Priority guidelines of the Hawai'i State Plan cover the economy, population growth and land resources, crime and criminal justice, affordable housing, quality education, sustainability, and climate change adaptation.

The table below summarizes the relationship between the proposed action and the priority guidelines of the Hawai'i State Plan. A more detailed discussion is presented in **Appendix "G"**.

Table 8. Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies (Chapters 226-101 to 226-109)

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**	**N/A**
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 development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy		✓	
(b) Priority guidelines to promote the economic health and quality of the visitor industry			✓
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries			✓
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture			✓

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	N/A
(e) Priority guidelines for water use and development	✓		
(f) Priority guidelines for energy use and development			✓
(g) Priority guidelines to promote the development of the information industry			✓
Chapter 226-104: Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution		✓	
(b) Priority guidelines for regional growth distribution and land resource utilization			✓
Chapter 226-105: Crime and criminal justice.			
Priority guidelines in the area of crime and criminal justice			✓
Chapter 226-106: Affordable housing.			
Priority guidelines for the provision of affordable housing			✓
Chapter 226-107: Quality education.			
Priority guidelines to promote quality education			✓
CHAPTER 226-108: Sustainability			
Priority guidelines and principles to promote sustainability		✓	
CHAPTER 226-109: Climate change adaptation priority guidelines			
Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:		✓	

The proposed exploratory well project is most applicable to the State's priority guidelines for economic and population growth and sustainability. The proposed exploratory wells support research and development of water sources and potential water system improvements. Testing of the exploratory wells will aid in determining the adequacy and availability of water from the sites. Should the tests be successful, the conversion of exploratory wells to production wells will be assessed to ensure the withdrawal of water will not have significant adverse impacts to the Launiupoko Aquifer or the Honolua Aquifer. The proposed action promotes water sector resilience through the pursuit of additional groundwater sources. Additionally, the project will be implemented outside of natural landscape hazards such as the tsunami evacuation zone and the project sea level rise hazard zone.

C. STATE FUNCTIONAL PLAN

A key element of the Statewide Planning System is the Functional Plans, which set forth the policies, statewide guidelines, and priorities within a specific field of activity. Thirteen Functional Plans which have been developed by the State agency are primarily responsible for a given functional area. Together with the County General Plans, the State Functional Plans establish more specific strategies for implementation. In particular, State Functional Plans provide for the following:

- Identify major Statewide priority concerns
- Define current strategies for each functional area
- Identify major relationships among functional areas
- Provide direction and strategies for departmental policies, programs, and priorities
- Provide a guide for the allocation of resources
- Coordinate State and County roles and responsibilities in the implementation of the Hawai'i State Plan

Table 9 provides an assessment of the relationship between the proposed action and each of the 13 Functional Plans.

Table 9. Relationship Between the Proposed Launiupoko Exploratory Wells and the State Functional Plans

	State Functional Plan	State Coordinating Agency	Purpose	Analysis
1	Agriculture Functional Plan (1991)	Department of Agriculture	Continued viability of agriculture throughout the State	As an exploratory well project, the proposed action is not applicable to the Agricultural Functional Plan. The lands under the proposed project sites are not in agricultural cultivation. The total exploratory well sites encompass approximately six (6) acres and are not significant in terms of the region's vast agricultural areas.
2	Conservation Lands State Functional Plan (1991)	Department of Land and Natural Resources	Addresses issues of population and economic growth and its strain on current natural resources; broadening public use of natural resources while protecting lands and shorelines from overuse; additionally, promotes the aquaculture industry	The proposed exploratory well Sites L-1 and L-2 are located within the SLUC “Conservation” District. The OCCL was consulted on this project and they noted that the proposed action is allowed in the “Conservation” District with the approval of a Conservation District Use Permit (CDUP), which will be obtained prior to construction. In addtion, construction BMPs will be used to manage and control erosion during grading operations to minimize downstream water quality impacts. Work on the project is not anticipated to be affected by natural hazards, and industry standard design and construction practices have been and will be employed for the project.
3	Education State Functional Plan (1989)	Department of Education	Improvements to Hawai‘i’s educational curriculum, quality of educational staff, and access to adequate facilities	The proposed project is not applicable to the Education State Functional Plan.
4	State Functional Plan (1990)	Department of Labor and Industrial Relations	Improve the qualifications, productivity, and effectiveness of the State’s workforce through better education and training of workers as well as efficient planning of economic development, employment opportunities, and training activities	The proposed project supports design and construction activity which contributes to increased employment opportunities, job choices, and living standards. Businesses positively affected by the project are those which support the

	State Functional Plan	State Coordinating Agency	Purpose	Analysis
				design and construction industry such as architects and engineers, material suppliers, equipment rental companies, and landscape companies. As such, the proposed project is anticipated to have a beneficial impact on local employment.
5	Energy State Functional Plan (1991)	Department of Business, Economic Development and Tourism	Lessen the reliance on petroleum and other fossil fuels in favor of alternative sources of energy so as to keep up with the State's increasing energy demands while also becoming a more sustainable island state; achieving dependable, efficient, and economical statewide energy systems	The proposed project is not applicable to the Energy State Functional Plan.
6	Health State Functional Plan (1989)	Department of Health	Improve health care system by providing for those who don't have access to private health care providers; increasing preventative health measures; addressing 'quality of care' elements in private and public sectors to cut increasing costs	The proposed project is not applicable to the Health State Functional Plan.
7	Higher Education Functional Plan (1984)	University of Hawai'i	Prepare Hawai'i's citizens for the demands of an increasingly complex world through providing technical and intellectual tools	The proposed project is not applicable to the Higher Education Functional Plan.
8	Historic Preservation State Functional Plan (1991)	Department of Land and Natural Resources	Preservation of historic properties, records, artifacts and oral histories; provide public with information/education on the ethnic and cultural heritages and history of Hawai'i	Archaeological and cultural studies, including a CIA, LRFI, and AFI for the relocated Well Site L-3, have been carried out on the subject properties to provide information on the cultural resources and history in support of the Historic Preservation State Functional Plan.
9	Housing State Functional Plan (2017)	Hawai'i Housing Finance and Development Corporation	Based largely on joint public/private efforts to finance, build, and maintain an adequate supply of affordable housing. It will be a working tool to guide the State, the counties, as well as the private sector in meeting the	As an exploratory well project, the proposed action is not applicable to the Housing State Functional Plan.

	State Functional Plan	State Coordinating Agency	Purpose	Analysis
			overall goal that every Hawaii resident will have the opportunity to live in a safe, decent and affordable home.	
10	Human Services State Functional Plan (1989)	Department of Human Services	Refining support systems for families and individuals by improving elderly care, increasing preventative measures to combat child/spousal abuse and neglect; providing means for 'self-sufficiency'	The proposed project is not applicable to the Human Services State Functional Plan.
11	Recreation State Functional Plan (1991)	Department of Land and Natural Resources	Manage the use of recreational resources via addressing issues: (1) ocean and shoreline recreation, (2) mauka, urban, and other recreation opportunities, (3) public access to shoreline and upland recreation areas, (4) resource conservation and management, (5) management of recreation programs/facilities/areas, and (6) wetlands protection and management	The proposed project is not applicable to the Recreation State Functional Plan.
12	Tourism State Functional Plan (1991)	Department of Business, Economic Development and Tourism	Balance tourism/economic growth with environmental and community concerns; development that is cognizant of the limited land and water resources of the islands; maintaining friendly relations between tourists and community members; development of a productive workforce and enhancement of career and employment opportunities in the visitor industry	The proposed project is not applicable to the Toursim State Functional Plan.
13	Transportation State Functional Plan (1991)	Department of Transportation	Development of a safer, more efficient transportation system that also is consistent with planned physical and economic growth of the state; construction of facility and infrastructure improvements; develop a transportation system balanced with new alternatives; pursue land use initiatives which help reduce travel demand	The proposed project is not applicable to the Transportation State Functional Plan.

D. HAWAIʻI 2050 SUSTAINABILITY PLAN

The Hawaiʻi 2050 Sustainability Plan is intended to serve as the State's climate and sustainability strategic action plan pursuant to Hawaiʻi Revised Statutes (HRS) Section 226-65. The Hawaiʻi 2050 Sustainability Plan was developed using public engagement consistent with a community-driven approach in addition to collaboration with state and county stakeholder agencies.

The analysis to follow focuses on what the Plan describes as the Decade of Action. The Decade of Action is defined as 2020-2030, a timeframe in which the United Nations declared to accelerate sustainable solutions for the biggest climate challenges. This analysis looks at eight (8) Recommended Actions which contain 38 strategies intended to guide Hawaiʻi to a more sustainable future. **Table 10** outlines the ways in which the project meets the Recommended Actions outlined by the Plan.

Table 10. Hawaiʻi 2050 Sustainability Plan (HRS, Section 226-65)

Hawaiʻi 2050 Sustainability Plan (HRS, Section 226-65) **DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable**	**DA**	**IA**	**N/A**
1. Promote a Sustainable Economic Recovery			
Strategy 1: Support farmer livelihoods		✓	
Strategy 2: Support local markets for locally grown food			✓
Strategy 3: Promote sustainable & resilient farmland, practices, and infrastructure			✓
Strategy 4: Invest in green workforce development beginning with youth.			✓
Strategy 5: Foster the development of jobs that can sustain families financially.			✓
Strategy 6: Support diversification of the economy.			✓
Strategy 7: Reduce the environmental footprint of the tourism industry.			✓
Strategy 8: Support native Hawaiian culture and reduce impacts of the tourism industry to local communities.		✓	
Analysis: **The proposed project would ensure continued maintenance of IIFS for the Kanahā Stream, within the Kahoma Surface Water Hydrologic Unit, to support traditional and customary Native Hawaiian practices and water rights. As such, the project indirectly supports Native Hawaiian agricultural and cultural practices that rely on instream flow of the Kanahā Stream.**			
2. Reduce Greenhouse Gas Emissions			
Strategy 9: Measure, manage, and plan for GHG emission reduction.			✓
Strategy 10: Incorporate climate change planning into decision-making processes.			✓
Strategy 11: Promote energy conservation and efficiency through outreach, communication, and community and public engagement.			✓
Strategy 12: Continue to invest in the deployment of clean energy technologies to reduce reliance on fossil fuels.			✓
Strategy 13: Expand the adoption of zero emission vehicles.			✓

Hawai‘i 2050 Sustainability Plan (HRS, Section 226-65) DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable	DA	IA	N/A
Strategy 14: Promote alternative modes of transportation.			✓
Strategy 15: Reduce the generation of waste, including plastic waste.			✓
Strategy 16: Increase diversion of waste through recycling, reuse, and composting.			✓
***Analysis*: As the proposed project is limited to the construction and testing of exploratory wells to assess potential yield and water quality for the maintenance of IIFS for the Kanahā Stream, the project does not directly or indirectly impact GHG emissions.**			
3. Improve Climate Resilience			
Strategy 17: Integrate climate change adaptation and resilience considerations into planning and implementation.	✓		
Strategy 18: Assess and communicate the impacts of climate change to residents, businesses, and communities most likely to be impacted.			✓
Strategy 19: Implement actions that improve the state's resilience to climate change.		✓	
Strategy 20: Increase the resilience of vulnerable populations to the impacts of climate change and other shocks and stressors.		✓	
***Analysis:* The proposed construction and testing of exploratory wells to assess potential yield and water quality for the continued maintenance of IIFS for the Kanahā Stream would allow for enhanced biological and natural conditions surrounding the Stream while promoting climate resilience by providing exploratory wells for potential conversion to permanent wells, which would provide backup water access for IIFS requirements and domestic water usage. As such, the project will improve climate resilience during drought conditions.**			
4. Advance Sustainable Communities			
Strategy 21: Advance smart growth initiatives and multimodal transportation systems.			✓
Strategy 22: Advance sustainability in school and university operations			✓
Strategy 23: Integrate sustainable design principles into new and existing buildings.			✓
***Analysis:* The proposed project is limited to the construction and testing of exploratory wells to assess potential yield and water quality for the maintenance of IIFS for the Kanahā Stream and does not involve smart growth initiatives, multimodal transpotation systems, educational operations, or new buildings. As such, the project does not directly or indirectly impact the advancement of sustainable communities.**			
5. Advance Equity			
Strategy 24: Strengthen broadband access to support digital learning and online solutions in rural areas.			✓
Strategy 25: Continue to improve economic and social sustainability of individuals through access to affordable housing.			✓
Strategy 26: Continue to implement strategies that reduce homelessness in Hawai‘i to enhance livelihoods.			✓
Strategy 27: Continue to advance opportunities for all, regardless of gender.			✓

Hawai'i 2050 Sustainability Plan (HRS, Section 226-65) DA = Directly Applicable, IA = Indirectly Applicable, N/A = Not Applicable	DA	IA	N/A
Analysis: **The proposed project is limited to the construction and testing of exploratory wells to assess potential yield and water quality for the maintenance of IIFS for the Kanahā Stream and does not involve broadband internet access, access to affordable housing, strategies to reduce homelessness, or efforts to advance equitable opportunities for all. As such, the project does not directly or indirectly impact the advancement of equity in the community.**			
6. Institutionalize Sustainability Throughout Government			
Strategy 28: Invest in staff and other resources to coordinate and advance sustainability goals across state agencies and local governments.			✓
Strategy 29: Update state policies to reflect sustainability and climate change priorities.			✓
Strategy 30: Incorporate sustainability into government operations.			✓
Analysis: **The proposed exploratory wells do not directly or indirectly relate to institutionalizing sustainability in government.**			
7. Preserve the Natural Environment			
Strategy 31: Improve water quality through reduced pollution and dumping.			✓
Strategy 32: Support water reuse strategies to conserve water.			✓
Strategy 33: Establish policies to protect Hawai'i's unique marine ecosystems.			✓
Strategy 34: Manage climate change impacts to marine resources.			✓
Strategy 35: Protect and manage watersheds.		✓	
Strategy 36: Continue to adopt strategies that protect land-based natural resources.		✓	
Strategy 37: Conserve working forest landscapes, protect forests from harm, and enhance public benefits from trees and forests.			✓
Analysis: **The proposed construction and testing of exploratory wells to assess potential yield and water quality for the continued maintenance of IIFS for the Kanahā Stream would facilitate the preservation of the natural environment by enhacing water accessibility and developing sufficient wells to draw upon during the dry season and mitigate potential drought impacts on water supply. As such, the project will enhance protections for watersheds in West Maui, ensure the continued instream flow of the Kanahā Stream, and protect the traditional and customary practices that utilize these natural features.**			
8. Perpetuate Traditional Ecological Knowledge and Values			
Strategy 38: Ground climate and sustainability strategies in our cultural foundation.	✓		
Analysis: **The proposed project would maintain IIFS for the Kanahā Stream, which supports traditional and customary Native Hawaiian practices and water rights. As such, the project directly supports the perpetuation of traditional ecological knowledge or values.**			

E. GENERAL PLAN OF THE COUNTY OF MAUI

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a Maui Island Plan.

1. Countywide Policy Plan

The Countywide Policy Plan was adopted in March 2010 and is a comprehensive policy document for the islands of Maui County to the year 2030. The plan replaces the General Plan of the County of Maui 1990 Update and provides the policy framework for the development of the Maui Island Plan as well as for updating the nine (9) detailed Community Plans. The Countywide Policy Plan provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future. Goals are intended to describe a desirable condition of the County by the year 2030 and are intentionally general. Objectives tend to be more specific and may be regarded as milestones to achieve the larger goals. Policies are not intended as regulations, but instead provide a general guideline for County decision makers, departments, and collaborating organizations toward the attainment of goals and objectives. Implementing actions are specific tasks, procedures, programs, or techniques that carry out policy.

Table 11 below summarizes the relationship between the proposed action and the 11 goals of the Countywide Policy Plan. The relationship between the action and the goals are categorized into the following groups. A more detailed analysis and discussion, including the methodology used, is presented in **Appendix "G-1"**.

1. **Directly applicable:** the action and its potential effects directly advances, promotes or affects the relevant goal, objective, or policy.

2. **Indirectly applicable:** the action and its potential effects indirectly supports, advances or affects the objective, policy or priority guideline.

3. **Not applicable:** the action and its potential effects have no direct or indirect relationship to the objectives and policies of the Countywide Policy Plan.

In general, a proposed action's applicability to the goals, objectives, policies, and implementing actions of the Countywide Policy Plan is judged on the basis of the action's direct or indirect relationship to the respective objectives, policies, and priority directions. It is recognized that the categorization of "applicability" is subject to interpretation and should be appropriately considered in the context of local and regional conditions. The analysis presented in **Table 11** and summarized below focuses on key elements of the proposed action's relationship to the Countywide Policy Plan. Detailed discussion on the applicability of the proposed action to each goal and related objectives, policies, and implementing actions of the Countywide Policy Plan is provided in **Appendix "G-1"**.

Table 11. Countywide Policy Plan

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
A. PROTECT THE NATURAL ENVIRONMENT			
Goal: Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.		✓	
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.		✓	
C. IMPROVE EDUCATION			
Goal: Residents will have access to lifelong formal and informal educational options enabling them to realize their ambitions.			✓
D. STRENGTHEN SOCIAL AND HEALTHCARE SERVICES			
Goal: Health and social services in Maui County will fully and comprehensively serve all segments of the population.			✓
E. EXPAND HOUSING OPPORTUNITIES FOR RESIDENTS			
Goal: Quality, island-appropriate housing will be available to all residents.			✓
F. STRENGTHEN THE LOCAL ECONOMY			
Goal: Maui County's economy will be diverse, sustainable, and supportive of community values.		✓	
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.			✓
H. DIVERSIFY TRANSPORTATION OPTIONS			
Goal: Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
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.	✓		
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.		✓	
K. STRIVE FOR GOOD GOVERNANCE			
Goal: Government services will be transparent, effective, efficient, and responsive to the needs of residents.		✓	
L. MITIGATE CLIMATE CHANGE AND WORK TOWARD RESILIENCE			
Goal: Minimize the causes and negative effects of climate change.			✓

The proposed exploratory wells project directly and indirectly advance the Countywide Policy Plan's objective and policies for improving physical infrastructure through the research and testing of potential ground water sources in Lahaina to identify viable sources of potable water for public trust purposes. Indirectly, the project supports the goal of protecting the natural environment through the preparation of this EA and related technical studies. A biological resources survey and report was prepared for each of the five (5) sites evaluated in this EA. The survey results did not identify endangered or threatened species and their habitats. The proposed action is intended to identify a water source to eventually restore stream flow to the Kanahā Stream, indirectly supporting the restoration of stream flow and support of Native Hawaiian aquatic species and traditional kalo cultivation. As well, the preparation of a CIA and consultation with SHPD indirectly supports the perpetuation of traditional Hawaiian cultural practices and history.

2. Maui Island Plan

The Maui Island Plan (MIP) is applicable to the island of Maui only, providing more specific policy-based strategies for population, land use, transportation, public and community facilities, water and wastewater systems, visitor destinations, urban design, and other matters related to future growth.

As provided by Chapter 2.80B, the MIP shall include the following components:

1. *An island-wide land use strategy, including a managed and directed growth plan*

2. *A water element assessing supply, demand and quality parameters*

3. *A nearshore ecosystem element assessing nearshore waters and requirements for preservation and restoration*

4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*

5. *Milestone indicators designed to measure implementation progress of the MIP*

The MIP addresses a number of planning categories with detailed policy analysis and recommendations which are framed in terms of goals, objectives, policies, and implementing actions. These planning categories address the following areas:

1. *Population*

2. *Heritage Resources*

3. *Natural Hazards*

4. *Economic Development*

5. *Housing*

6. *Infrastructure and Public Facilities*

7. *Land Use*

Additionally, an essential element of the MIP is its directed growth plan, which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town boundaries, and rural growth boundaries. The respective boundaries identify areas appropriate for future growth and their corresponding intent with respect to development character.

The proposed well sites are not classified within the directed growth plan of the MIP. Well Sites L-1 and L-2 are identified as State Conservation, however, they are otherwise not designated by the MIP. Well Site H-2 is classified as "Sensitive Lands" within the MIP protected areas. The MIP provides that the Maui County Council and Administration should be notified if a development may compromise a protected area. Well Site H-2 is analyzed in this EA as an alternative well location. Should the DWS pursue Well Site H-2, it will coordinate with the County Council and Administration. See **Figure 24** and **Figure 25**.

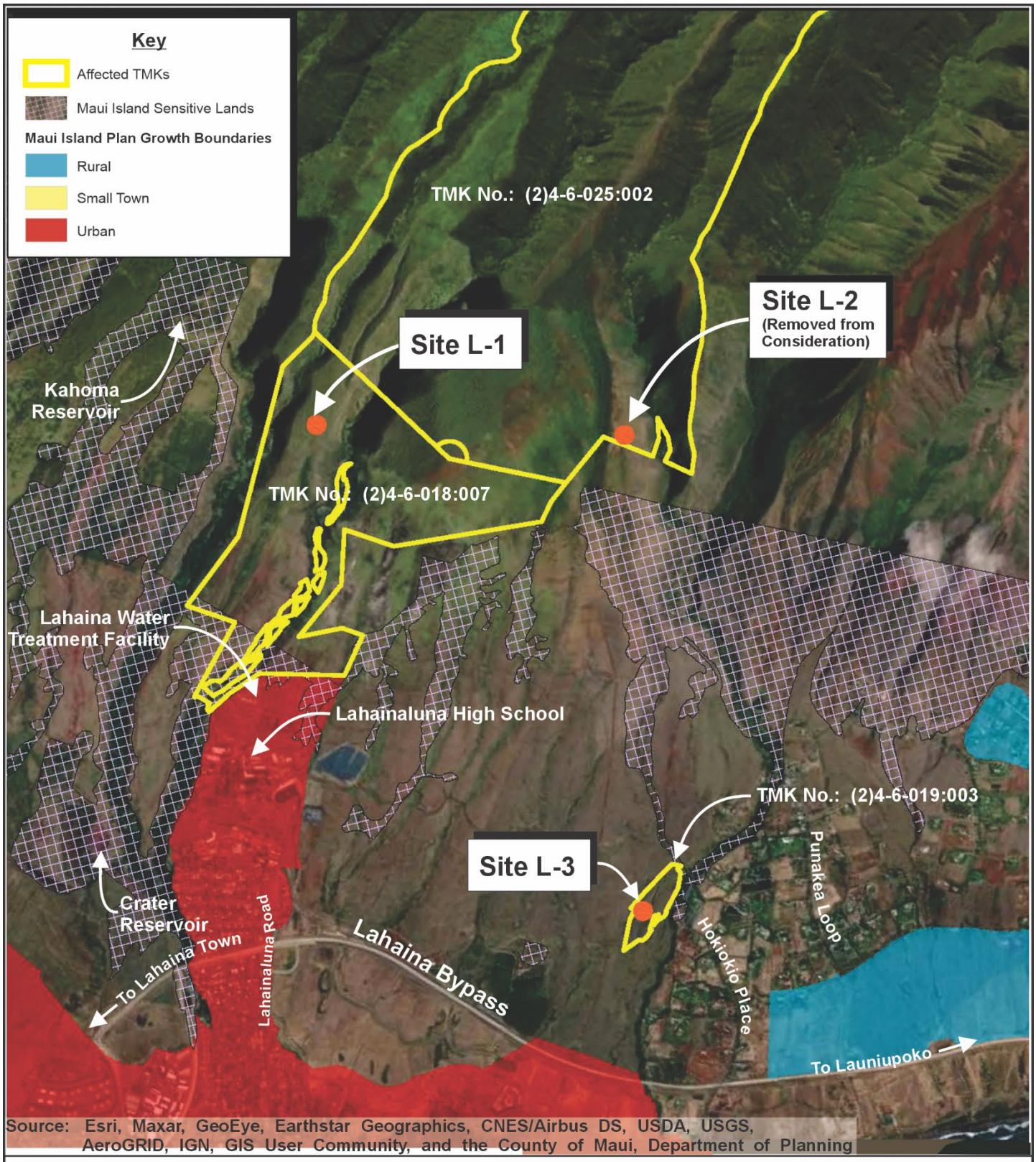


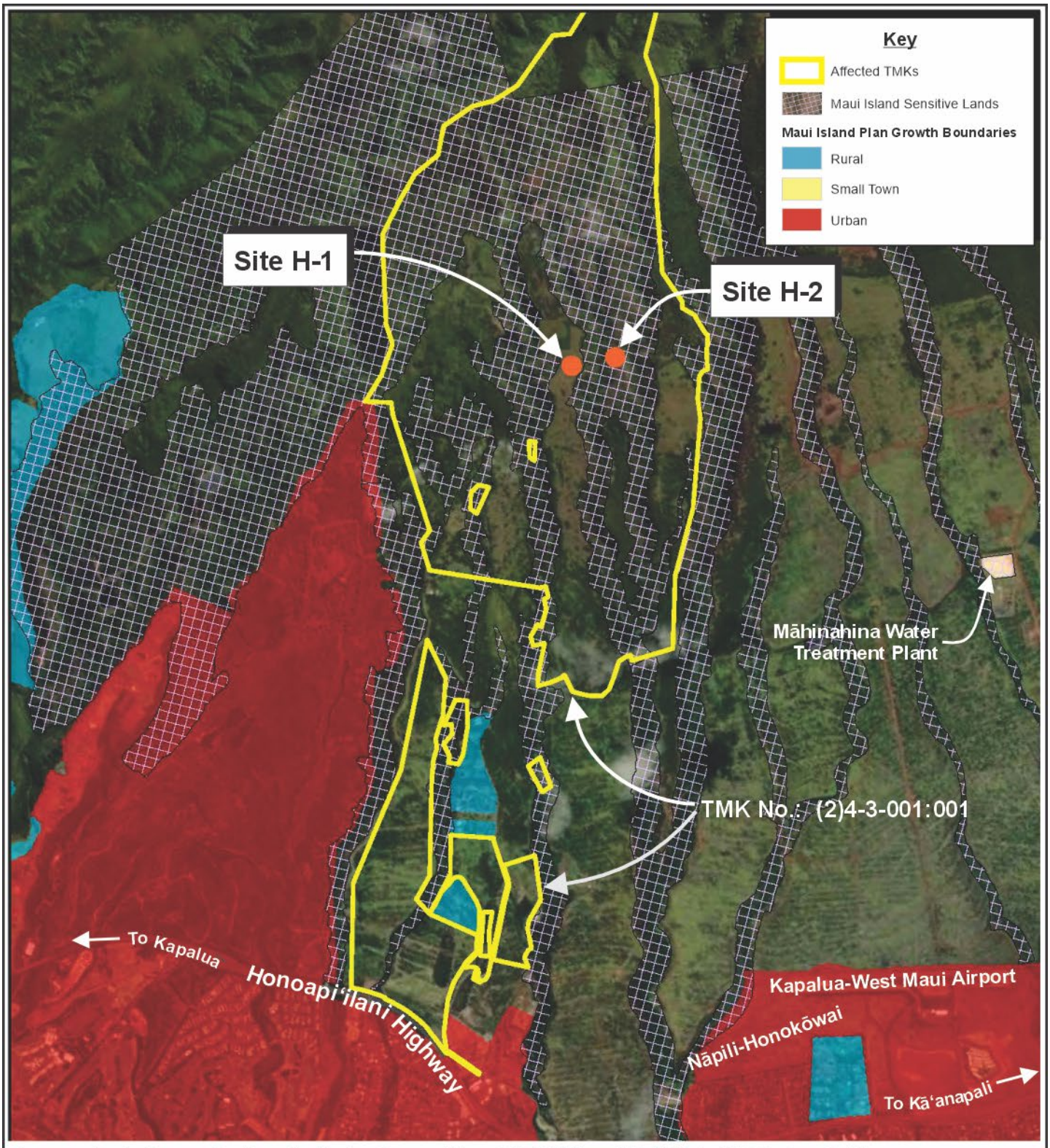
Figure 24 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Maui Island Plan Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 MIP



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 25

Launiupoko Exploratory Wells
Sites H-1 and H-2
Maui Island Plan Map

1250 Feet
0 625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 MIP

Table 12 below summarizes the relationship between the proposed action and the goals of the MIP. The relationship between the action and the goals are categorized into the following groups. More detailed analysis and discussion, including the methodology used, is presented in **Appendix "G-2"**.

1. **Directly applicable:** the action and its potential effects directly advances or promotes the objective, policy or priority guideline.

2. **Indirectly applicable:** the action's potential effects indirectly support or advances the objective, policy or priority guideline.

3. **Not applicable:** The action and its potential effects have no direct or indirect relationship to the objectives and policies of the Maui Island Plan.

In general, a proposed action's applicability to the MIP is judged on the basis of the action's direct or indirect relationship to the respective objectives, policies, and priority directions. It is recognized that the categorization of "applicability" is subject to interpretation and should be appropriately considered in the context of local and regional conditions. The analysis presented in **Table 12** and summarized below focuses on key elements of the proposed action's relationship to the MIP. Detailed discussion on the applicability of the proposed action to each goal and related objectives, policies, and implementing actions of the MIP is provided in **Appendix "G-2"**.

Table 12. Maui Island Plan 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			
1.1 Maui's people, values, and lifestyles thrive through strong, healthy, and vibrant island communities.		✓	
CHAPTER 2 – HERITAGE RESOURCES			
CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES ISSUES			
2.1 Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.		✓	
SHORELINE, REEFS, AND NEARSHORE WATERS			
2.2 An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.		✓	
WATERSHEDS, STREAMS, AND WETLANDS ISSUES			
2.3 Healthy watersheds, streams, and riparian environments.		✓	

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
WILDLIFE AND NATURAL AREAS			
2.4 Maui's natural areas and indigenous flora and fauna will be protected.		✓	
SCENIC RESOURCES			
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.			✓
CHAPTER 3 – NATURAL HAZARDS			
3.1 Maui will be disaster resilient.			✓
CHAPTER 4 – ECONOMIC DEVELOPMENT			
ECONOMIC DIVERSIFICATION			
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.		✓	
TOURISM			
4.2 A healthy visitor industry that provides economic well-being with stable and diverse employment opportunities.			✓
AGRICULTURE			
4.3 Maui will have a diversified agricultural industry contributing to greater economic, food, and energy security and prosperity.			✓
EMERGING SECTORS			
4.4 A diverse array of emerging economic sectors.			✓
SMALL BUSINESS DEVELOPMENT			
4.5 Small businesses will play a key role in Maui's economy.			✓
HEALTH CARE SECTOR			
4.6 Maui will have a health care industry and options that broaden career opportunities that are reliable, efficient, and provide social well-being.			✓
EDUCATION AND WORKFORCE DEVELOPMENT			
4.7 Maui will have effective education and workforce development programs and initiatives that are aligned with economic development goals.			✓
CHAPTER 5 – HOUSING			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
CHAPTER 6 – INFRASTRUCTURE AND PUBLIC FACILITES			
SOLID WASTE			
6.1 Maui will have implemented the ISWMP thereby diverting waste from its landfills, extending their capacities.			✓
WASTEWATER			
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.			✓
WATER			
6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.	✓		
TRANSPORTATION			
6.4 An interconnected, efficient, and well-maintained, multimodal transportation system.			✓
TRANSIT			
6.5 An island-wide transit system that addresses the needs of residents and visitors and contributes to healthy and livable communities.			✓
PARKS			
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.			✓
PUBLIC FACILITIES			
6.7 Maui will have adequate public facilities that meet the diverse needs of residents.			✓
SCHOOLS AND LIBRARIES			
6.8 Maui will have school and library facilities that meet residents' needs and goals.			✓
HEALTH CARE			
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.			✓
ENERGY			
6.10 Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
HARBORS AND AIRPORT			
6.11 Maui will have harbors and airports that will efficiently, dependably, and safely facilitate the movement of passengers and cargo.			✓
CHAPTER 7 – LAND USE			
AGRICULTURAL LANDS			
7.1 Maui will have a prosperous agricultural industry and will protect agricultural lands.			✓
RURAL AREAS			
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.			✓
URBAN AREAS			
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.			✓
CHAPTER 8 – DIRECTED GROWTH PLAN			
URBAN AND SMALL TOWN GROWTH AREA			
8.1 Maui will have well-serviced, complete, and vibrant urban communities and traditional small towns through sound planning and clearly defined development expectations.			✓
RURAL GROWTH AREA			
8.2 Maui will maintain opportunities for agriculture and rural communities through sound planning and clearly defined development expectations.			✓

The proposed project directly supports the MIP's goal for an environmentally sustainable, reliable, safe, and efficient water system. The proposed action involves analyzing pump test and water quality data to determine potential sources of potable water, directly advancing the objective for improving water quality and maintaining water systems in striving to meet the needs and balance the island's water needs. Indirectly, the project supports other goals of the MIP, including the goal of maintaining healthy watersheds, streams, and riparian environments. Appropriate BMPs will be implemented to minimize runoff and impacts to downstream properties. Furthermore, if successful, the potential new water source will be used to restore stream flow to Kanahā Stream. It is acknowledged that adequate stream flow allows for traditional kalo cultivation and sustenance of riparian ecosystems.

F. WEST MAUI COMMUNITY PLAN

The project site is located within the West Maui Community Plan (WCMP) region, one (1) of nine (9) community plan regions established in the County of Maui. Each region's growth and development is guided by a Community Plan. The County's Community Plan reflects current and anticipated conditions in the West Maui region and advances planning goals, objectives, policies, and implementation considerations to guide decision-making in the region. The primary purpose of the Community Plan is to outline a detailed agenda or carry out these policies and objectives. The West Maui Community Plan was adopted by the County of Maui through Ordinance Number 5334 and became effective on February 2, 2022. The Community Plan land use map designates the lands underlying project Well Sites L-1 and L-2 as "State Conservation". Well Site L-3, H-1, and H-2 are designated "Agricultural" by the West Maui Community Plan. See **Figure 26** and **Figure 27**.

The proposed project is consistent with the following goals, objectives, and policies of the WCMP as outlined below.

GOAL:

Ready and Resilient Systems

POLICIES (WATER):

> *2.1.10: Require public water systems, and to the extent legally allowable, private water systems to develop in a manner facilitating potential interconnection or integrated management to optimize pumpage, mitigate saltwater intrusion, prevent adverse impacts to streams, preserve regional resources, and preserve traditional and customary rights protected under the Hawai'i State Constitution, Article XII, Section 7.*

Response: The proposed exploratory well sites were selected over other potential well sites due to the higher likelihood of reaching the target pumpage of 0.775 mgd required per well, for a total of 1.55 mgd. Other sites considered were eliminated if saltwater intrusion or chloride levels were too high. Seepage run tests conducted by the USGS were reviewed to confirm that pumpage from the proposed exploratory wells will not impact surrounding stream flow. In addition, a CIA survey was conducted to identify traditional and customary practices in the project area and suggest mitigation to ensure the protection of traditional and customary rights. Mitigations proposed in the CIA include maintaining safe access for local residents to watercourses and culturally significant sites during and following project implementation; prioritizing community involvement through community meetings, advisory boards staffed by native community leaders, and engaging public-private partnerships between the community and the County; and finally protecting natural resources.

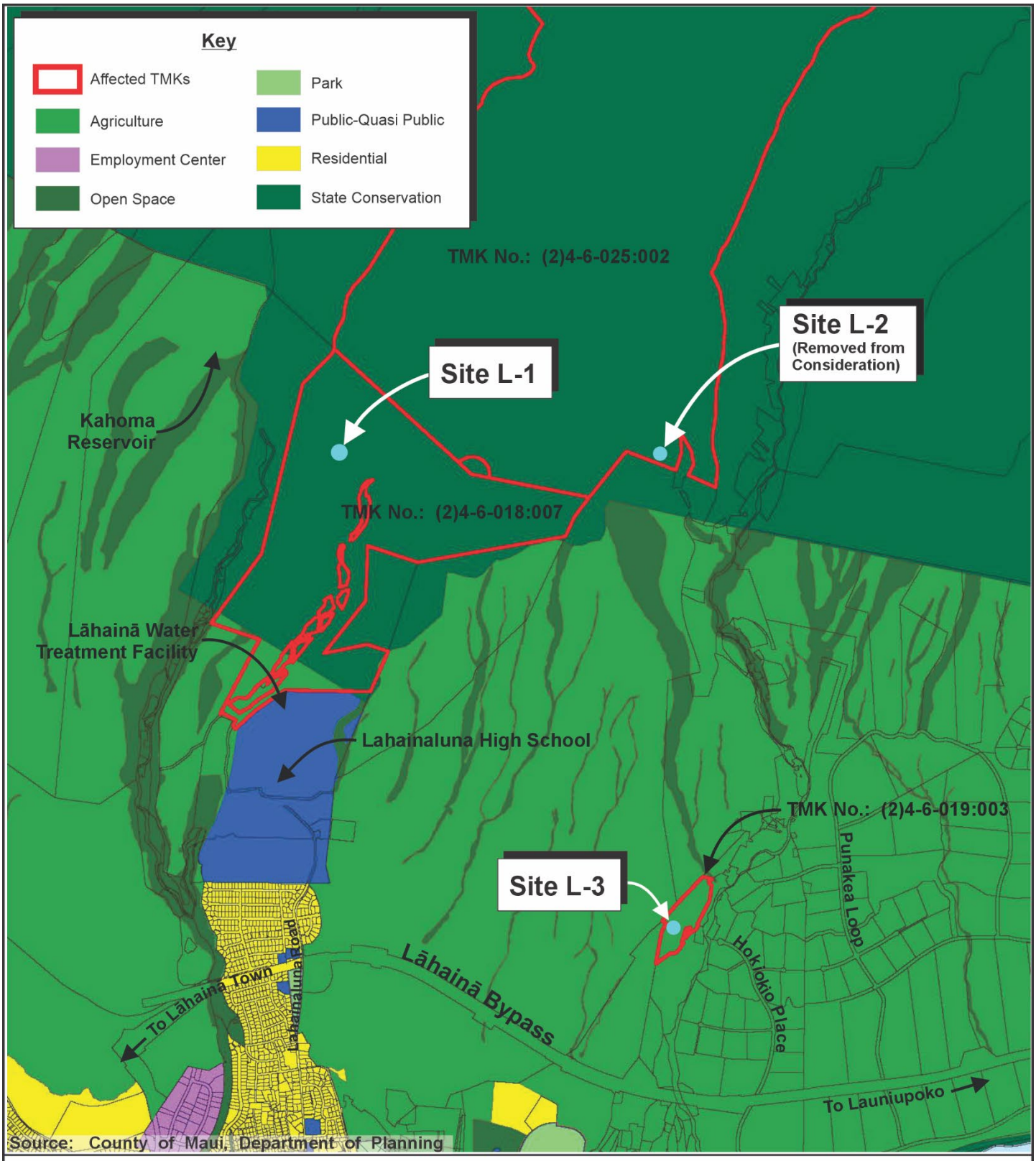


Figure 26 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
West Maui Community Plan Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L1L2L3 WMCP

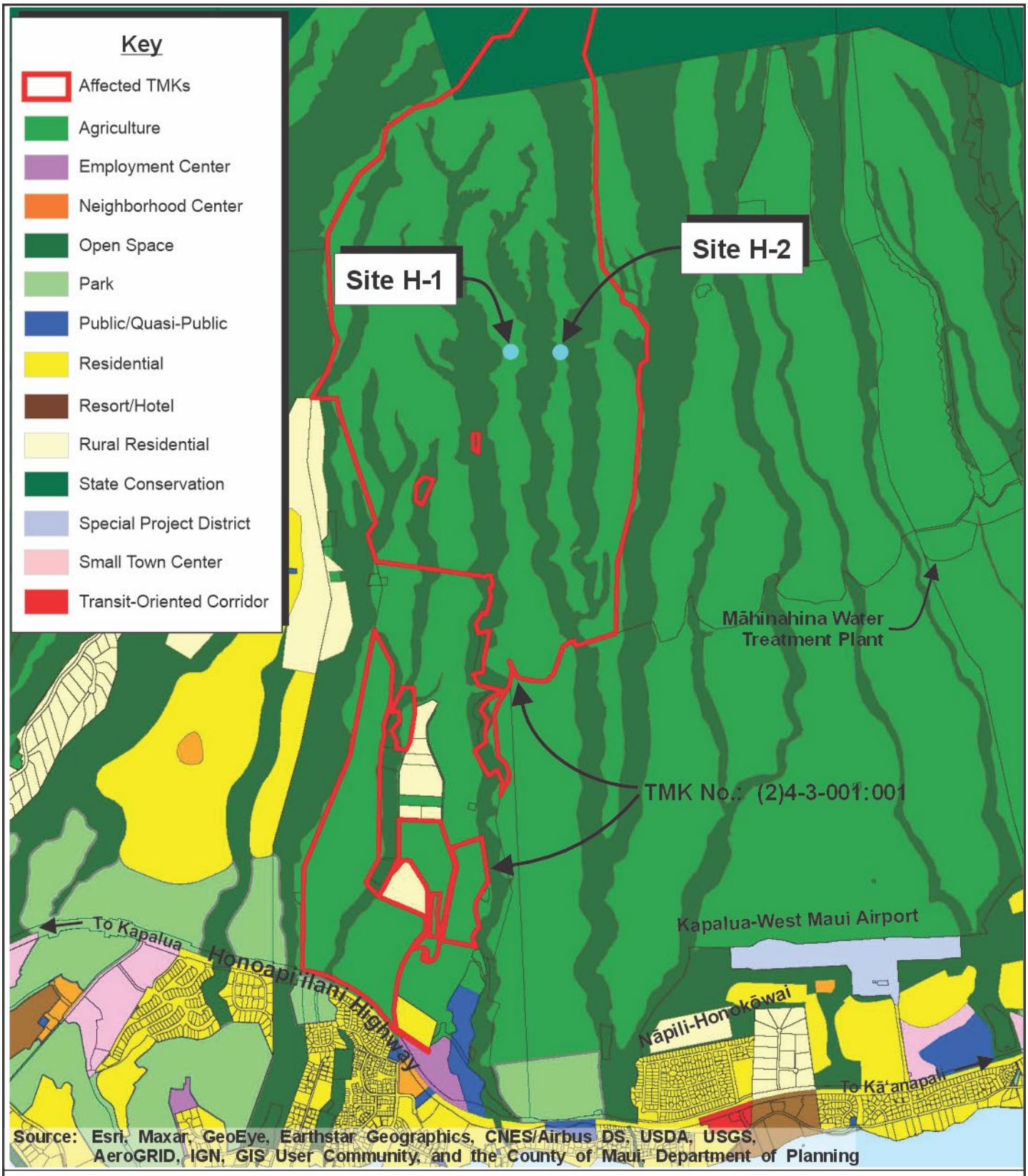


Figure 27

Launiupoko Exploratory Wells
Sites H-1 and H-2
West Maui Community Plan Map

1250 Feet
0 625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/H1H2 WMCP

GOAL:

Responsible Stewardship of Resources, Culture, and Character

POLICIES:

> *2.3.16 | All development projects must engage in consultation with the Aha Moku ʻo Maui representative associated with the project area – either Moku ʻo Lahaina or Moku ʻo Kāʻanapali – and provide evidence of this engagement to the Department.*

Response: The Aha Moku o Maui was contacted as part of the early consultation process for the Draft EA and the CIA. Of the Aha Moku o Maui, Keʻeaumoku Kapa, Uʻilani Kapu, and Suzette Montalvo Felicilda responded and participated in a group interview at Nā Aikāne o Maui and participated in a site visit; Kapali Keahi and Kaipo Kekona responded and participated in a group interview at Nā Aikāne o Maui; and Kekai Keahi responded and interviewed with Junya Nakoa and Kanoelani Steward. See **Appendix "F"**. A consultation meeting was also held with the Aha Moku o Maui during the preparation of the Ka Paʻakai Analysis. See **Appendix "F-1"**.

G. MAUI COUNTY ZONING

The proposed well sites are designated as "Agricultural" and "Interim" by Maui County Zoning. Refer to **Figure 4** and **Figure 5**. Minor utility facilities are permitted within the "Agricultural" district. Section 19.04.040 of the Maui County Code defines minor utility facilities as:

> *transmission lines used directly in the distribution of utility services that have minor impact on adjacent land uses which include, but which are not limited to, twenty-three kilovolt transmission substations, vaults, water wells, tanks and distribution equipment, sewage pump stations, and other similar type uses*.

The Launiupoko Exploratory Well Project is a minor utility and permitted by Maui County Zoning. With respect to the "Interim" zoning district, Section 19.02A.030 of the Maui County Code permits the construction of new or the expansion of public/quasi-public facilities, owned and operated by private or governmental agencies.

The proposed project will comply with the development standards of the "Agricultural" and "Interim" districts.

H. MAUI COUNTY WATER USE AND DEVELOPMENT PLAN

Hawaiʻi State Law requires each County to prepare, periodically update, and adopt a Water Use and Development Plan (WUDP) to serve as the long-range planning blueprint

for all water uses in each County. In 2019, DWS prepared a draft WUDP and Regional Plans for six (6) Aquifer Sector Areas, including Wailuku, Central, Koʻolau, Hāna, Kahikinui, and Lahaina. The draft WUDP was adopted in 2022 via Ordinance 5335. The WUDP is intended to be a long-range plan for the use, development, conservation, protection and management of the county's water resources. It is part of the *Hawai'i Water Plan* which serves as a comprehensive, long-range planning guide for use by the Commission on Water Resource Management (CWRM).

A combination of several preliminary strategies were selected by the DWS that align with planning objectives, are feasible considering hydrologic and legal constraints, cost-effective to adequately meet projected demand while balancing the needs of the community. Key issues identified in the WUDP public process for the region focused on restoration and protection of streamflow to support Native Hawaiian rights and traditional and customary practices; watershed protection; long term effects of water use on resource availability and enhanced transparency and controls on water withdrawals. The community voiced support for precautionary planning to reduce and adapt to the effects of drought and climate change on water resource availability and quality, and adapting economic and population growth and the built environment to local water resource conditions, integrating conservation and the use of alternative resources. Recommended alternatives include resource management as well as development of conventional and alternative resources. The proposed action is in keeping with the following planning objectives and recommended strategies identified in the WUDP:

Planning Objectives*:*

Environment- Minimize Adverse Environmental Impacts

Availability- Provide Adequate Volume of Water Supply

Conventional Water Source Strategies:

Conventional water sources include groundwater (wells and tunnels) and surface water (stream diversions).

Strategy #4: Develop basal groundwater wells to provide adequate water supply for planned population growth projected to 16 mgd, accounting for peak source needs up to 19 mgd by 2035.

I. COASTAL ZONE MANAGEMENT

The Hawaiʻi Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawaiʻi's coastal zone. The project area lies approximately three (3) miles away from the coast, outside of the County of Maui's Special

Management Area (SMA). As such, a SMA Use permit for coastal zone management is not required for the project. Although the project area is not located in a coastal area, the proposed project has been assessed relative to the coastal zone management considerations, as set forth in Chapter 205A, HRS.

1. Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

a. Improve coordination and funding of coastal recreational planning and management; and

b. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

i. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

ii. Requiring replacement of coastal resources having significant recreational value, including but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

iii. Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

iv. Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

v. Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

vi. Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

vii. Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

viii. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Section 46-6.

Response: The project area does not abut the shoreline and is located inland on the slopes of the West Maui Mountains and away from shoreline resources. The proposed actions will, therefore, not affect coastal recreational opportunities.

2. Historic Resources

Objective:

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

Policies:

a. Identify and analyze significant archeological resources;

b. Maximize information retention through preservation of remains and artifacts or salvage operations; and

c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: As stated previously, an archaeological assessment and archaeological field inspection for the proposed project area has been prepared. Refer to **Appendix "D"** and **Appendix "E"**. Should there be an inadvertent discovery during ground altering activities, work will stop in the immediate area of the find and the SHPD will be contacted to establish the appropriate level of mitigation measures.

A Cultural Impact Assessment (CIA) and Ka Pa'akai Analysis were prepared for the project and recommended actions to mitigate the potential impacts of new groundwater withdrawal. Refer to **Appendix "F"** and **Appendix "F-1"**. These mitigation measures include assessing existing wells for viability; establishing and prioritizing community involvement; protecting natural and cultural resources through implementation of BMPs; ensuring safe access for cultural practitioners; employing a mauka-to-makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality; developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members. These measures aim to maintain and

potentially increase the availability of fresh water for traditional and customary practices.

3. Scenic and Open Space Resources

Objective:

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

Policies:

a. Identify valued scenic resources in the coastal zone management area;

b. Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

c. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

d. Encourage those developments which are not coastal dependent to locate in inland areas.

Response: The proposed improvements will not have a significant adverse impact upon scenic or open space resources. The proposed actions involve the construction of water infrastructure in areas that are located upland from public roadways and would not impact any scenic or open space resources.

4. Coastal Ecosystems

Objective:

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

Policies:

a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

b. Improve the technical basis for natural resource management;

c. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

d. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

e. Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: The proposed project is not anticipated to result in any adverse impacts to coastal ecosystems as the project area is located over three (3) miles away from the ocean. Appropriate Best Management Practices (BMPs) and erosion-control measures will be implemented to mitigate runoff during construction-related activities.

5. Economic Uses

Objective:

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

Policies:

a. Concentrate coastal dependent development in appropriate areas;

b. Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

i. Use of presently designated locations is not feasible;

ii. Adverse environmental effects are minimized; and

iii. The development is important to the State's economy.

Response: The project is supportive of the objective and policies for economic uses in terms of supporting the existing commercial uses in the West Maui area.

6. Coastal Hazards

Objective:

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

Policies:

a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;

c. Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

d. Prevent coastal flooding from inland projects.

Response: The project area is located in Flood Zone X, an area outside of the one (1) percent annual chance floodplain. Appropriate BMPs will be implemented during construction to ensure downstream and adjacent properties will not be adversely impacted. The project is also located outside of the tsunami evacuation zone.

7. Managing Development

Objective:

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

Policies:

a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

b. Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

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

Response: In compliance with the requirements of Chapter 343, HRS, this Environmental Assessment (EA) has been prepared to facilitate public understanding and involvement in project development. All aspects of the development will be conducted in accordance with applicable Federal, State and County standards. Compliance with applicable regulatory requirements advances the objective and policies for managing development.

8. Public Participation

Objective:

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

Policies:

a. Promote public involvement in coastal zone management processes;

b. Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Opportunities for public awareness and participation for the project are facilitated through the notification, review and comment processes of the EA requirements of Chapter 343, HRS. Such opportunities include the early consultation process for the Draft EA and the CIA as well as a group interview at Nā Aikāne o Maui on March 21, 2023 and site visit on May 7, 2024. See **Appendix "F"**. The proposed project is not contrary to the objectives of public awareness, education, and participation.

9. Beach Protection

Objective:

Protect beaches for public use and recreation.

Policies:

a. Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

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

c. Minimize the construction of public erosion-protection structures seaward of the shoreline.

d. Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and

e. Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.

Response: The proposed project is not located in proximity to shoreline areas, nor is it anticipated to impact shoreline activities or beach processes.

10. Marine Resources

Objective:

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

a. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

b. Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

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

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

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

Response: The proposed project is not anticipated to impact marine or coastal resources as the project area is located over three (3) miles away from the ocean.

In addition to the foregoing objectives and policies, HRS Section 205A-30.5 Prohibitions, provides specifications for the limitation of lighting in coastal shoreline areas in relation to the granting of SMA permits:

No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:

(1) Directly illuminates the shoreline and ocean waters; or

(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.

(b) Subsection (a) shall not apply to special management area use permits for structures with:

(3) Artificial lighting provided by a government agency or its authorized users for government operations, security, public safety, or navigational needs; provided that a government agency or its authorized users shall make reasonable efforts to properly position or shield lights to minimize adverse impacts.

Response: All outdoor lighting for the proposed project will be shielded and down cast. There will be no lighting along the access road. Construction is anticipated to occur during daylight hours, and as such, no lighting during construction is anticipated.

IV

SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Assessment of construction-related impacts, noise and air quality impacts, and potential impacts on the physical and socio-economic, as well as an archaeological inventory survey (AIS) were carried out as part of an environment assessment documentation process. The proposed project will have a limited, unavoidable construction-related impact on the environment, as described in Chapter II.

Construction-related impacts include those related to noise generation occurring from heavy equipment used for site preparation and construction activities. In addition, temporary air quality impacts associated with dust generation from construction activities and exhaust emissions discharged by construction equipment are also likely. However, during construction, these impacts are temporary and will be mitigated through the use of appropriate Best Management Practices (BMPs), such as dust barriers, water wagons and/or sprinklers to control dust, and watering graded areas upon completion of daily construction activities. Upon completion, the proposed project is not expected to be a source of long-term adverse air or noise conditions. The proposed project includes site and road drainage systems designed as a mitigation control measure to protect downstream properties and coastal waters from stormwater runoff.

Construction work will be coordinated with the landowners and affected individuals. A National Pollution Discharge Elimination System (NPDES) permit will be applied for and obtained prior to construction. BMPs will be implemented as part of project construction to minimize impacts to topography, soils and downstream properties, and water bodies.

As a result of the interim instream flow standards established for the Kanahā Stream in 2018, which requires the diversion of 1.55 mgd of surface water to the stream, the DWS is pursuing new groundwater sources to replace the groundwater that will be lost to this diversion in order to continue providing water to the existing residents of West Maui. If the proposed exploratory wells are converted to production wells, the loss of 1.55 mgd of source water would be replaced in order to continue meeting existing water demand while complying with the 2018 CWRM directive. As discussed previously, the Preliminary Design Report (PDR) and 2025 Memorandum from Tom Nance Water Resource Engineering indicated that water that would be pumped from the proposed wells would be within the sustainable yield of the Launiupoko Aquifer and Honolua Aquifer. In addition, as the CWRM has administrative control over pumping in the Lahaina Aquifer Sector Area (ASA), it is required by law to limit withdrawals to below sustainable yield and is obligated to provide for the reservations allocated to users, within that limit. As such, pumping of the potential production wells resulting from successful results of the proposed exploratory wells would not cause the Launiupoko aquifer to be pumped beyond sustainable yield, which may lead to adverse environmental impacts. This limitation on the DWS and pumping from production wells will be enforced in part upon issuance of a Ground Water Use Permit from the CWRM for the future production wells, which must take place prior to any water withdrawal from the aquifer

(State of Hawai‘i, CWRM 2022). Refer to **Appendix “A”** and **Appendix “B”**. All testing and monitoring will meet requirements of the State of Hawai‘i, Department of Health, Safe Water Drinking Branch (DOH-SWDB) and Federal Environmental Protection Agency (EPA) regulations. A Water Use Development Permit must also be obtained from the CWRM.

As recommended by the Ka Pa‘akai Analysis, the DWS will undertake a number of feasible actions to mitigate the potential impacts of new groundwater withdrawal from the planned Well Site L-1 and Well Site L-3. Refer to **Appendix “F-1”**. These include employing a mauka-to-makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality; developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members. These measures aim to maintain and potentially increase the availability of fresh water for traditional and customary practices.

ALTERNATIVES TO THE PROPOSED ACTION

V

V. ALTERNATIVES TO THE PROPOSED ACTION

A. PROPOSED ACTION

1. Preferred Alternative – Well Site L-1 and Well Site L-3

The proposed project involves the construction of four (4) exploratory wells (two (2) wells each at Well Site L-1 and Well Site L-3) and access roads in the Launiupoko Aquifer in the Lahaina region of West Maui. The proposed project is the initial step towards restoring stream flow to the Kanahā Stream and meeting interim instream flow standards set by the Commission on Water Resource Management (CWRM). If the exploratory wells are successful, each well could potentially produce 0.775 mgd based on pumping 16 hours per day with a pump capacity of 807 gallons per minute (gpm) to replace 1.55 mgd of surface water to the Kanahā Stream. The yield of each exploratory well will be evaluated to determine their ability to contribute to a cumulative of 1.55 mgd of water.

The Preliminary Design Report details the reasons Well Site L-1 and Well Site L-3 are the recommended well sites for the project. Refer to **Appendix "A"**. Well Site L-1 and Well Site L-3 are located on State-owned land at elevations of about 1,700 feet and 330 feet above mean sea level (amsl), respectively. These sites were selected as the preferred alternative based on likelihood of successfully tapping into high-level ground water and due to their proximity to the Kanahā Stream and shared location within the Launiupoko Aquifer. Two (2) test holes drilled in the Launiupoko Aquifer in 1970 encountered high-level groundwater. Test Hole 1 is approximately 650 feet south of Well Site L-1, and Test Hole 2 is approximately 1,500 feet southeast of Well Site L-1. Results from these test holes and geologic conditions indicate that encountering high-level groundwater at Well Site L-1 is a reasonable expectation.

Well Site L-3 is about 1.1 miles from the ocean at an elevation of about 330 feet above mean sea level on the north side of Kauaula Stream. Under normal circumstances, a well at this elevation and proximity to the ocean would not be expected to produce water suitable for drinking without reverse osmosis treatment. However, four (4) recently developed wells on the south side of Kauaula Stream have all, quite unexpectedly, produced water that is drinking fresh water. All four (4) wells have static water levels that are substantially higher than expected. Drawdowns in the three (3) wells that were pump tested were just a fraction of a foot, indicating very high formation permeability.

2. Alternative Sites – Well Sites H-1 and H-2

Alternative site locations in the Honolua Aquifer have also been considered for the development of exploratory wells and were assessed in this Draft EA. Well Site H-1 and Well Site H-2 are situated on a 1,377-acre parcel owned by the Maui Land & Pineapple Company, Inc. (MLP) at elevation levels of 1,280 feet and 1,240 feet amsl, respectively. It is expected that basal groundwater will reach approximately eight (8) feet amsl. Since the evaluated Honolua sites are privately owned, it was determined to be more difficult to develop compared to the State-owned Launiupoko sites.

B. ALTERNATIVE WELL SITES CONSIDERED BUT DISMISSED

1. Well Site L-2

High-level groundwater may also be found at Well Site L-2. However, Well Site L-2 is located within the Panaʻewa section of the West Maui Forest Reserve. Per Chapter 13-209-4 (6) of the Hawaiʻi Administrative Rules (HAR), drilling of an exploratory well is not permitted within the Forest Reserve. As such, Well Site L-2 has been removed from consideration as a potential well site.

2. Prior Location for Well Site L-3

Well Site L-3 was previously located approximately 400 feet from the currently proposed L-3 site that has been assessed in this EA. During a site visit in May 2024, a large boulder with petroglyphs was confirmed to be located in the middle of the original Well Site L-3 location. For that reason, Well Site L-3 described in the preferred alternative was relocated approximately 400 feet downslope to avoid the petroglyph site. The original Well Site L-3 is no longer being pursued as a potential exploratory well site.

3. Other Alternative Well Sites

Existing wells and potential well sites within the Launiupoko Aquifer at lower elevations were also considered but not recommended due to their higher chloride and salinity levels attributed to the underlying post-shield Honolua Volcanic rock. Several DWS wells at lower elevations in the Launiupoko Aquifer, such as Kanahā 1 and Kanahā 2, were considered, but previous test results indicated fluctuating chloride levels ranging from 100 million gallons per liter (mg/l) to over 800 mg/l. These chloride levels may go above the Environmental Protection Agency's (EPA) National Secondary Drinking Water Regulations (NSDWR) maximum contaminant level of 250 mg/l. The NSDWR are secondary standards that are non-mandatory water quality standards that are not a direct human health risk, but may result in water having an undesirable taste, odor, or color. High levels of chloride in drinking

water may result in a salty taste, and high salinity levels in water may be toxic to freshwater plants and animals.

C. NO ACTION ALTERNATIVE

The no action alternative does not develop the exploratory wells, and the project sites remain as-is.

The no action alternative has not been selected for implementation as it does not address the water needs for replacement of 1.55 mgd to the Kanahā Stream and would not provide an alternative source of potable water for the DWS water system. In addition, the no action alternative is not consistent with the Lahaina Long Term Recovery Plan (LTRP), which designates the project as a “priority project”.

D. DEFERRED ACTION ALTERNATIVE

Similar to the no action alternative, the deferred action alternative does not construct the exploratory wells and will not identify potential groundwater sources for the replacement of 1.55 mgd of water to the Kanahā Stream in addition to domestic or municipal uses in West Maui. The deferred action alternative would also not be consistent with the LTRP.

VI

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project is anticipated to result in the irreversible and irretrievable commitment of natural and fiscal resources. Other resource commitments include energy, labor, and material resources. Impacts relating to the use of these resources are not considered significant when weighed against the expected positive socio-economic and community benefits derived from the project.

The State CWRM established a sustainable yield estimated as seven (7) mgd for the Launiupoko Aquifer and eight (8) mgd for the Honolua Aquifer. The Preliminary Design Report (PDR) and 2025 Memorandum from Tom Nance Water Resource Engineering indicated that water that would be pumped from the proposed wells would be within the sustainable yield of the Launiupoko Aquifer and Honolua Aquifer. Refer to **Appendix "A"** and **Appendix "B"**. The exploratory wells will be tested to determine if they can be converted to permanent production wells to produce 1.55 mgd total. All testing and monitoring will meet requirements of the State DOH-SWDB and Federal Environmental Protection Agency (EPA) regulations. Should the exploratory testing determine that the wells are suitable for conversion to permanent production wells, the withdrawal of water would need to be approved by the Commision on Water Resource Management (CWRM) and a separate Environmental Assessment for the production wells would be prepared. As the CWRM has administrative control over pumping in the Lahaina Aquifer Sector Area (ASA) and it is required by law to limit withdrawals to below sustainable yield, pumping of the potential production wells resulting from successful results of the proposed exploratory wells would not cause the Launiupoko aquifer to be pumped beyond sustainable yield, which may lead to adverse environmental impacts. Issuance of a Ground Water Use Permit from the CWRM for the future production wells must take place prior to any water withdrawal from the aquifer (State of Hawai‘i, CWRM 2022).

SIGNIFICANCE CRITERIA ASSESSMENT

VII

VII. SIGNIFICANCE CRITERIA ASSESSMENT

The proposed project includes the use of State lands and State and County funds. As such, an Environmental Assessment (EA) has been prepared pursuant to Chapter 343, Hawai'i Revised Statutes (HRS) and Chapter 200.1 of Title 11, Hawai'i Administrative Rules (HAR) of the State Department of Health, Environmental Impact Statement Rules.

The "Significance Criteria", Section 13 of the HAR, Title 11, Chapter 200.1, Environmental Impact Statement Rules, were reviewed and analyzed to determine whether the proposed project will have significant impacts to the environment. The following analysis is provided.

1. Irrevocably commit a natural, cultural, or historic resource

A Cultural Impact Assessment (CIA) and Ka Pa'akai Analysis were prepared for the proposed Well Site L-1 and Well Site L-3 and found that there are concerns regarding the proposed project related to the potential to disturb archaeological features and potential impacts to freshwater resources, cultural practices, and access to cultural sites. The CIA recommended the DWS assess existing wells for viability, establish and prioritize community involvement, protect natural and cultural resources through implementation of best management practices (BMPs), and ensure safe access for cultural practitioners. The Ka Pa'akai Analysis notes that given the potential for additional water withdrawal from the Launiupoko aquifer, the DWS has agreed to undertake a number of feasible actions to mitigate the potential impacts of new groundwater withdrawal from the planned Well Site L-1 and Well Site L-3. These include employing a mauka-to-makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality; developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members. These measures aim to maintain and potentially increase the availability of fresh water for traditional and customary practices.

The Department of Water Supply (DWS) will coordinate with the State of Hawai'i and the Maui Land & Pineapple Company, Inc. (MLP), the respective owners of the project parcels, and the State Historic Preservation Division (SHPD), as appropriate, to mitigate adverse impacts relative to the project. Should the inadvertent discovery of significant cultural materials occur during construction, the contractor will halt all work in the immediate area of the find and notify SHPD to discuss mitigation, as appropriate.

The proposed project is not anticipated to result in the irrevocable commitment to loss or destruction of natural or cultural resources.

2. Curtail the range of beneficial uses of the environment

The proposed project and the commitment of limited land resources are not anticipated to curtail the range of beneficial uses of the environment. A Biological Resources Survey Report was conducted for the project and concluded that the project sites are overwhelmingly inhabited by non-native botanical species. Of the native and non-native plants and animal species observed in the proposed project area, none are federally endangered or threatened species, and none carry special protections or concerns.

Although not seen during the survey, the reports note the potential presence of the endemic and endangered Hawaiian hoary bat, the ae'o, or Hawaiian Stilt, the nēnē, or Hawaiian Goose, and endangered seabirds, the Hawaiian petrel and the threatened Newell's shearwater. With implementation of Best Management Practices (BMPs) during construction, the proposed project is not expected to result in significant adverse effects on beneficial uses of the environment.

3. Conflict with the State's environmental policies or long-term environmental goals established by law

The State's Environmental Policy and Guidelines are set forth in Chapter 343, HRS. BMPs will be implemented during project construction. Drainage systems included as part of the project are designed to protect downstream properties and coastal resources from stormwater runoff. The proposed action is not contrary to the policies and guidelines set forth in Chapter 344, HRS.

4. Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State

As previously noted, archaeological studies and a CIA were conducted for this project.

The proposed project will benefit the economy by providing construction and construction-related employment. There is benefit to the social welfare of the community as the project advances efforts to restore stream flow to the Kanahā Stream, which would allow for beneficial recreational and traditional instream uses.

As stated previously, with implementation of recommended mitigations proposed in the CIA, safe access will be maintained for local residents during and following project implementation while prioritizing community involvement and protecting natural resources.

No adverse impact to public health or welfare is anticipated as a result of the proposed project. Appropriate mitigation measures will be implemented to address anticipated temporary noise and air quality impacts in the area, resulting from project construction. The proposed project is limited to construction of exploratory wells in order to test the yield and quality of the water source to determine if they may be suitable for conversion to future production wells.

5. Have a substantial adverse effect on public health

The proposed project is intended to improve instream flow for Kanahā Stream while enhancing community resiliency by developing sufficient wells to expand water capacity to use during the dry season and droughts. During the construction period, appropriate BMPs will be implemented to mitigate potential air quality and noise impacts and to ensure that air quality and noise levels stay within the regulatory limits. Following construction, the proposed project will not substantially affect public health.

6. Involve adverse secondary impacts, such as population changes or effects on public facilities

A secondary impact is generally defined as an impact which is caused by a specific action, and which takes place later in time or further removed in distance but is still reasonably foreseeable. No substantial secondary impacts or effects on public facilities or on population changes are anticipated as a result of project implementation. Population changes are guided by the planning policies and land uses set in the Maui Island Plan and West Maui Community Plan. The proposed project is to identify groundwater sources to replace 1.55 mgd currently diverted from the Kanahā Stream.

7. Involve a substantial degradation of environmental quality

During the construction phase, there will be short-term air quality and noise quality impacts as a result of the project. In the long term, there will be no significant adverse impacts on air quality and ambient noise levels. The proposed action will not significantly affect the open space and scenic character of the region.

The proposed project is located approximately one (1) to three (3) miles away from the shoreline on the landward (mauka) side of Honoapiʻilani Highway.

Temporary BMPs will be implemented as part of project construction to minimize impacts to topography, soils and downstream properties, and water bodies.

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

8. Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions

The Commission on Water Resource Management (CWRM) has issued sustainable yields of seven (7) mgd for the Launiupoko Aquifer and eight (8) mgd for the Honolua Aquifer.

The PDR and 2025 Memorandum from Tom Nance Water Resource Engineering indicated that water that would be pumped from the proposed wells would be within the sustainable yield of the Launiupoko Aquifer and Honolua Aquifer, including the total existing and authorized use of the aquifer. Refer to **Appendix "A"** and **Appendix "B"**.

If test results from the exploratory wells produce the desired yield and meet water quality standards, they will be considered for conversion to permanent production wells. The construction of production wells would go through a separate environmental review process and an additional Environmental Assessment will be prepared and approval from CWRM will be required. As the CWRM is required by law to limit withdrawals to below sustainable yield and issuance of a Ground Water Use Permit from the CWRM for the future production wells must take place prior to any water withdrawal from the aquifer, pumping of the potential production wells resulting from successful results of the proposed exploratory wells would not cause the Launiupoko aquifer to be pumped beyond sustainable yield, which may lead to adverse environmental impacts. (State of Hawai‘i, CWRM 2022).

9. Have a substantial effect on a rare, threatened, or endangered species, or its habitat

As noted previously, a Biological Resources Survey Report was prepared for the project and concluded that the native plants in the project area did not present any particular environmental concern and that no special native plant habitats were observed.

With implementation of BMPs during construction, the proposed project is not anticipated to substantially affect a rare, threatened, or endangered species of animal or plant, or its habitat.

10. Have a substantial adverse effect on air or water quality or ambient noise levels

Short-term construction activities will have an impact on air and noise quality; these impacts will be minimal and temporary. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. Noise impacts will be mitigated by limiting construction activities to daylight work hours. Implementation of drainage improvements designed in accordance with the Drainage Standards of the County of Maui to address stormwater runoff from the project area will include permanent BMPs to protect water quality and coastal resources in the area.

BMPs will be implemented as part of project construction to minimize and mitigate impacts to topography, soils and downstream properties, and water bodies.

In the long term, with appropriate mitigative measures in place, the proposed action is not anticipated to have a significant impact on air and water quality or ambient noise levels.

11. Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters

The proposed project is not located within any environmentally sensitive areas, such as wetlands, coastal areas including beaches and coastal water, fresh water, estuaries, erosion-prone areas, or tsunami zones.

The proposed well sites are located about one (1) to three (3) miles away from the shoreline and are located in Flood Zone X, an area of minimal flooding. During construction, BMP's will be implemented for erosion and sedimentation control to mitigate potential impacts from construction on nearby waterbodies. The project also includes drainage systems as permanent BMPs to protect coastal waters and nearby properties.

The proposed project is not anticipated to affect any environmentally sensitive areas.

12. Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies

The project includes wells that are relatively low profile and will be located on land that slopes from 330 feet to 1,800 feet amsl at the base of the West Maui Mountains. The proposed project will be located upland and approximately one (1) to three (3) miles away from Honoapi'ilani Highway, the major roadway in West Maui and, as such, will not be readily visible from residences or roadways.

The proposed project is not expected to adversely affect scenic viewplanes.

13. Require substantial energy consumption or emit substantial greenhouse gas

The proposed action will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction. The proposed project components require electricity which will be provided by extension of electrical lines from the existing MECO system. This use is not expected to result in substantial consumption of energy resources or the emission of greenhouse gases.

The project's technical characteristics and related impact considerations were thoroughly evaluated by the DWS. In accordance with HAR, Section 11-200.1-13, "Significance Criteria" every phase of the proposed action, the anticipated impacts, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action were considered. The analysis contained in this EA was supported through in-depth technical studies that were prepared by qualified professionals, and agencies having jurisdiction and expertise in their respective fields of authority were consulted during the EA preparation process.

Each section of the EA included a discussion and analysis of the impacts related to the respective environmental, infrastructural, public services, and socio-economic parameters. While this project may cause impacts, based on the analysis conducted in the EA, the impacts are not anticipated to be significant. Where mitigation measures are required due to potential impacts attributed to the project, the DWS will implement those applicable measures to further reduce adverse impacts. Furthermore, the project will also advance efforts to restore stream flow to Kanahā Stream through identifying viable water sources in West Maui.

In summary, this project will be developed in an area with existing infrastructure systems and will not extend County service areas. The proposed project is not anticipated to have a significant adverse impact on the surrounding physical, cultural, and socio-economic environments. Based on the preceding analysis in this EA document, and in accordance with the significance criteria set forth in 11-200.1-13, HAR, the proposed project is anticipated to result in an Anticipated Finding of No Significant Impact (AFNSI).

LIST OF PERMITS AND APPROVALS

VIII

VIII. LIST OF PERMITS AND APPROVALS

The following list of permits and approvals are anticipated to be needed for project implementation:

State

1. Department of Land and Natural Resources, Commission on Water Resource Management Well Construction Permits

2. Board of Land and Natural Resources, Conservation District Use Permit (for site L-1 only)

3. Department of Health, National Pollutant Discharge Elimination System Permit for stormwater discharges due to construction activities

4. Department of Health, Noise Permit, as applicable

County of Maui

1. Grading and Grubbing Permits

AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, LETTERS RECEIVED, AND RESPONSES TO SUBSTANTIVE COMMENTS

IX

IX. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, LETTERS RECEIVED, AND RESPONSES TO SUBSTANTIVE COMMENTS

The following list of agencies, organizations, and individuals were consulted in the preparation of the Draft Environmental Assessment (EA). Agency comments and responses to substantive comments are included herein.

FEDERAL

1. Gerald Gregory, District Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   77 Hoʻokele Street, Suite 202
   Kahului, Hawaiʻi 96732

2. Pacific Ocean Division
   U.S. Army Corps of Engineers
   Building 525, Suite 300
   Fort Shafter, Hawaiʻi 96858-5440

3. Linda Speerstra, Chief
   Regulatory Branch
   U.S. Department of the Army
   U.S. Army Engineer District, Honolulu
   Regulatory Branch, Building 230
   Fort Shafter, Hawaiʻi 96858-5440
   Via email:
   CEPOHRO@usace.army.mil

4. Chelsie Javar-Salas, Acting Island Team Leader
   U.S. Fish and Wildlife Service
   Pacific Islands Fish and Wildlife Office
   300 Ala Moana Blvd., Rm. 3-122
   Honolulu, Hawaiʻi 96850

STATE OF HAWAIʻI

5. Keith Regan, Comptroller
   State of Hawaiʻi
   Department of Accounting and General Services
   1151 Punchbowl Street, #426
   Honolulu, Hawaiʻi 96813

6. Phyllis Shimabukuro-Geiser, Chair
   State of Hawaiʻi
   Department of Agriculture
   1428 South King Street
   Honolulu, Hawaiʻi 96814-2512

7. William Aila, Jr., Chair
   State of Hawaiʻi
   Department of Hawaiian Home Lands
   P.O. Box 1879
   Honolulu, Hawai ʻi 96805

8. Clare E. Connors, Attorney General
   State of Hawaiʻi
   Department of Attorney General
   425 Queen Street
   Honolulu, Hawaiʻi 96813

9. Chris Sadayasu, Director
   State of Hawaiʻi
   Department of Business, Economic Development & Tourism
   P.O. Box 2359
   Honolulu, Hawaiʻi 96804

10. Ikaika Anderson, Chairman
    State of Hawaiʻi
    Department of Hawaiian Home Lands
    P.O. Box 1879
    Honolulu, Hawaiʻi 96805

11. Dr. Kenneth Fink, M.D., Director
    State of Hawaiʻi
    Department of Health
    1250 Punchbowl St., Room 325
    Honolulu, Hawaiʻi 96813

12. Alec Wong, P.E., Chief
State of Hawai'i
Department of Health
Clean Water Branch
Hale Ola, Room 225
2827 Waimano Home Road
Pearl City, Hawai'i 96782

13. Patti Kitkowski, District Environmental Health Program Chief
State of Hawai'i
Department of Health
Maui Sanitation Branch
54 South High Street, Room 300
Wailuku, Hawai'i 96793

14. Lene Ichinotsubo
State of Hawai'i
Department of Health
Solid and Hazardous Waste Branch
2827 Waimano Road, Suite 100
Pearl City, Hawai'i 96782-1407

15. State of Hawai'i
Department of Health
Environmental Health Administration
P.O. Box 3378
Honolulu, Hawai'i 96801

16. State of Hawai'i
Department of Health
Environmental Management Division
Hale Ola Building, Room 207
2827 Waimano Home Road
Pearl City, Hawai'i 96782

17. Dawn Chang, Chairperson
State of Hawai'i
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809
Via email: dlnr@hawaii.gov
and dlnr.land@hawaii.gov

18. M. Kaleo Manuel, Deputy Director
State of Hawai'i
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawai'i 96809
Via email: dlnr@hawaii.gov
and dlnr.land@hawaii.gov

19. Michael Cain, Acting Administrator
State of Hawai'i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai'i 96813
Via email: dlnr@hawaii.gov
and dlnr.land@hawaii.gov

20. Ed Sniffen, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813

21. Marvin Moniz, District Manager Islands of Maui, Moloka'i, and Lana'i
State of Hawai'i
Department of Transportation Airports Division (Maui)
1 Kahului Airport Road, Unit 5
Kahului, Hawai'i 96732

22. Denise Iseri-Matsubara, Executive Officer
State of Hawai'i
Hawai'i Housing Finance and Development Corporation
677 Queen Street
Honolulu, Hawai'i 96813

23. Dr. Sylvia Hussey, Chief Executive Officer
State of Hawai'i
Office of Hawaiian Affairs
560l N. Nimitz Highway, Suite 200
Honolulu, Hawai'i 96817

24. Scott Glenn, Director
State of Hawai‘i
Office of Planning and Sustainable Development Environmental Review Program
P.O. Box 2359
Honolulu, Hawai‘i 96804

25. Dan Orodenker, Executive Officer
State of Hawai‘i
State Land Use Commission
P.O. Box 2359
Honolulu, Hawai‘i 96804

26. State of Hawai‘i
University of Hawai‘i
Water Resources Research Center
2540 Dole Street, Room 283
Honolulu, Hawai‘i 96822

27. Elle Cochran, Representative
State of Hawai‘i
Hawai‘i House of Representatives
415 S. Beretania Street
Honolulu, Hawai‘i 96813

28. Angus L.K. McKelvey, Senator
State of Hawai‘i
Hawai‘i State Senate
415 S. Beretania Street
Honolulu, Hawai‘i 96813

COUNTY OF MAUI

29. Herman Andaya, Administrator
County of Maui
Maui Emergency Management Agency
200 South High Street
Wailuku, Hawaii 96793

30. Rogerene Arce, Director
County of Maui
Department of Agriculture
200 South High Street
Wailuku, Hawai‘i 96793

31. Shayne Agawa, Acting Director
County of Maui
Department of Environmental Management
200 South High Street
Wailuku, Hawai‘i 96793

32. Bradford Ventura, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai‘i 96732

33. Lori Tsuhako, Director
County of Maui
Department of Housing and Human Concerns
2200 Main Street, Suite 546
Wailuku, Hawai‘i 96793

34. Patrick McCall, Acting Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2F
Wailuku, Hawai‘i 96793

35. Kathleen Aoki, Acting Director
County of Maui
Department of Planning
2200 Main Street, Suite 315
Wailuku, Hawai‘i 96793

36. John Pelletier, Chief
County of Maui
Department of Police
55 Mahalani Street
Wailuku, Hawai‘i 96793

37. Jordan Molina, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawai‘i 96793

38. Marc Takamori, Director
County of Maui
Department of Transportation
110 Ala‘ihi Street, Suite 210
Kahului, Hawai‘i 96732

39. Luana Mahi, Director
County of Maui
Office of Economic Development
2200 Main Street, Suite 305
Wailuku, Hawai‘i 96793

40. Honorable Tamara Paltin
County of Maui
Maui County Council
200 South High Street
Wailuku, Hawai‘i 96793

ORGANIZATIONS

41. Hawaiian Telcom
Plan Review Department
60 South Church Street
Wailuku, Hawai‘i 96793
Via email: HT-PlanReviews@hawaiiantel.com

42. Michael Grider, Manager
Maui Electric Company
Engineering Division
P.O. Box 398
Kahului, Hawai‘i 96732

43. Blossom Feteira
Maui Mokupuni Council
Via email:
Blossom96708@yahoo.com

44. Ke‘eaumoku Kapu, Po‘o
Aha Moku o Maui, Inc.
Via email:
kapukapuakea@gmail.com

45. Albert Perez, Executive Director
Maui Tomorrow
P.O. Box 880390
Pukalani, Hawai‘i 96788

46. Sierra Club Maui
P.O. Box 791180
Paia, Hawai‘i 96779

47. Keeaumoku Kapu, CEO
Aha Moku o Maui, Inc.
Via email:
kapukapuakea@gmail.com

48. Uilani Kapu
Aha Moku o Maui (Lahaina)
Via email: uilani.kapu@gmail.com

49. Kaipo Kekona
Aha Moku o Maui, Inc.
Via email: kekonak83@gmail.com

50. Spectrum
158 Ma‘a Street
Kahului, Hawai‘i 96732

51. West Maui Preservation Association
P.O. Box 11150
Lahaina, Hawai‘i 96761

Subject: Proposed Launiupoko Exploratory Wells Project
Attachments: BMPs For Work In or Around Aquatic Environment_revised Nov 2018.doc; IPaC Info Letter_Species List Instructions_PIFWO_20Apr2022_Final.pdf

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From: Harrington, Carrie <carrie_harrington@fws.gov>
Sent: Wednesday, February 15, 2023 3:50 PM
To: General eMail <planning@munekiyohiraga.com>
Subject: Proposed Launiupoko Exploratory Wells Project

Dear Munekiyo Hiraga:

The US Fish and Wildlife Service received your letter requesting technical assistance for the above proposed project.

Our comments are outlined below:

1. Please find attached our best management practices for working in or near aquatic environments. If there are streams or any other aquatic habitat in the project footprint, you will also need to consult with us under the Fish and Wildlife Coordination Act.
2. For section 7 consultation under the Endangered Species Act, please access our online **Information for Planning and Consultation** (IPAC) tool to obtain a species list for all federally listed species that may occur in the project footprint and associated avoidance and minimization measures. Guidance for IPAC outlined below and attached.

The US Fish and Wildlife Service has updated how we process section 7 consultations.

The very first step in our updated consultation process is to obtain an official species list in our new Information for Planning and Consultation (IPAC) online tool, for which a link can be found at the box in top left corner of the below website:

https://ecos.fws.gov/ecp/

Please see the attached pdf with directions on how you obtain an official species list in IPAC.

Once all of your basic project information is entered, including a map of the project, IPAC will generate a species list comprised of all federally listed species that may occur in the project area. Each species name on the list will have a link underneath it in which you will find our avoidance and minimization measures (AMMs) for that species. For some groups of species (e.g., seabirds and waterbirds), the AMMs will be the same.

After completeing all the steps in IPAC, you will need to formally submit the official species list. A copy will automatically be sent to our office. Each project is assigned a unique Project Code in IPAC. This Project Code should be provided to our office with any correspondences relating to a given project.

A few IPAC tips

- When you reach the stage for defining your project area: If you are uploading a polygon and have more than one TMK in the project area, make sure all TMKs are in one polygon. Otherwise, you will get a project code for every TMK.

- You can ignore any requests or links regarding additional document uploads or continuing your consultation in IPAC. These options are still under development. At this time, we are only asking partners to enter the project information and submit for an official species list.
- While the attached pdf of instructions will direct you to **https://ipac.ecosphere.fws.gov/**, several partners have gotten stuck at “create a Login.gov account.” Our IT suggested accessing IPAC through ECOS (**https://ecos.fws.gov/ecp/**) may help reduce this issue.
- Your offical IPAC species list is based on species' ranges. IPAC generates a list of all federally listed species and other trust resources that could potentially be in the project area.
- If the IPAC species list includes species you do not think occur in the project area, explain why in your consultation request letter.
- Implementing biological surveys is a good way to determine if a species is currently present in the project footprint or if the habitat suggests a species may be present within the project footprint. Take into consideration that the lifespan for some plants may only be two months of the year after a heavy rain while other plants may only flower a few months of the year in a given season. Similarly, for animals, consider factors such as the breeding season or other life history stages that would determine detectability. Plan surveys to occur when the species are most likely be detected.
- We recommend our partners incorporate all the species and their associated AMMs in their impacts analysis. The AMMS are there to help our partners avoid and minimize effects to listed species.

Please feel free to contact me if you need additional assistance.

Thank you for your efforts to protect listed species,
Carrie Harrington

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

The U.S. Fish and Wildlife Service (USFWS) recommends the following measures to be incorporated into project planning to avoid or minimize impacts to fish and wildlife resources. Best Management Practices (BMPs) include the incorporation of procedures or materials that may be used to reduce either direct or indirect negative impacts to aquatic habitats that result from project construction-related activities. These BMPs are recommended in addition to, and do not over-ride any terms, conditions, or other recommendations prepared by the USFWS, other federal, state or local agencies. If you have questions concerning these BMPs, please contact the USFWS Aquatic Ecosystems Conservation Program at 808-792-9400.

1. Authorized dredging and filling-related activities that may result in the temporary or permanent loss of aquatic habitats should be designed to avoid indirect, negative impacts to aquatic habitats beyond the planned project area.

2. Dredging/filling in the marine environment should be scheduled to avoid coral spawning and recruitment periods, and sea turtle nesting and hatching periods. Because these periods are variable throughout the Pacific islands, we recommend contacting the relevant local, state, or federal fish and wildlife resource agency for site specific guidance.

3. Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs should be maintained for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.

4. All project construction-related materials and equipment (dredges, vessels, backhoes, silt curtains, etc.) to be placed in an aquatic environment should be inspected for pollutants including, but not limited to; marine fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP – see https://www.fws.gov/policy/A1750fw1.html) can help to prevent attraction and introduction of non-native species.

5. Project construction-related materials (fill, revetment rock, pipe, etc.) should not be stockpiled in, or in close proximity to aquatic habitats and should be protected from erosion (*e.g.*, with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.

6. Fueling of project-related vehicles and equipment should take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.

7. All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non-invasive vegetation matting, hydro-seeding, etc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai‘i 96850

Subject: IPaC generated official species list for the Pacific Islands Fish and Wildlife Office

Dear Action Agency or Applicant:

The Pacific Islands Fish and Wildlife Office (PIFWO) is transitioning to the Information for Planning and Consultation (IPaC) online portal, https://ipac.ecosphere.fws.gov/ for federal action agencies and non-federal agencies or individuals to obtain official species lists, including threatened and endangered species, designated critical habitat, and avoidance and minimization measures to consider in your general project design. IPaC has been used by continental USFWS offices to provide official species lists and avoidance and minimization guidance since 2017. Using IPaC expedites the process for species list distribution. Obtaining a species list in IPaC is relatively straightforward and takes minimal time to complete. Step by step instructions are included below.

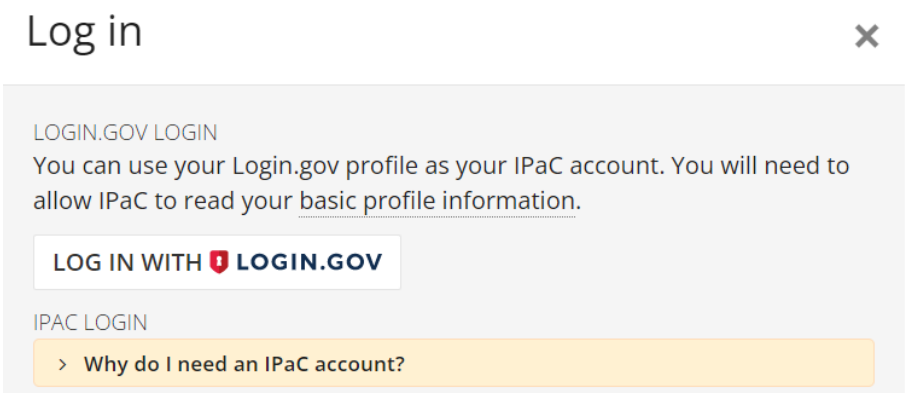
Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of your species list should be verified after 90 days. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change the species list. Verification can be completed by visiting the IPaC website at regular intervals during project planning and implementation. An updated list may be requested through the IPaC system by completing the same process used to obtain the initial species list.

We hope this process provides efficiencies to our partners in obtaining a species list. For federal action agencies, it also opens additional IPaC functionality that the PIFWO office is still working on, such as the use of Determination Keys for informal section 7 programmatic consultations. We will let our agency partners know when that functionality becomes available.

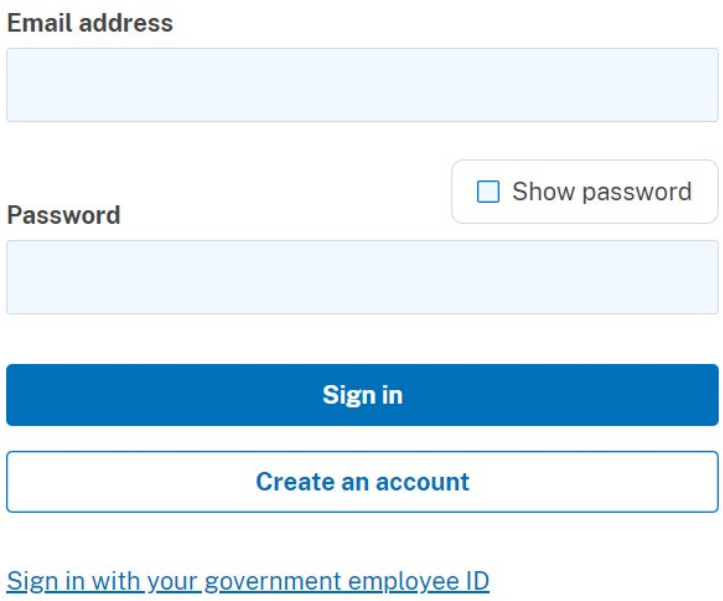
If you have questions about a species list obtained through the IPaC system or need assistance in completing an IPaC species list request, please contact the Service at 808-792-9400 or via email at pifwo_admin@fws.gov. We appreciate your efforts to conserve listed species across the Pacific Islands.

Instructions for Action Agencies and partners to obtain an official species list in IPaC

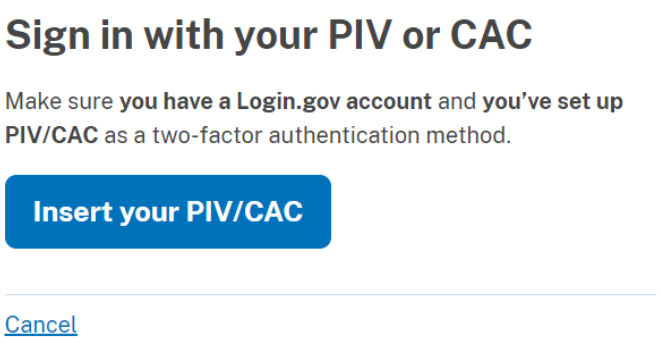
- Navigate to https://ipac.ecosphere.fws.gov/
- You can get an unofficial species list without logging in. However, if you want an official species list you will need to log in first using your Login.gov account. If you don't have an IPaC account, they are easy to create.



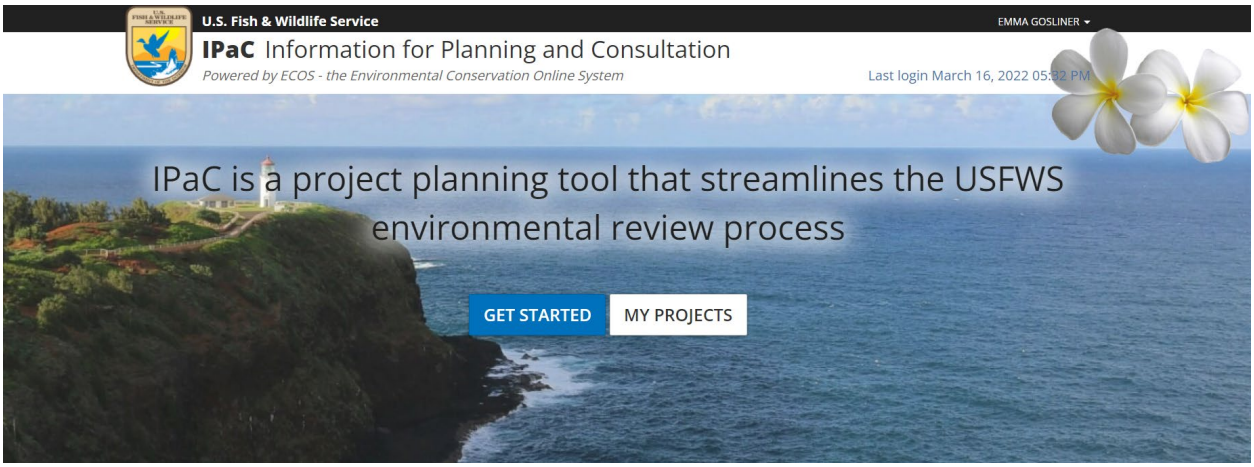
Select Log in with Login.gov and sign in using your email and password.



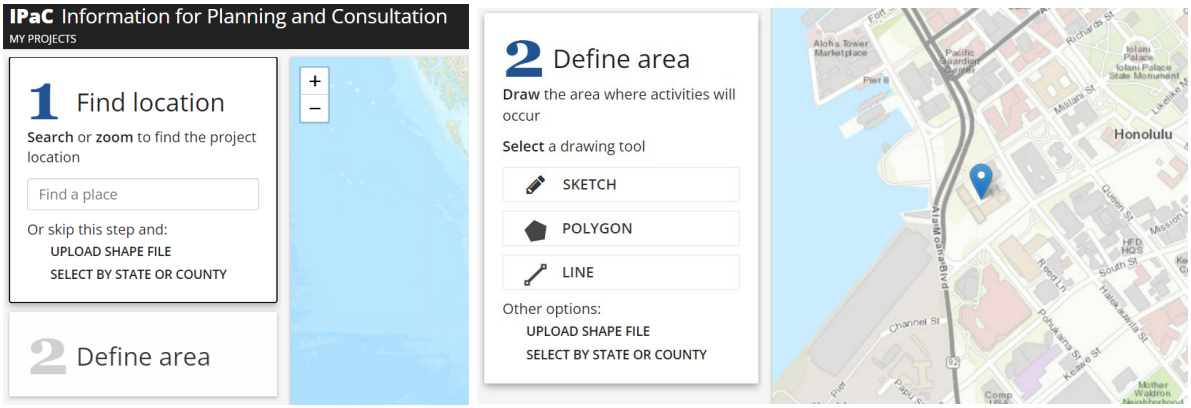
If you have a PIV or CAC card, you can sign in using that method as well.

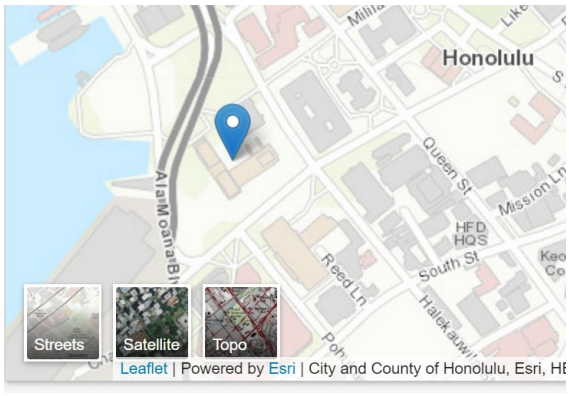


- Once you log in, select "Get Started".

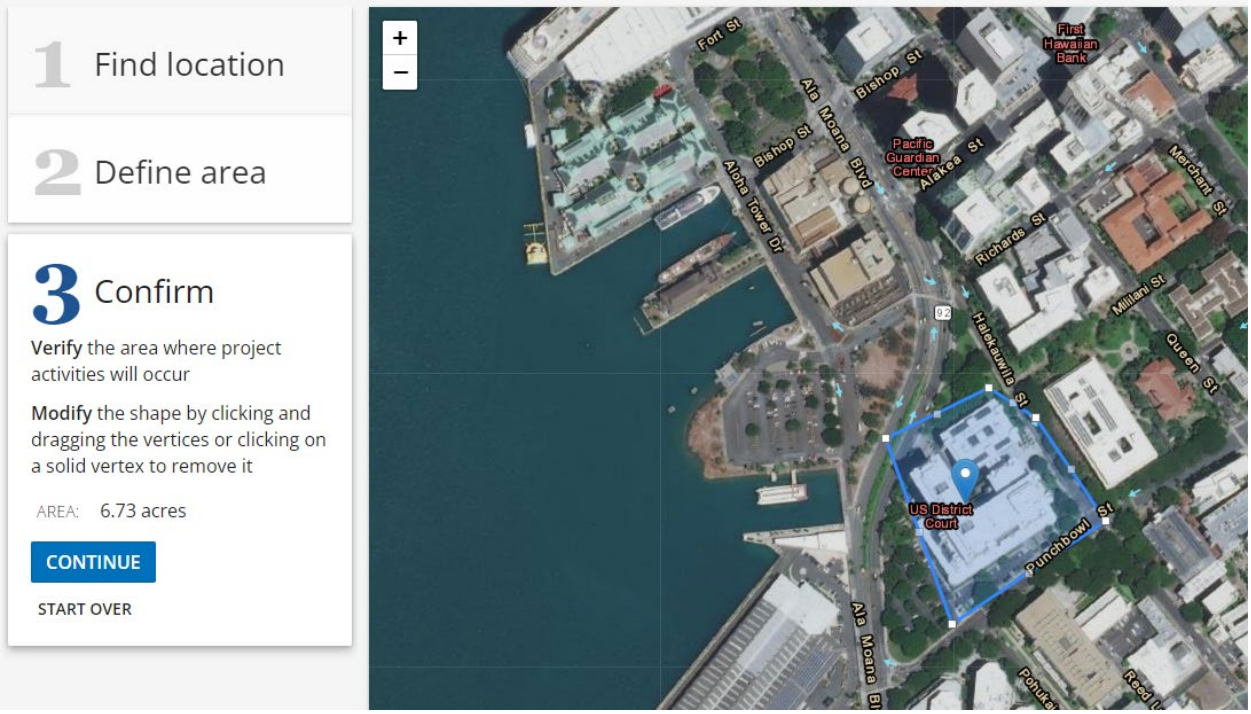


- Define the action area: Identify the location of the proposed action by uploading an existing shapefile or by entering an address or coordinates of the action area. Once identified on the map, you can manually draw the action area using the drawing tools.



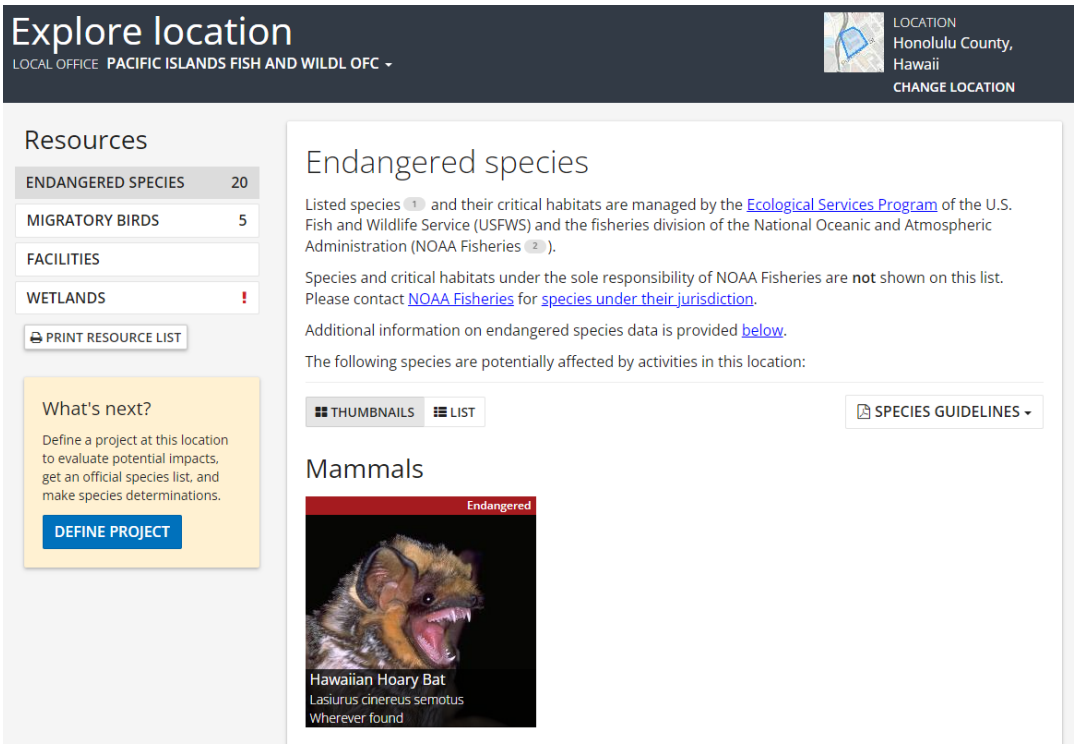


To help identify your action area you can choose between multiple base maps available.

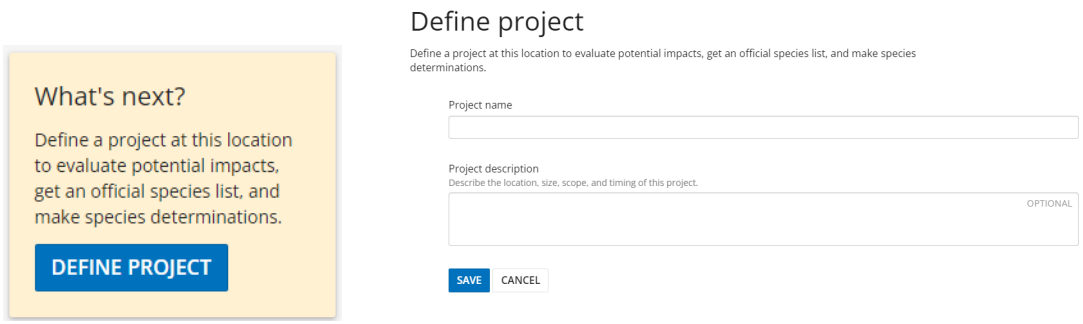


Press continue when you have finished drawing or uploading the action area location.

- The species information on the page that follows is not official. However, it identifies the project County, local Fish and Wildlife Field Office, species covered under NOAA Fisheries as well as Migratory Bird Treaty Act species. The list can be viewed in Thumbnail or List format.
- Once the species list populates you will see images of the species that may occur on, near, or transgress across your project. Click on SPECIES GUIDELINES on your top right to see Avoidance and Minimization measures to incorporate into your General Project Design Guidelines.

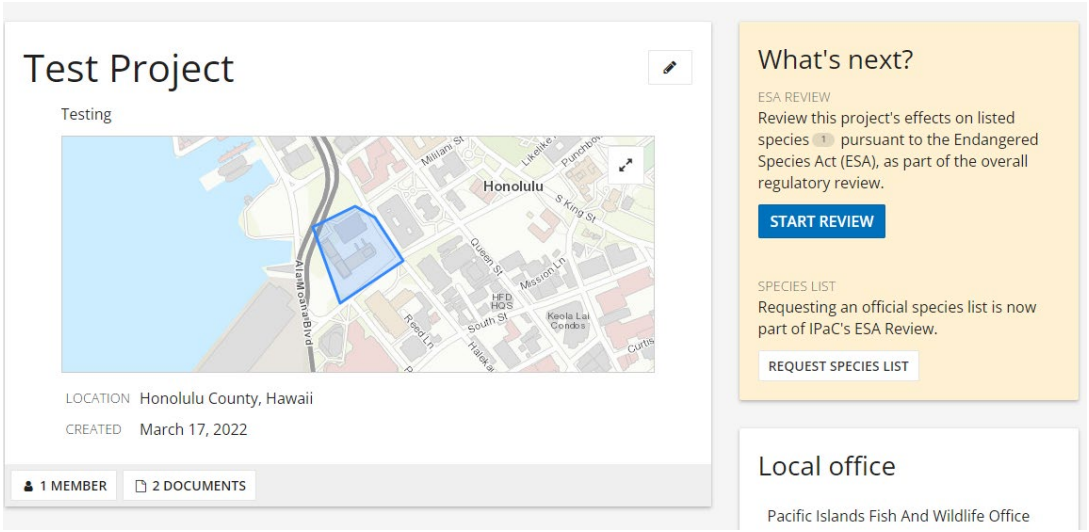


- Continue with the following steps to comply with the requirements of ESA section 7 to obtain an **official species list**.
- Select Define Project

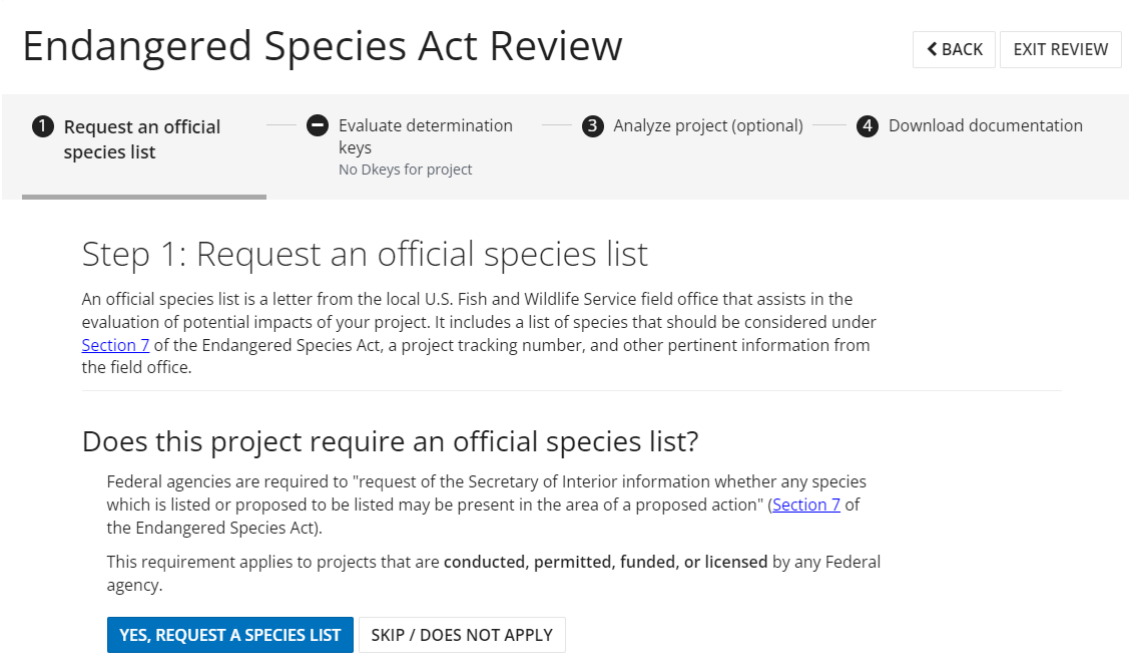


Enter the Project Name and a brief description of the project (a description is not mandatory, but recommended for future coordination with the Service). Click SAVE at bottom of page.

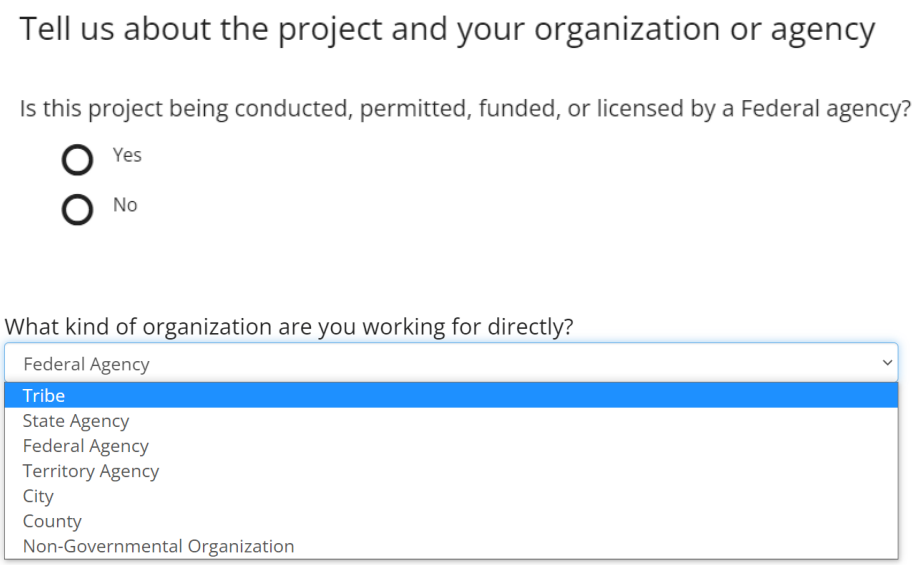
- At the bottom of the What's next box on the right, click Request Species List



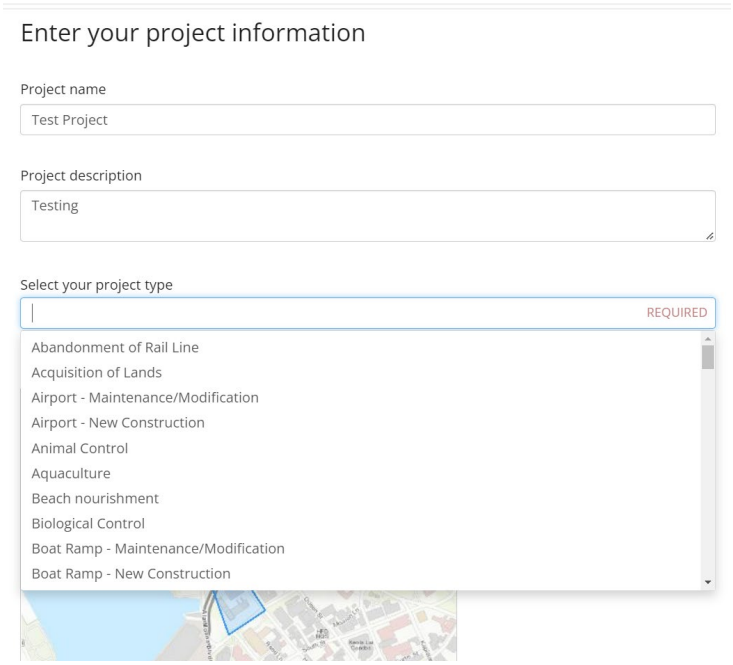
- on the following screen, click Yes, Request Species List



- Fill out the contact information for yourself or your agency. Contractors, state partners, and any other project proponents may request a species list and should be covered using the dropdown menus.



- From the pull-down menu for Classify Type of Project, select the project type that best fits the proposed action.

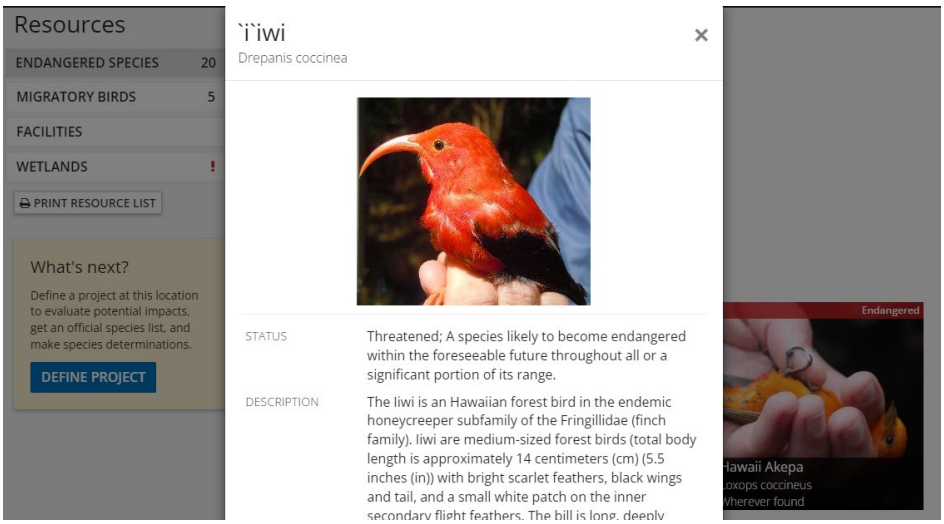


- Once all required sections are filled out, press SUBMIT OFFICIAL SPECIES LIST REQUEST



- An Official Species List should be generated and available for download in a couple of seconds.

- If you need additional information on a species, click on their name that is hot-linked to their species information page. A brief overview of the species' status, description and critical habitat will appear as well as a link to their ECOS species profile.



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Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Via email: pifwo_admin@fws.gov

Carrie Harrington
Pacific Islands Fish and Wildlife Office
U.S. Fish and Wildlife Service
300 Ala Moana Blvd., Room 3-122
Honolulu, Hawai'i 96850

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Ms. Harrington:

On behalf of the County of Maui, Department of Water Supply (DWS), thank you for your email, dated February 15, 2023, providing comments on the proposed Launiupoko Exploratory Wells project. We offer the following information in response to the comments received.

Comment No. 1:

Please find attached our best management practices for working in or near aquatic environments. If there are streams or any other aquatic habitat in the project footprint, you will also need to consult with us under the Fish and Wildlife Coordination Act.

Response: Thank you for providing the USFWS standard Best Management Practices. These BMPs have been shared with the project team for implementation, as applicable. There are no known streams or any other aquatic habitat in the project vicinity.

Comment No. 2:

For section 7 consultation under the Endangered Species Act, please access our online Information for Planning and Consultation (IPAC) tool to obtain a species list for all federally listed species that may occur in the project footprint and associated avoidance and minimization measures. Guidance for IPAC outlined below and attached.

Response: Thank you for the information regarding the IPAC tool for Section 7 consultation pursuant to the Endangered Species Act. The proposed action is not anticipated to utilize federal funds or have other triggers for Section 7 consultation. Nevertheless, we appreciate the information provided by the IPAC tool.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,



Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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MAR 1 0 2023

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA

KEITH A. REGAN
COMPTROLLER
KA LUNA HO'OMALU HANA LAULĀ

MEOH-LENG SILLIMAN
DEPUTY COMPTROLLER
KA HOPE LUNA HO'OMALU HANA LAULĀ

STATE OF HAWAI'I | KA MOKU'ĀINA O HAWAI'I
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES | KA 'OIHANA LOIHELU A LAWELAWE LAULĀ
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)23.021

MAR - 8 2023

Ms. Emily Y. K. Murai, Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Murai:

Subject: Chapter 343, Hawaii Revised Statutes (HRS) Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project

Thank you for the opportunity to provide comments on the subject project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities in West Maui, and we have no comments to offer at this time.

If you have any questions, your staff may contact Dennis Chen of the Planning Branch at (808) 586-0491 or via e-mail at dennis.yk.chen@hawaii.gov.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

DE:mo
c: Jeff Pearson, DAGS Maui District Office

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VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Christine L. Kinimaka, Public Works Administrator
Department of Accounting and General Services
State of Hawai'i
P.O. Box 119
Honolulu, Hawai'i

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Ms. Kinimaka:

Thank you for your comment letter dated March 8, 2023 regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we acknowledge that the proposed project does not impact any of the State of Hawai'i Department of Accounting and General Services projects or existing facilities and the Department has no comments to offer at this time.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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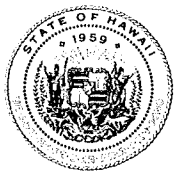
FEB 24 2023

JOSH GREEN, M.D.
GOVERNOR
STATE OF HAWAII
Ke Kia'āina o ka Moku'āina 'o Hawai'i

SYLVIA J. LUKE
LT. GOVERNOR
STATE OF HAWAII
Ka Hope Kia'āina o ka Moku'āina 'o Hawai'i



IKAIKA ANDERSON
CHAIRMAN DESIGNATE, HHC
Ka Luna Ho'okele

KATIE L. DUCATT
DEPUTY DESIGNATE TO THE CHAIRMAN
Ka Hope Luna Ho'okele

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
Ka 'Oihana 'Āina Ho'opulapula Hawai'i
P. O. BOX 1879
HONOLULU, HAWAII 96805

February 17, 2023 ref: PO-23-030

Ms. Emily Murai, Associate
The Maui County, Department of Water Supply
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Aloha Ms. Murai,

RE: Request for the Proposed Launiupoko Exploratory Wells Project, Lahaina, Maui

We are in receipt of your letter dated January 31, 2023 regarding the proposed Launiupoko Wells Project Request for Early Consultation. Mahalo for the opportunity to provide initial comments during the early consultation period for the Draft Environmental Assessment (DEA). In the DEA, please discuss how this project will impact DHHL's ability to implement its Development Plans for its lands in Honokōwai and Leiali'i. The Hawaiian Homes Commission approved the department's (DHHL) plans for approximately 777 acres in 2021. This Master Plan intends to create a mixed urban and subsistence homestead agricultural community at Honokōwai. Specifically, please address the following concerns:

1. Please address how this proposed project will affect DHHL's ability and rights, whether positively or negatively, to implement the plans for its lands in Honokōwai and Leiali'i. Currently, potable water availability is the most significant constraint that impacts the timing of DHHL development.

2. Please discuss in further detail the DWS's plan to use the Launiupoko and Honolua Aquifers, while assessing the environmental impacts. If there have been alternatives to replace 1.55 million gallons per day of surface water to be released in the Kanahā stream, or combinations examined as well, please include them in your DEA.

Mahalo for the opportunity to comment. Please contact dhhl.planning@hawaii.gov with any questions.

Me ke aloha,

Ikaika Anderson, Chairman-Designate
Hawaiian Homes Commission

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VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Kali Watson, Chairman
State of Hawai'i
Department of Hawaiian Home Lands
Hawaiian Homes Commission
P.O. Box 1879
Honolulu, Hawai'i 96805

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Watson:

We received a comment letter from the Department of Hawaiian Home Lands dated February 17, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment No. 1:

Please address how this proposed project will affect DHHL's ability and rights, whether positively or negatively, to implement the plans for its lands in Honokowai and Leiali'i. Currently, potable water availability is the most significant constraint that impacts the timing of DHHL development.

Response: The proposed project will involve the construction and testing of exploratory wells in the Launiupoko Aquifer. It is our understanding that on September 18, 2018, the CWRM approved DHHL's reservation of 0.770 mgd of groundwater to meet their foreseeable groundwater needs in the Honokōwai Aquifer. With these water reservations for DHHL in the Honokōwai Aquifer, the proposed project is not anticipated to affect DHHL's ability or rights to implement plans for its lands in Honokōwai and Leiali'i. Additionally, a 2022 CWRM findings of fact report provides that the CWRM approved DHHL's reservation of 0.770 mgd of groundwater to meet their foreseeable groundwater needs in the Honokōwai Aquifer on September 18, 2018.

Comment No. 2:

Please discuss in further detail the DWS's plan to use the Launiupoko and Honolua Aquifers, while assessing the environmental impacts. If there have been alternatives to replace 1.55 million gallons per day of surface water to be released in the Kanaha stream, or combinations examined as well, please include them in your DEA.

Response: The Environmental Assessment (EA) for the proposed project will evaluate the proposed project and assess potential environmental impacts. If the exploratory wells and tests are successful, a separate EA will be prepared to assess the conversion of the proposed exploratory wells to permanent production wells. Alternatives for the proposed project will be discussed in the EA. The development of the two (2) proposed Launiupoko wells is the direct result to replace the surface water source that was allocated to the Lāhainā Water Treatment Plant, which now is to be released into Kanahā Stream.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft EA being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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JOSH GREEN, M.D.
GOVERNOR OF HAWAI'I
KE KIA'ĀINA O KA MOKU'ĀINA 'O HAWAI'I

KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HO'OKELE

Lorrin W. Pang, M.D., M.P.H.
District Health Officer

STATE OF HAWAI'I
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
Maui District Health Office
54 South High St. Rm. #300
Wailuku, HI 96793

February 15, 2023

Ms. Emily Murai, Associate
305 High Street, Suite 104
Wailuku, Hawaii 96793
(via email:planning@munekiyohiraga.com)

Dear Ms. Murai:

Subject: Chapter 343, Hawaii Revised Statues (HRS) Early Consultation
Request for the Proposed Launiupoko Exploratory Wells Project

Thank you for letting us comment on this project. We have no comments because the project will connect to the county sewer system. If you have any questions please direct them to Roland Tejano, Environmental Engineer at 808 984-8232. Or email him at roland.tejano@doh.hawaii.gov.

It is strongly recommended that you review the department's website at https://health.hawaii.gov/epo/landuse/ and contact the appropriate program that concerns your project.

Should you have any questions, please contact me at 808 984-8230 or email me at patricia.kitkowski@doh.hawaii.gov.

Sincerely,

Patti Kitkowski

c: Joanna Seto, EMD Administrator

JOSH GREEN, M.D.
GOVERNOR OF HAWAI'I
KE KIA'ĀINA O KA MOKU'ĀINA 'O HAWAI'I

KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HO'OKELE

Lorrin W. Pang, M.D., M.P.H.
District Health Officer

STATE OF HAWAI'I
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
Maui District Health Office
54 South High St. Rm. #301
Wailuku, HI 96793

Date: February 15, 2023

To: Ms. Emily Murai, Associate
305 High Street, Suite 104
Wailuku, Hawaii 96793

From: Patti Kitkowski, District Environmental Health Program Chief
Environmental Health Services Division

Subject: Chapter 343, Hawaii Revised Statutes
Early Consultation Request for the Proposed Launiupoko Exploratory Wells

In most cases, the District Health Office will no longer provide individual comments to agencies or project owners to expedite the land use review and process.
Agencies, project owners, and their agents should apply Department of Health "Standard Comments" regarding land use to their standard project comments in their submittal. Standard comments can be found on the Land Use Planning Review section of the Department of Health website: https://health.hawaii.gov/epo/landuse/. Contact information for each Branch is available on that website.

Note: Agencies and project owners are responsible for adhering to all applicable standard comments and obtaining proper and necessary permits before the commencement of any work.

General summary comments have been included for your convenience. However, these comments are not all-inclusive and do not substitute for review of and compliance with all applicable standard comments for the various DOH individual programs.

Clean Air Branch

1. Control of Fugitive Dust: A significant potential for fugitive dust emissions exists during all phases of construction and operations. Proposed activities in proximity to existing residences, businesses, public areas, or thoroughfares exacerbate potential dust problems. It is recommended that a dust control management plan be developed. The plan does *not* require DOH approval. Activities must comply with the provisions of Hawaii Administrative Rules (HAR), §11-60.1-33 on Fugitive Dust.

Clean Water Branch

1. Agencies and/or project owners seeking environmental compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55 may be responsible for fulfilling additional requirements. Any project and its potential impacts to State waters must meet the following criteria:
    a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
    b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
    c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
2. National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for point source water pollutant discharges into State surface waters (HAR, Chapter 11-55).
    a. Point source means any discernible, confined, and discrete conveyance from which pollutants are or may be discharged.
3. A Section 401 Water Quality Certification (WQC) is required if the project/activity:
    a. Requires a federal permit, license, certificate, approval, registration, or statutory exemption; and
    b. May result in a discharge into State waters. The term "discharge" is defined in Clean Water Act, Subsections 502(16), 502(12), and 502(6).
4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards [HAR, Chapters 11-54 and 11-55]. Noncompliance may result in penalties of $25,000 per day per violation and up to two (2) years in jail.
5. To determine if your project/activity requires a federal permit, license, certificate, approval, registration, or statutory exemption contact the appropriate federal agencies (e.g., Department of the Army (DA), U.S. Army Corps of Engineers (COE), Pacific Ocean Division Honolulu District Office (POH) Tel: 808-835-4303; U.S. Environmental Protection Agency Tel: 415-947-8021; Federal Energy Regulatory Commission Tel: 866-208-3372; U.S. Coast Guard Office of Bridge Programs Tel: 202-372-1511).

Hazard Evaluation & Emergency Response Office

1. A Phase I Environmental Site Assessment (ESA) and Phase II Site Investigation should be conducted for projects wherever current or former activities on site may have resulted in releases of hazardous substances, including oil or chemicals. Areas of concern include current and former industrial areas, harbors, airports, and formerly and currently zoned agricultural lands used for growing sugar, pineapple or other agricultural products.

Indoor and Radiological Health Branch

1. Project activities shall comply with the Administrative Rules of the Department of Health: HAR Chapters 11-39, 11-45, 11-46, 11-501, 11-502, 11-503, 11-504.

2. Construction/Demolition Involving Asbestos: If the proposed project includes renovation/demolition activities that may involve asbestos, the applicant should contact the Asbestos Abatement Office in the Noise, Radiation, and Indoor Air Quality Branch.

Safe Drinking Water Branch

1. Agencies and/or project owners are responsible for ensuring environmental compliance for their projects in the areas of 1) Public Water Systems; 2) Underground Injection Control; 3) Groundwater Protection, and 4) Drinking Water State Revolving Fund, in accordance with the Hawaii Administrative Rules (HAR), Chapters 11-19, 11-20, 11-21, 11-23, 11-23A, 11-25, and 11-65. They may be responsible for fulfilling additional requirements related the Safe Drinking Water program.

Solid & Hazardous Waste Branch

1. Hazardous Waste Program
    a. The state regulations for hazardous waste and used oil are in HAR Chapters 11-260.1 to 11-279.1. These rules apply to the identification, handling, transportation, storage, and disposal of regulated hazardous waste and used oil.
2. Solid Waste Section
    a. The Solid Waste Section (SWS) laws and regulations are contained in HRS Chapters 342H and 342I, and HAR Chapter 11-58.1, HAR, "Solid Waste Management Control."

Wastewater Branch

1. Wastewater Branch requires that the individual wastewater systems shall be designed and constructed to meet the requirements of HAR Chapter 11-62.
2. A minimum lot size of 10,000 square feet is required in order to utilize individual wastewater systems.
3. DOH reserves the right to review detailed wastewater plans for conformance to applicable rules.

Sanitation / Local DOH Comments:

1. Noise may be generated during demolition and/or construction. The applicable maximum permissible sound levels, as stated in Title 11, HAR, Chapter 11-46, "Community Noise Control," shall not be exceeded unless a noise permit is obtained from the Department of Health.

2. According to HAR §11-26-35, No person, firm, or corporation shall demolish or clear any structure, place, or vacant lot without first ascertaining the presence or absence of rodents that may endanger public health by dispersal from such premises. Should any such inspection reveal the presence of rodents, the rodents shall be eradicated before demolishing or clearing the structure, site, or vacant lot. A demolition or land clearing permit is required prior to demolition or clearing.

Other

1. CDC - Healthy Places - Healthy Community Design Checklist Toolkit recommends that state and county planning departments, developers, planners, engineers, and other

interested parties apply these principles when planning or reviewing new developments or redevelopment projects.

2. If new information is found or changes are made to your submittal, DOH reserves the right to implement appropriate environmental health restrictions as required. Should there be any questions on this matter, please contact the Department of Health, Environmental Health Services Division at 808 984-8230 or email patricia.kitkowski@doh.hawaii.gov .

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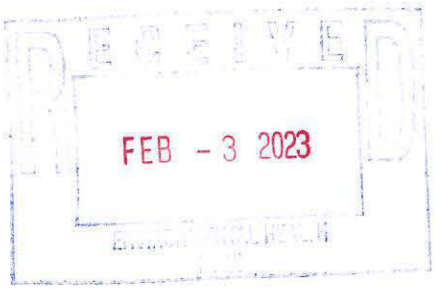
Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
SENIOR ADVISOR

January 31, 2023



Patti Kitkowski, District Environmental Health Program Chief
State of Hawai'i
Department of Health
Maui Sanitation Branch
54 South High Street, Room 300
Wailuku, Hawai'i 96793

SUBJECT: Chapter 343, Hawai'i Revised Statutes (HRS) Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project

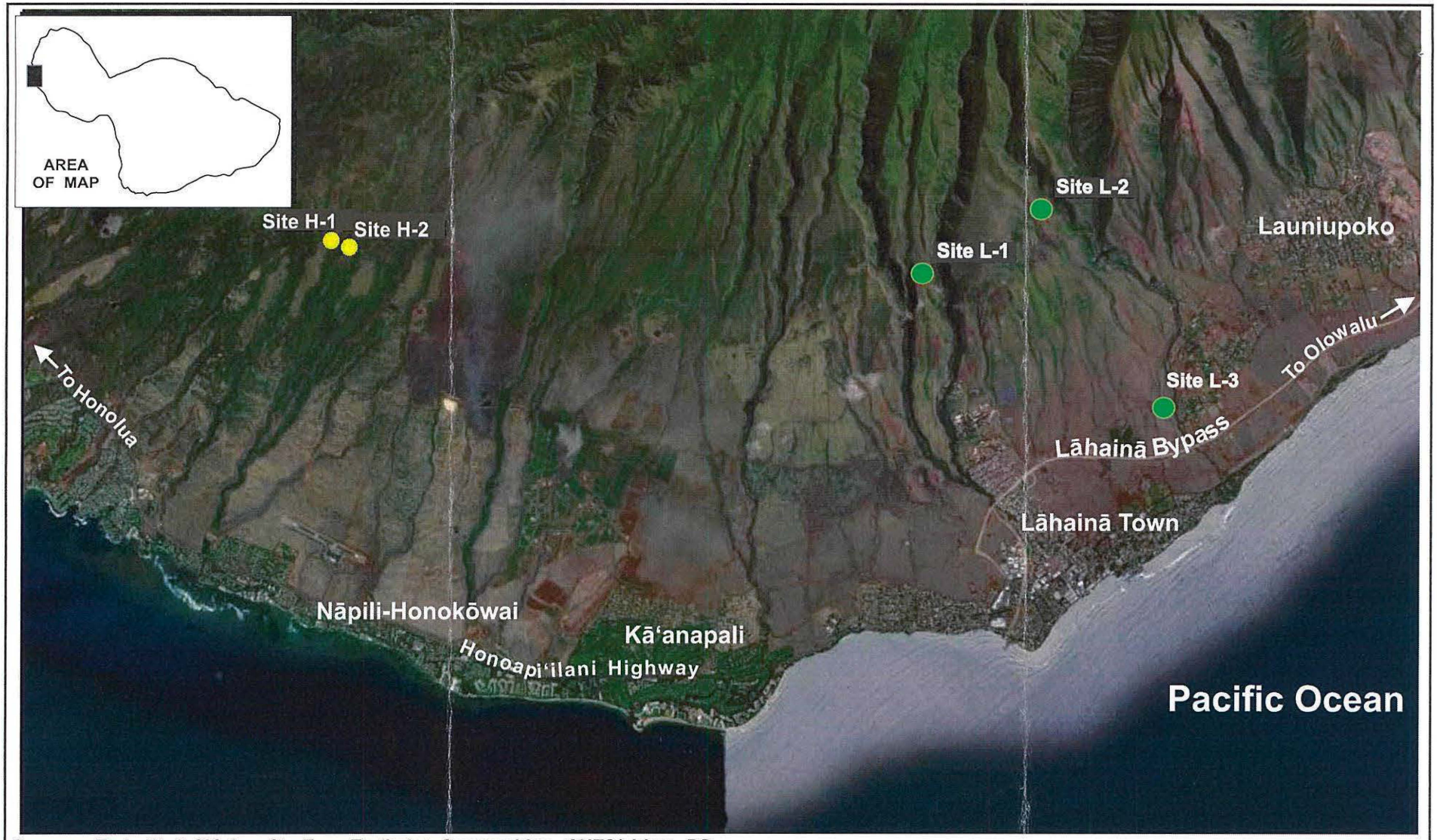
Dear Ms. Kitkowski:

The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the Lāhainā district of West Maui. A total of five (5) sites have been considered as potential well sites - Sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and Sites H-1 and H-2 in the Honolua Aquifer. See **Figure 1**. The DWS has selected Sites L-1 and L-3 for construction of the exploratory wells. See **Figure 2**. Two (2) exploratory wells will be constructed at both Site L-1 and Site L-3 in order to provide back-up capability for the wells. As such, a total of four (4) exploratory wells are proposed to be constructed. Sites L-2, H-1, and H-2 will be assessed as potential alternative sites. Refer to **Figure 2** and see **Figure 3**.

The proposed Site L-1 and Site L-3 wells will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Existing dirt and gravel roads will be used to access the sites and when necessary, new access roads will be graded and surfaced with gravel. The immediate work sites will be graded to create a gently sloping pad and a chain link security fence will be constructed around each site. The affected properties to be evaluated as potential exploratory well sites are outlined in **Table 1**, below.

Table 1. Project TMKs

TMK	Owner	Project Component
(2)4-6-018:007	**State of Hawai'i**	**Site L-1 and Access Roads**
(2)4-6-025:002	State of Hawai'i	Site L-2 (Alternative Site) and Access Roads
(2)4-6-019:003	**State of Hawai'i**	**Site L-3 and Access Roads**
(2)4-3-001:001	Maui Land & Pineapple Company, Inc.	Site H-1 (Alternative Site), Site H-2 (Alternative Site), and Access Roads



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/airbus DS, USDA, AeroGRID, IGN, and the GIS User Community

Figure 1

Launiupoko Exploratory Wells
Regional Location Map

3000
0 Feet
1500 6000

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/RegLoca

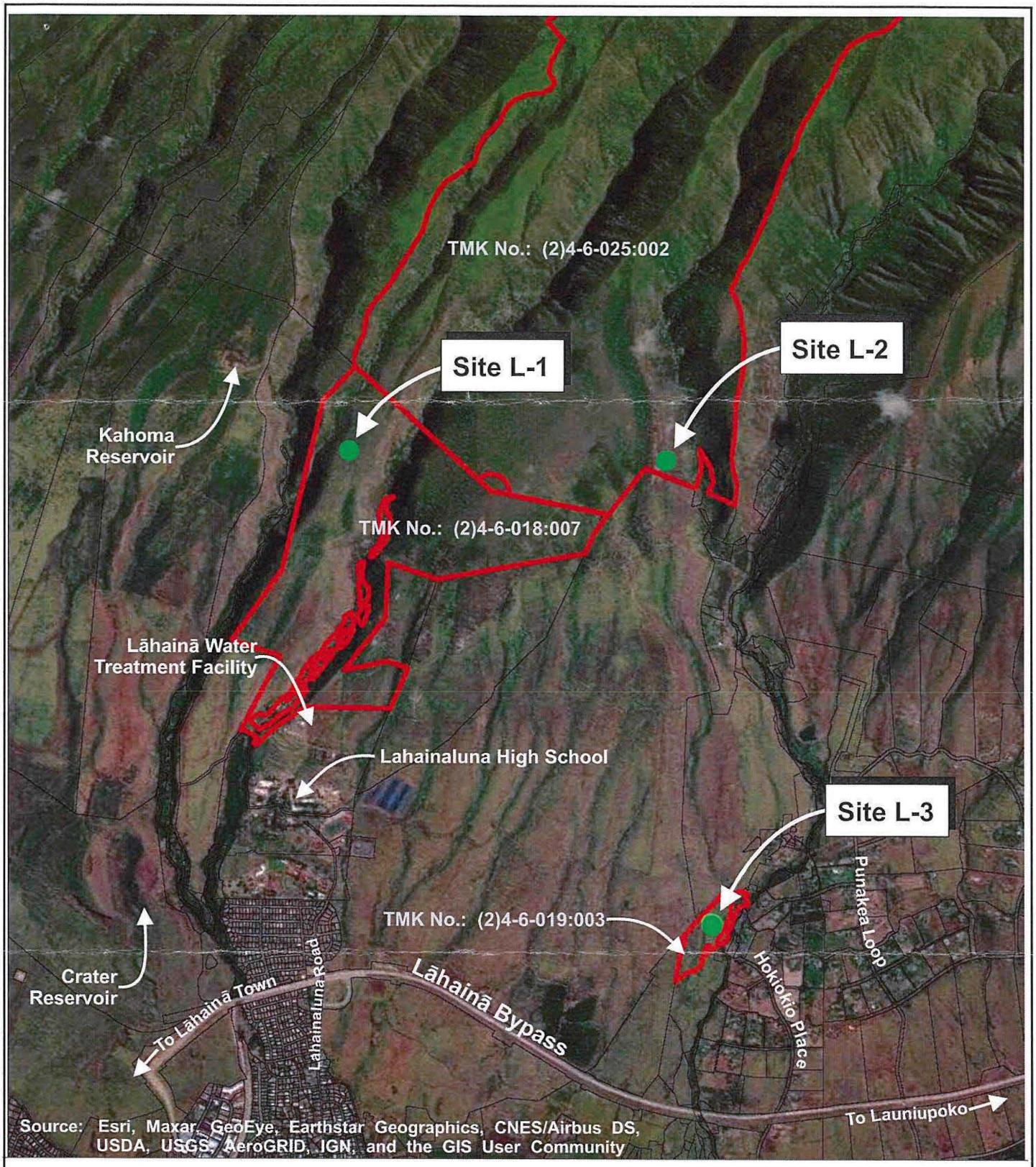


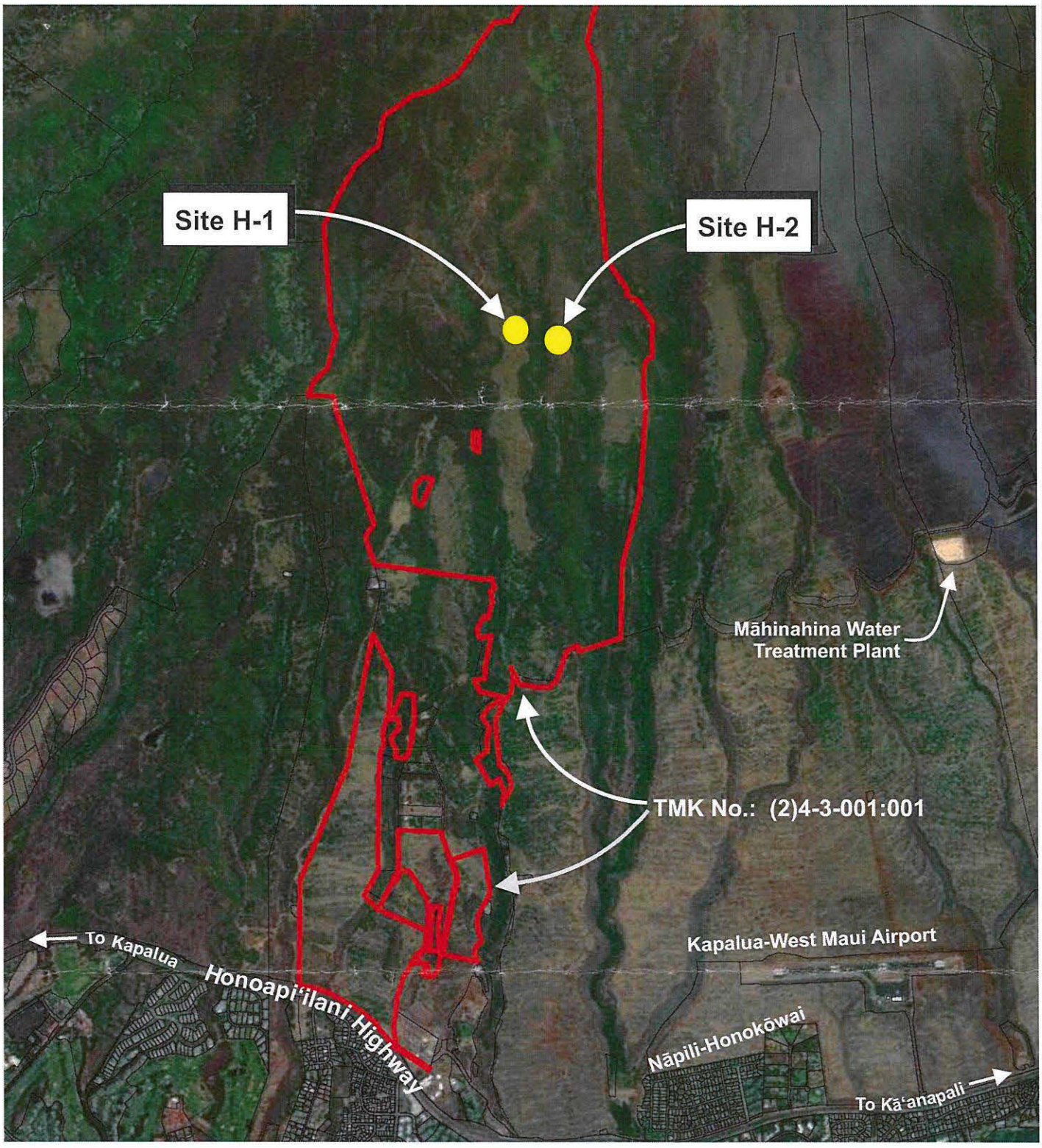
Figure 2 Launiupoko Exploratory Wells
Sites L-1, L-2, and L-3
Project Location Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

FE/Launiupoko Well Development/Applications/Figs/L-1L2L3ProjLoca



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 3

Launiupoko Exploratory Wells
Sites H-1 and H-2 Project Location Map

0 1250 Feet
625 2500

Prepared for: County of Maui, Department of Water Supply

MUNEKIYO HIRAGA

Based on water quality test results and pump tests, the DWS will determine if the exploratory well sites are suitable for conversion to permanent production wells. If successful, the production wells will be constructed to replace 1.55 million gallons per day of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow standards. It is noted that the CWRM designated the Lahaina Aquifer Sector Area as a Surface and Ground Water Management Area. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. The effective date of this designation is August 6, 2022. If the exploratory wells are successful, an application for a Water Use Permit will be submitted to the CWRM for future production wells.

It is further noted that Sites L-1 and L-2 are within the State Conservation Land Use District, and therefore, a Conservation District Use Permit (CDUP) will be obtained from the Board of Land and Natural Resources (BLNR) prior to commencing work on those sites.

The use of County funds and State lands as well as work within the Conservation District are triggers for preparation of an Environmental Assessment (EA) pursuant to Chapter 343, HRS. As such, a Draft EA will be prepared for this project in accordance with Chapter 11-200.1 of the Hawai'i Administrative Rules (HAR) to address the technical characteristics, alternatives, and potential environmental impacts, including potential archaeological and cultural impacts and impacts to flora and fauna resources. It is noted that this EA being prepared is limited to the exploratory test wells and will include an assessment of the proposed Sites L-1 and L-3 and alternative Sites L-2, H-1, and H-2. Should the exploratory wells be successful, a separate EA will be prepared prior to construction of permanent production wells. The DWS will be the approving agency for the EA.

On behalf of the DWS, we kindly request your early review and comment on the proposed project in accordance with the requirements of Chapter 11-200.1, HAR. We appreciate receiving any comments you may have by **February 21, 2023**. Please send your comments to the address listed below.

Munekiyo Hiraga
Attention: Emily Murai, Associate
305 High Street, Suite 104
Wailuku, Hawai'i 96793
OR
Email: planning@munekiyohiraga.com

Thank you for your participation in the Chapter 343, HRS environmental review process. Should you have any questions regarding this Chapter 343, HRS early consultation request, please do not hesitate to contact me at (808) 983-1233.

Very truly yours,

Emily Y. K. Murai, Associate

EM:ab
Enclosures

cc: John Stufflebean, Acting Director, County of Maui, Department of Water Supply (w/enclosures)
Thomas Ochwat, County of Maui, Department of Water Supply (w/enclosures)
Ronald Fukumoto, Fukumoto Engineering, Inc. (w/enclosures)
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MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Patti Kitowski, District Environmental Health Program Chief
Department of Health
Maui District Health Office
415 South Beretania Street
Honolulu, Hawai'i 96813

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Ms. Kitowski:

Thank you for your comment letter dated February 15, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment No. 1:

We have no comments because the project will connect to the county sewer system.

Response: We note that the proposed project is an exploratory well project and will not require wastewater treatment or connection to the County sewer system.

Comment No. 2:

It is strongly recommended that you review the department's website at https:1:health.hawaii.gov/epo/landuse/ and contact the appropriate program that concerns your project.

Response: We have reviewed the Standard Comments found at the DOH website referenced in your letter. The Standard Comments have been shared with the project team for review and incorporation into the project, as applicable.

Thank you again for your participation in the Chapter 343, Hawai‘i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

February 23, 2023

Munekiyo Hiraga
Attn: Ms. Emily Murai, Associate
305 High Street, Suite 104
Wailuku, Hawaii 96793

via email: planning@munekiyohiraga.com

Dear Ms. Murai:

SUBJECT: Early Consultation Request for the Proposed **Launiupoko Exploratory Wells Project** located at Lahaina District, Island of Maui; TMKs: (2) 4-6-018:007; (2) 4-6-025:002; (2) 4-6-019:003; and (2) 4-3-001:001 on behalf of the County of Maui, Department of Water Supply

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

At this time, enclosed are comments from the (a) Engineering Division, (b) Division of Forestry & Wildlife, and (c) Land Division-Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

February 1, 2023

MEMORANDUM

FROM: ~~TO:~~

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_ Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
_X_ Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation Request for the Proposed **Launiupoko Exploratory Wells Project**
LOCATION: Lahaina District, Island of Maui; TMKs: (2) 4-6-018:007; (2) 4-6-025:002; (2) 4-6-019:003; and (2) 4-3-001:001
APPLICANT: Munekiyo Hiraga on behalf of the County of Maui, Department of Water Supply

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **February 17, 2023.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

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

Signed: *Carty S. Chang*
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Feb 10, 2023

Attachments
cc: Central File

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project
Location: Lahaina District, Island of Maui
TMK(s): (2) 4-6-018:007; (2) 4-6-025:002; (2) 4-6-019:003; and (2) 4-3-001:001
Applicant: Munekiyo Hiraga on behalf of the County of Maui, Department of Water Supply

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4849.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: Feb 10, 2023

JOSH GREEN, M. .
GOVERNOR | KE IA'ĀINA

SYLVI LUKE
LIEUTENANT GOVERNOR | KA HOPE IA'ĀINA

W N N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ST TE OF H W I'I | K MOKU'ĀIN 'O H W I'I
EP R TMENT OF L N N NATUR L RESOUR E S
KA 'OIH NA KUMUW IW I 'ĀIN
L ND I VISION

P.O. BOX 6
HONOLULU, HAWAII 968 9

February 1, 2

MEMORANDUM

FROM: **LNR ge ncies**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ **Div. of Forestry & Wildlife** (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_ Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_ Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
_X_ Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation Request for the Proposed **Launiupoko Exploratory Wells Project**
LOCATION: Lahaina District, Island of Maui; TMKs: ( ) - 6- 8:0 7; ( ) -6- 5: ; ( ) -6- 9 :0 ; and ( ) - 3- :
APPLICANT: Munekiyo Hiraga on behalf of the County of Maui, Department of Water Supply

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **February 17, 2023.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

RI EF O MMENTS

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(☑) Comments are included/attached.

Signed: *Lainie Berry*
Print Name: LAINIE BERRY, Wildlife Program Mgr.
Division: Division of Forestry and Wildlife
Date: Feb 23, 2023

Attachments
cc: Central File

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

LAURA H.E. KAAKUA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

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

February 22, 2023

MEMORANDUM *Log no. 3991*

TO: RUSSELL Y. TSUJI, Land Administrator
Land Division

FROM: LAINIE BERRY, Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: Division of Forestry and Wildlife Comments for the Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project on Maui

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your early consultation request for the proposed Launiupoko Exploratory Wells project in the Lāhaina District, on the island of Maui; TMKs: (2) 4-6-018:007, 4-6-025:002, 4-6-019:003, and 4-3-001:001. The proposed project consists of constructing exploratory wells at five sites that have been considered potential well sites – Sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and Sites H-1 and H-3 in the Honolua Aquifer. Sites L-1 and L-3 have been selected, and two (2) exploratory wells will be constructed at each site for a total of four (4) exploratory wells. Sites L-2, H-1, and H-2 will be assessed as potential alternative sites.

The site proposed as L-1 falls within or adjacent to designated critical habitat. The critical habitat, known as the Maui Lowland Dry Unit 05, harbors the following endangered and/or rare plant species: *Asplenium diellaciniatum*, *Bidens campylotheca ssp. pentamera*, *Cenchrus agrimonioides*, *Ctenitis squamigera*, *Cyanea obtuse, Gouania hillebrandii*, *Hesperomannia arbuscula*, *Hibiscus brackenridgei*, *Kadua coriacea*, *Lysimachia lydgatei*, *Neraudia sericea*, *Remya mauiensis*, *Santalum haleakalae var. lanaiense*, *Schiedea salicaria*, *Sesbania tomentosa*, *Spermolepis hawaiiensis*, *Tetramolopium capillare*, and *Tetramolopium remyi.*

The site proposed as L-2 falls within the West Maui Natural Area Reserve (NAR) - Panaewa Section. In accordance with Hawaii Administrative Rules Chapter 13-209-4 (6), the proposed activities, specifically drilling an exploratory well and the development of a production well, are prohibited in the NAR and are not consistent with the purposes of Hawaii Revised Statutes Chapter 195. Please remove this site from further consideration.

DOFAW recommends that a qualified botanist survey for rare and endangered plants in all proposed affected areas prior to commencing work. We recommend that the survey consists of

a complete species list and that surveying of dry areas should be done during the wettest time when plants are more likely to be visible. If any listed species are found, please notify DOFAW at (808) 587-0166. For information on avoidance and minimization measures for plants, please refer to the following link: https://www.fws.gov/sites/default/files/documents/Plant%20Avoidance%20and%20Minimization%20Measures-April%202022.pdf.

The State listed Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight.

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15, when young seabirds make their maiden voyage to sea.

If nighttime construction is required during the seabird fledgling season (September 15 to December 15), we recommend that a qualified biologist be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen circling around the area, lights should then be turned off. If a downed seabird is detected, please follow DOFAW's recommended response protocol by visiting https://dlnr.hawaii.gov/wildlife/seabird-fallout-season/#response.

Permanent lighting also poses a risk of seabird attraction, and as such should be minimized or eliminated to protect seabird flyways and preserve the night sky. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawai‘i please visit https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

State-listed waterbirds such as the Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai*), Hawaiian Duck (*Anas wyvilliana*), and Hawaiian Goose (*Branta sandvicensis*) could potentially occur at or in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any of these species are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Maui Branch DOFAW Office at (808) 984-8100.

All the proposed project areas are within the range of the State listed Blackburn's Sphinx Moth (*Manduca blackburni*) or BSM. Larvae of BSM feed on many nonnative hostplants, including tree tobacco (*Nicotiana glauca*), which grows in disturbed soil. We recommend contacting the Maui Branch DOFAW office at (808) 984-8100 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM. DOFAW recommends removing plants less than one meter in height or during the dry season to avoid harm to BSM. If you intend to either remove tree tobacco

over one meter in height or to disturb the ground around or within several meters of these plants, they must be thoroughly inspected by a qualified entomologist for the presence of BSM eggs and larvae.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g., Coqui Frogs, Little Fire Ants, etc.), or invasive plant parts (e.g., Miconia, Mullein, etc.) that could harm our native species and ecosystems. We recommend consulting the Maui Invasive Species Committee (MISC) at (808) 573-6472 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

To prevent the spread of Rapid ʻŌhiʻa Death (ROD), DOFAW requests that the information and guidance at the following website be reviewed and followed if ʻōhiʻa trees are present at the project site that will be removed, trimmed, or potentially injured: https://cms.ctahr.hawaii.edu/rod.

We appreciate your efforts to work with our office for the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsibility of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Myrna N. Girald Pérez, Protected Species Habitat Conservation Planning Associate at (808) 265-3276 or myrna.girald-perez@hawaii.gov.

Sincerely,

Lainie Berry

LAINIE BERRY
Wildlife Program Manager

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

February 1, 2023

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_Engineering Division (DLNR.ENGR@hawaii.gov)
_X_Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_Land Division – Maui District (daniel.l.ornellas@hawaii.gov)
_X_Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Consultation Request for the Proposed **Launiupoko Exploratory Wells Project**
LOCATION: Lahaina District, Island of Maui; TMKs: (2) 4-6-018:007; (2) 4-6-025:002; (2) 4-6-019:003; and (2) 4-3-001:001
APPLICANT: Munekiyo Hiraga on behalf of the County of Maui, Department of Water Supply

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **February 17, 2023.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

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

Signed: [signature]
Print Name: Daniel Ornellas
Division: DLNR - MDLO
Date: 2/7/2023

Attachments
cc: Central File

Work with the following agencies for access:
1. Dept. of Education
2. DLNR DOFAW
3. DLNR Land Division

MUNEKIYO HIRAGA
Planning. Project Management. Sustainable Solutions.

Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Ian Hirokawa, Land Administrator
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 601
Honolulu, Hawai'i 96809

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Tsuji:

Thank you for your comment letter dated February 23, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Engineering Division

Comment:

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA' s Flood Insurance Rate Maps (FIRM).

Response: We acknowledge your comment that the project is required to comply with the rules and regulations of the National Flood Insurance Program, Title 44 of the Code of Federal Regulations, when the proposed development falls within a Special Flood Hazard Area. We note that all proposed exploratory well sites are located within Flood Zone X (unshaded), an area of minimal flood hazard.

Division of Forestry and Wildlife (DOFAW)

Comment No. 1:

The site proposed as L-1 falls within or adjacent to designated critical habitat. The critical habitat, known as the Maui Lowland Dry Unit 05, harbors the following endangered and/or rare plant species: Asplenium diellaciniatum, Bidens campylotheca ssp. pentamera, Cenchrus agrimonioides, Ctenitis squamigera, Cyanea obtuse, Gouania hillebrandii, Hesperomannia arbuscula, Hibiscus brackenridgei, Kadua coriacea, Lysimachia lydgatei, Neraudia sericea, Remya mauiensis, Santalum haleakalae var. lanaiense, Schiedea salicaria, Sesbania tomentosa, Spermolepis hawaiiensis, Tetramolopium capillare, and Tetramolopium remyi.

Response: We acknowledge that the proposed exploratory well site L-1 falls within or adjacent to designated critical habitat. The critical habitat, known as the Maui Lowland Dry Unit 05, harbors the following endangered and/or rare plant species: *Asplenium diellaciniatum, Bidens campylotheca ssp. pentamera, Cenchrus agrimonioides, Ctenitis squamigera, Cyanea obtuse, Gouania hillebrandii, Hesperomannia arbuscula, Hibiscus brackenridgei, Kadua coriacea, Lysimachia lydgatei, Neraudia sericea, Remya mauiensis, Santalum haleakalae var. lanaiense, Schiedea salicaria, Sesbania tomentosa, Spermolepis hawaiiensis, Tetramolopium capillare, and Tetramolopium remyi*. A biological resources survey report was prepared for all proposed exploratory well sites including Site L-1. The survey included a walk-through survey of the entire project site. The biological resources survey will be included in the Draft Environmental Assessment (EA).

Comment No. 2:

The site proposed as L-2 falls within the West Maui Natural Area Reserve (NAR) - Panaewa Section. In accordance with Hawaii Administrative Rules Chapter 13-209-4 (6), the proposed activities, specifically drilling an exploratory well and the development of a production well, are prohibited in the NAR and are not consistent with the purposes of Hawaii Revised Statutes Chapter 195. Please remove this site from further consideration.

Response: Thank you for notifying us that the proposed Site L-2 is within the West Maui Natural Area Reserve (NAR) Pana'ewa Section. Based on this information, Site L-2 has been removed from consideration as a potential well site.

Comment No. 3:

DOFAW recommends that a qualified botanist survey for rare and endangered plants in all proposed affected areas prior to commencing work. We recommend that the survey consists of a complete species list and that surveying of dry areas should be done during the wettest time when plants are more likely to be visible. If any listed species are found, please notify DOFAW at (808) 587-0166. For information on avoidance and minimization measures for plants, please refer to the following link: https://www.fws.gov/sites/default/files/documents/Plant%20Avoidance%20and%20Minimization%20Measures-April%202022.pdf.

Response: A biological resources survey was conducted for the proposed project sites by Robert Hobdy, Environmental Biologist in April 2022, with the exception of Site L-3 which was surveyed in December 2022. No rare or endangered plants were found during the survey. The United States Fish and Wildlife Service (USFWS) Avoidance, Minimization, and Conservation Measures for listed plants in the Pacific Islands has been shared with the project team for implementation, as applicable.

Comment No. 4:

The State listed Hawaiian Hoary Bat (Lasiurus cinereus semotus) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6

meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided for any construction because bats can become ensnared and killed by such fencing material during flight.

Response: We understand that the State listed Hawaiian Hoary Bat or ʻŌpeʻapeʻa (*Lasiurus cinereus semotus*) could potentially occur in the vicinity of the project area and may roost in nearby trees. As such, any site clearing required will be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15) and woody plants greater than 15 feet will not be disturbed, removed, or trimmed, as practicable. While barbed wire is needed to secure the area to protect the public health and safety, use will be limited to the extent practicable.

Comment No. 5:

For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15, when young seabirds make their maiden voyage to sea.

If nighttime construction is required during the seabird fledgling season (September 15 to December 15), we recommend that a qualified biologist be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen circling around the area, lights should then be turned off.

Permanent lighting also poses a risk of seabird attraction, and as such should be minimized or eliminated to protect seabird flyways and preserve the night sky.

Response: The project is not anticipating to conduct any nighttime work. However, should any artificial lighting be required, it will be shielded and downward facing to minimize potential impacts to seabirds.

Land Division- Maui District

Comment:

Work with the following agencies for access:

1. *Dept. of Education*
2. *DLNR DOFAW*
3. *DLNR Land Division*

Response: The DWS will coordinate with the appropriate State agencies for access.

Thank you again for your participation in the Chapter 343, Hawai‘i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
OFFICE OF CONSERVATION AND COASTAL LANDS
P.O. BOX 621
HONOLULU, HAWAII 96809

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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

Correspondence: MA 23-123

FEB 27 2023

Emily Y. K. Murai, Associate
Munekiyo Hiraga
planning@munekiyohiraga.com

SUBJECT: Early Consultation for the Proposed Launiupoko Exploratory Wells Project Located at Panaewa/Kuia, Lahaina, Maui, TMKs: (2) 4-6-018:007 & (2) 4-6-025:002

Dear Emily Murai:

The Office of Conservation and Coastal Lands (OCCL) has reviewed your correspondence regarding the subject matter. According to your information, the County of Maui's Department of Water Supply, is proposing to construct exploratory wells in the Lahaina district. Five sites are under consideration. Two sites noted as Sites H-1 and H-2 located on parcels, (2) 4-6-018:007 & (2) 4-6-025:002, appear to lie within the Conservation District Resource subzone.

Proposed land uses include exploratory test wells, access roads, fencing and permanent wells.

- The exploratory test well is an identified land use in the Conservation District pursuant to the Hawai'i Administrative Rules (HAR) §13-5-22 DATA COLLECTION (C-1) Basic data collection, research, education, and resource evaluation that involves a land use causing ground disturbance from installation of equipment (e.g., meteorological towers, radio towers, or test wells).
- An access road is an identified land use in the Conservation District pursuant to HAR §13-5-22 P-13 LAND AND RESOURCE MANAGEMENT (D-2) Road construction and major erosion control projects.
- Fencing is an identified land use in the Conservation District pursuant to HAR §13-5-22 P-9 STRUCTURES, ACCESSORY (B-1) Construction or placement of structures accessory to existing facilities or uses; or LAND AND RESOURCE MANAGEMENT (C-1) Installation of a new fence or shelter.
- A permanent well is an identified land use in the Conservation District pursuant to HAR §13-5-22 LAND AND RESOURCE MANAGEMENT (D-3) Water Systems.

The road work, exploratory well and fencing could be applied for under one Conservation District Use Application (CDUA) with the final Environmental Assessment and HRS 6E determination regarding historic properties for a Board permit. If a permanent well is proposed this would also require a Board permit with another final EA per your correspondence. Therefore, to allow,

modify or deny the projects would be at the discretion of the Board of Land and Natural Resources.

Should you have any questions regarding this correspondence contact Tiger Mills of our Office at (808) 587-0382 or at kimberly.mills@hawaii.gov.

Sincerely,

K. Tiger Mills, Staff Planner
Office of Conservation and Coastal Lands

C: MDLO
Maui County
-Planning

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Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

K. Tiger Mills, Staff Planner
Office of Conservation and Coastal Lands
State of Hawai'i
P.O. Box 621
Honolulu, Hawai'i 96809

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Ms. Mills:

Thank you for your comment letter dated February 27, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment No. 1:

Proposed land uses include exploratory test wells, access roads, fencing and permanent wells.

- *The exploratory test well is an identified land use in the Conservation District pursuant to the Hawai'i Administrative Rules (HAR) §13-5-22 DATA COLLECTION (C-1) Basic data collection, research, education, and resource evaluation that involves a land use causing ground disturbance from installation of equipment (e.g., meteorological towers, radio towers, or test wells).*

- *An access road is an identified land use in the Conservation District pursuant to HAR §13-5-22 P-13 LAND AND RESOURCE MANAGEMENT (D-2) Road construction and major erosion control projects.*

- *Fencing is an identified land use in the Conservation District pursuant to HAR §13-5-22 P-9 STRUCTURES, ACCESSORY (B-1) Construction or placement of structures accessory to existing facilities or uses; or LAND AND RESOURCE MANAGEMENT (C-1) Installation of a new fence or shelter.*

- *A permanent well is an identified land use in the Conservation District pursuant to HAR §13-5-22 LAND AND RESOURCE MANAGEMENT (D-3) Water Systems.*

Response: Thank you for confirming that the proposed exploratory test well, access roads, and fencing are identified land uses in the Conservation District per Hawai'i Administrative Rules (HAR) 13-5-22 with approval of applicable permits. Sites H-1 and H2 are identified by TMK (2)4-3-001:001 and are located outside of the State Land Use Conservation District. We note that that TMKs (2)4-5-018:007 and (2)4-6-025:002 are located in the Conservation District Resource subzone. Proposed well Site L-1 is located on TMK (2)4-5-018:007 and proposed well site L-2 is located on TMK (2)4-6-025:002. Site L-3, identified by TMK (2)4-6-019:003, is located outside of the State Land Use Conservation District.

Comment No. 2:

The road work, exploratory well and fencing could be applied for under one Conservation District Use Application (CDUA) with the final Environmental Assessment and HRS 6E determination regarding historic properties for a Board permit. If a permanent well is proposed this would also require a Board permit with another final EA per your correspondence. Therefore, to allow, modify or deny the projects would be at the discretion of the Board of Land and Natural Resources.

Response: Thank you for confirming that the road work, exploratory well, and fencing can be applied for under one (1) Conservation District Use Application (CDUA) with the Final EA and Chapter 6E Hawai'i Revised Statutes (HRS) determination. We acknowledge that should a permanent well be proposed, a separate CDUA will be submitted with an EA to the Board of Land and Natural Resources for their review and approval.

Thank you again for your participation in the Chapter 343, HRS environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Acting Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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JOSH GREEN, M.D.
GOVERNOR

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO
JAMES KUNANE TOKIOKA

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

IN REPLY REFER TO:

DIR 0087
STP 8.3553

February 21, 2023

Ms. Emily Murai
Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Murai:

Subject: Chapter 343, Hawaii Revised Statutes (HRS) Early Consultation
Proposed Launiupoko Exploratory Wells Project
Lahaina, Maui, Hawaii
Tax Map Key: (2) 4-6-018:007; 4-6-019:003; 4-6-025:002; 4-3-001:001

Thank you for your letter dated January 31, 2023, requesting the Hawaii Department of Transportation's (HDOT) review and comments on the County of Maui, Department of Water Supply's (DWS) proposed Launiupoko Exploratory Wells Project. HDOT understands five sites are being considered as potential well sites; three sites (L-1, L-2, and L-3) being located within the Launiupoko Aquifer, and two sites (H-1 and H-2) being located within the Honolua Aquifer. DWS has selected two of the sites for construction of exploratory wells, with the remaining sites to be assessed as alternative well locations.

HDOT has the following comments:

1. The tax map key for exploratory wells H-1 and H-2 is located approximately 1.15 miles from the airport boundary of Kapalua Airport (JHM). The tax map key for wells L-1 through L-3 is located approximately 4.51 miles from the airport boundary of JHM. All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.

2. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction

equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

3. Due to the proximity to the airport, there is a potential for fumes, smoke, vibrations, odors, etc. resulting from aircraft flight operations over the project site. These incidences may increase or decrease over time and are dependent on airport operations.

4. Standing water has the potential to become a wildlife hazard. The HDOT-A recommends that the developer incorporates measures to minimize hazardous wildlife attractants in compliance with the FAA Advisory Circular (AC) 150/5200-33C Hazardous Wildlife Attractants On or Near Airports. If the project results in a wildlife attractant, these hazards shall be immediately mitigated by the County of Maui, Department of Water Supply upon notification by the HDOT-A and/or FAA.

5. In reviewing the information provided, the construction and use of the proposed exploratory wells would not significantly impact the State highway system.

6. Consider the applicability of HDOT's Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways (HRS Chapter 291, Section 36).

Please submit a notification of publication of the Draft Environmental Assessment, and any other future land use entitlement related requests for review or correspondence to the HDOT Land Use Intake email address at DOT.LandUse@hawaii.gov.

If there are any questions, please contact Mr. Blayne Nikaido, Planner, Land Use Section of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

Sincerely,

EDWIN H. SNIFFEN
Director of Transportation

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Karlynn K. Fukuda
PRESIDENT
Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Via email: DOT.LandUse@hawaii.gov

Edwin H. Sniffen, Director
Department of Transportation
State of Hawai'i
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Sniffen:

Thank you for your comment letter dated February 21, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment No. 1:

The tax map key for exploratory wells H-1 and H-2 is located approximately 1.15 miles from the airport boundary of Kapalua Airport (JHM). The tax map key for wells L-1 through L-3 is located approximately 4.51 miles from the airport boundary of JHM. All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.

Response:

We acknowledge that well sites H-1, H-2, L-1 and L-3 are located within five (5) miles of the JHM airport. As such, the Technical Assistance Memorandum (TAM) will be reviewed for applicability to the proposed project and guidance on potential review and permits required.

Comment No. 2:

Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or Alteration pursuant to the Code of *Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faagov/oeaaa/external/portal.jsp.*

Response: We acknowledge your comment that the Federal Aviation Administration (FAA) requires the submittal of FAA Form 7460-1, Notice of Proposed Construction or Alteration, pursuant to Code of Federal Regulations, Title 14, Part 77.9, if construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100 to 1 surface from any point on the runway with its longest runway more than 3,200 feet. We understand that the completed Form 7460-1 shall include construction and equipment area heights, including heights of temporary construction cranes. The FAA website noted in your letter will be reviewed for Form 7460-1 requirements and submittal process information, as may be applicable.

Comment No. 3:

Due to the proximity to the airport, there is a potential for fumes, smoke, vibrations, odors, etc. resulting from aircraft flight operations over the project site. These incidences may increase or decrease over time and are dependent on airport operations.

Response: The DWS is aware of potential noise from aircraft operations, as well as the chance for fumes, smoke, vibrations, and odors that may result from occasional aircraft flight operations.

Comment No. 4:

Standing water has the potential to become a wildlife hazard. The HDOT-A recommends that the developer incorporates measures to minimize hazardous wildlife attractants in compliance with the FAA Advisory Circular (AC) 150/5200-33C Hazardous Wildlife Attractants On or Near Airports. If the project results in a wildlife attractant, these hazards shall be immediately mitigated by the County of Maui, Department of Water Supply upon notification by the HDOT-A and/or FAA.

Response: We acknowledge your comment and note that standing water has the potential to become a wildlife hazard. As the proposed action is limited to the development of exploratory wells, the project is not anticipated to create conditions to support the presence of standing water.

Comment No. 5:

In reviewing the information provided, the construction and use of the proposed exploratory wells would not significantly impact the State highway system.

Response: Thank you for confirming that the proposed project will not significantly impact the State highway system.

Comment No. 6:

Consider the applicability of HDOT's Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways (HRS Chapter 291, Section 36).

Response: Requirements for a State of Hawai'i, Department of Transportation (HDOT) will be Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways per Hawai'i Revised Statutes (HRS) Chapter 291, Section 36 will be reviewed for applicability.

Comment No. 7:

Please submit a notification of publication of the Draft Environmental Assessment, and any other future land use entitlement related requests for review or correspondence to the HDOT Land Use Intake email address at DOT.LandUse@hawaii.gov.

Response: Notice of the publication of the Draft EA and future land use entitlement review requests will be sent to the HDOT Land Use Intake email address at DOT.LandUse@hawaii.gov.

Thank you again for your participation in the Chapter 343, HRS environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: Blayne Nikaido, Planner, Land Use Section of the HDOT Statewide Transportation Planning Office
John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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Subject: EA request for Launiupoko Well
Attachments: Munekiyo Hiraga EA request.pdf; EIS response ltr READ ONLY.doc

From: Barbara Guieb <barbarag@hawaii.edu>
Sent: Friday, February 17, 2023 10:52 AM
To: General eMail <planning@munekiyohiraga.com>
Subject: EA request

Please see our response attached. Thank you.

--
Barbara Guieb, Office Assistant IV
University of Hawaii at Manoa
Water Resources Research Center
2540 Dole St., Holmes Hall 283
Honolulu HI 96822
(808) 956-7848 phone
(808) 956-5044 fax

Water Resources Research Center

UNIVERSITY of HAWAIʻI®
MĀNOA

February 17, 2023

To Whom It May Concern,

This is to acknowledge receipt of your letter requesting a review of an environmental assessment (EA) or environmental impact statement (EIS), see attached. The Environmental Center at the University of Hawai‘i at Mānoa, which for a time was linked to the Water Resources Research Center (WRRC), has been discontinued. As a result of the closure of the Environmental Center, we regret that WRRC no longer has the capacity to review environmental documents.

Sincerely,



Thomas Giambelluca
Director

2540 Dole Street, Holmes Hall 283
Honolulu, Hawai‘i 96822
Telephone: (808) 956-7847
Fax: (808) 956-5044
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VICE PRESIDENT

Michael T. Munekiyo AICP
SENIOR ADVISOR

January 31, 2023

State of Hawai'i
University of Hawai'i
Water Resources Research Center
2540 Dole Street, Room 283
Honolulu, Hawai'i 96822

SUBJECT: Chapter 343, Hawai'i Revised Statutes (HRS) Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project

Dear Sir or Madame:

The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the Lāhainā district of West Maui. A total of five (5) sites have been considered as potential well sites - Sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and Sites H-1 and H-2 in the Honolua Aquifer. See **Figure 1**. The DWS has selected Sites L-1 and L-3 for construction of the exploratory wells. See **Figure 2**. Two (2) exploratory wells will be constructed at both Site L-1 and Site L-3 in order to provide back-up capability for the wells. As such, a total of four (4) exploratory wells are proposed to be constructed. Sites L-2, H-1, and H-2 will be assessed as potential alternative sites. Refer to **Figure 2** and see **Figure 3**.

The proposed Site L-1 and Site L-3 wells will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Existing dirt and gravel roads will be used to access the sites and when necessary, new access roads will be graded and surfaced with gravel. The immediate work sites will be graded to create a gently sloping pad and a chain link security fence will be constructed around each site. The affected properties to be evaluated as potential exploratory well sites are outlined in **Table 1**, below.

Table 1. Project TMKs

TMK	Owner	Project Component
(2)4-6-018:007	**State of Hawai'i**	**Site L-1 and Access Roads**
(2)4-6-025:002	State of Hawai'i	Site L-2 (Alternative Site) and Access Roads
(2)4-6-019:003	**State of Hawai'i**	**Site L-3 and Access Roads**
(2)4-3-001:001	Maui Land & Pineapple Company, Inc.	Site H-1 (Alternative Site), Site H-2 (Alternative Site), and Access Roads

Based on water quality test results and pump tests, the DWS will determine if the exploratory well sites are suitable for conversion to permanent production wells. If successful, the production wells will be constructed to replace 1.55 million gallons per day of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow standards. It is noted that the CWRM designated the Lahaina Aquifer Sector Area as a Surface and Ground Water Management Area. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. The effective date of this designation is August 6, 2022. If the exploratory wells are successful, an application for a Water Use Permit will be submitted to the CWRM for future production wells.

It is further noted that Sites L-1 and L-2 are within the State Conservation Land Use District, and therefore, a Conservation District Use Permit (CDUP) will be obtained from the Board of Land and Natural Resources (BLNR) prior to commencing work on those sites.

The use of County funds and State lands as well as work within the Conservation District are triggers for preparation of an Environmental Assessment (EA) pursuant to Chapter 343, HRS. As such, a Draft EA will be prepared for this project in accordance with Chapter 11-200.1 of the Hawai'i Administrative Rules (HAR) to address the technical characteristics, alternatives, and potential environmental impacts, including potential archaeological and cultural impacts and impacts to flora and fauna resources. It is noted that this EA being prepared is limited to the exploratory test wells and will include an assessment of the proposed Sites L-1 and L-3 and alternative Sites L-2, H-1, and H-2. Should the exploratory wells be successful, a separate EA will be prepared prior to construction of permanent production wells. The DWS will be the approving agency for the EA.

On behalf of the DWS, we kindly request your early review and comment on the proposed project in accordance with the requirements of Chapter 11-200.1, HAR. We appreciate receiving any comments you may have by **February 21, 2023**. Please send your comments to the address listed below.

Munekiyo Hiraga
Attention: Emily Murai, Associate
305 High Street, Suite 104
Wailuku, Hawai'i 96793
OR
Email: planning@munekiyohiraga.com

Thank you for your participation in the Chapter 343, HRS environmental review process. Should you have any questions regarding this Chapter 343, HRS early consultation request, please do not hesitate to contact me at (808) 983-1233.

Very truly yours,

Emily Y. K. Murai, Associate

EM:ab
Enclosures

cc: John Stufflebean, Acting Director, County of Maui, Department of Water Supply (w/enclosures)
Thomas Ochwat, County of Maui, Department of Water Supply (w/enclosures)
Ronald Fukumoto, Fukumoto Engineering, Inc. (w/enclosures)
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Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Thomas Giambelluca
University of Hawai'i
Water Resources Research Center
2540 Dole Street, Holmes Hall 283
Honolulu, Hawai'i 96822

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Giambelluca:

Thank you for your comment letter dated February 17, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we acknowledge that the Water Resources Research Center (WRRC) no longer has the capacity to review environmental documents due to the closure of the Environmental Center at the University of Hawai'i at Mānoa.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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FEB 13 2023

HOUSE OF REPRESENTATIVES
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

February 8th, 2023

Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii, 96793

RE: PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT

Dear Emily Murai,

Thank you for reaching out for comments. Yes, I am in support of the proposed Launiupoko Exploratory Wells Project and any efforts to search for backup water resources on West Maui. As a stakeholder, living and working for House District 14, I recognize my participation in the Chapter 343, HRS environmental review process is an important factor in the determination of the proposed Launiupoko Exploratory Wells Project.

Additionally, as the Vice Chair of the Energy & Environmental Protection committee and as a member of Agriculture & Food Systems committee, I have a unique perspective that is inimitable in the decision-making process regarding these matters. Water being an integral and limited resource, means our communities are in need of the potential well sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and sites H-1 and H-2 in the Honolua Aquifer.

I acknowledge, however, that Chapter 343- HRS environmental review process is just one step as additional tests and the legislature are still needed. I also have several questions regarding this proposal. How or why have these specific sites been chosen? Are you aware of the lands being designated conservation and agricultural zoning? Site L-3, in particular is very close to the coast line, and at risk of future saltwater inclusion. Finally, who are the anticipated end users of this water? I look forward to future progress in this endeavor.

Sincerely, Elle Cochran

State Representative Elle Cochran

Representative Elle Cochran
House District 14 – Mā'alaea, West Maui, Kahakuloa, Waiehu
415 South Beretania St., Room 315
Honolulu, Hawaii • 96813
Phone: (808) 586-6160 • Email: repcochran@capitol.hawaii.gov

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Mark Alexander Roy AICP, LEED AP
VICE PRESIDENT
Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Elle Cochran, State Representative
House District 14
Hawai'i State Capitol, Room 315
415 South Beretania Street
Honolulu, Hawai'i 96813

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Representative Cochran:

Thank you for your comment letter dated February 8, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment No. 1:

Yes, I am in support of the proposed Launiupoko Exploratory Wells Project and any efforts to search for backup water resources on West Maui.

Response: We appreciate your support of the proposed project and efforts to search for backup water resources in West Maui.

Comment No. 2:

Additionally, as the Vice Chair of the Energy & Environmental Protection committee and as a member of Agriculture & Food Systems committee, I have a unique perspective that is inimitable in the decision-making process regarding these matters. Water being an integral and limited resource, means our communities are in need of the potential well sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and sites H-1 and H-2 in the Honolua Aquifer.

Response: Thank you for your comments regarding the limited water resources and the need for the potential well sites.

Comment No. 3:

How or why have these specific sites been chosen?

Response: The sites were selected based on hydrogeological analysis conducted by Tom Nance Water Resource Engineering (TNWRE). The hydrogeological assessment is included in the Preliminary Design Report, which will be included in the Draft EA.

Comment No. 4:

Are you aware of the lands being designated conservation and agricultural zoning?

Response: Sites L-1 and L-2 are located within the State Land Use Conservation District. Sites L-3, H-1 and H-2 are located within the State Land Use Agricultural District. Appropriate land use approvals for the Conservation District or Agricultural District will be secured for the site that is selected.

Comment No. 5:

Site L-3, in particular is very close to the coast line, and at risk of future saltwater inclusion.

Response: Thank you for your comments regarding saltwater intrusion. Site L-3 is located about 5,700 feet from the coastline at an elevation of 330 feet above mean sea level. The exploratory well tests will provide information on water quality as well as salinity.

Comment No. 6:

Finally, who are the anticipated end users of this water?

Response: If the proposed exploratory wells are converted to production wells, water from these wells will replace 1.55 million gallons per day of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow standards. The end users of this water are the residents, businesses, and general public in Lahaina Town.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,



Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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FEB 1 3 2023

RICHARD T. BISSEN, JR.
Mayor

LORI TSUHAKO
Acting Director

SAUMALU MATA'AFA
Deputy Director



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

February 7, 2023

Emily Y.K. Murai, Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Murai:

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES (HRS) EARLY CONSULTATION REQUEST FOR THE PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT

The Department has reviewed the information submitted for the above subject project. Based on our review, we have determined that the project is not subject to Chapter 2.96, Maui County Code, and does not require a residential workforce housing agreement. At the present time, the Department has no additional comments to offer.

Please contact Mr. Buddy Almeida, Housing Administrator, at (808) 270-7351 if you have any questions.

Sincerely,

Lori Tsuhako

LORI TSUHAKO, LSW, ACSW
Acting Director of Housing and Human Concerns

cc: Buddy Almeida, Housing Administrator

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VICE PRESIDENT
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VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Richard E. Mitchell, Esq., Director
Department of Housing
County of Maui
2065 Main Street, Suite 108
Wailuku, Hawai'i 96793

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Mitchell:

Thank you for your comment letter dated February 7, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), thank you for confirming that the project is not subject to Chapter 2.96, Maui County Code, and does not require a residential workforce housing agreement.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: Buddy Almeida, Housing Administrator
John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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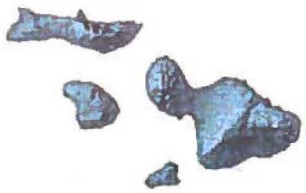
RICHARD T. BISSEN, JR.
Mayor

KEKUHAUPIO R. AKANA
Acting Managing Director

PATRICK S. MCCALL
Acting Director

SHANE T. DUDOIT
Deputy Director

DEPARTMENT OF PARKS AND RECREATION
COUNTY OF MAUI
700 HALI'A NAKOA STREET, UNIT 2
WAILUKU, MAUI, HAWAI'I 96793
www.mauicounty.gov



February 6, 2023

Emily Murai, Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Murai:

SUBJECT: CHAPTER 343, HAWAI'I REVISED STATUTES (HRS) EARLY CONSULTATION; REQUEST FOR THE PROPOSED LAUNIUPOKO EXPLORATORY WELLS PROJECT

Thank you for the opportunity to review and comment on the subject project. The Department of Parks and Recreation has no comment at this time.

Should you have any questions, please feel free to contact me or Samual Marvel, Chief of Planning and Development at samual.marvel@co.maui.hi.us or (808) 270-6173.

Sincerely,

PATRICK S. MCCALL
Acting Director of Parks and Recreation

c: John Stufflebean, Acting Director of Department of Water Supply
Thomas Ochwat, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
Samual Marvel, Chief of Planning and Development

PSM:SAM

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Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Patrick S. McCall, Director
Department of Parks and Recreation
County of Maui
700 Haliʻa Nakoa Street, Unit 2
Wailuku, Hawaiʻi 96793

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawaiʻi

Dear Mr. McCall:

Thank you for your comment letter dated February 6, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we acknowledge that the County of Maui, Department of Parks and Recreation has no comments to offer at this time.

Thank you again for your participation in the Chapter 343, Hawaiʻi Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: Samual Marvel, Chief of Planning and Development
John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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FEB 2 1 2023

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, MAUI, HAWAII 96793
TELEPHONE: (808) 244-6400
FAX: (808) 244-6411

RICHARD T. BISSEN, JR.
MAYOR

OUR REFERENCE

YOUR REFERENCE

JOHN PELLETIER
CHIEF OF POLICE

WADE M. MAEDA
DEPUTY CHIEF OF POLICE

February 14, 2023

Ms. Emily Murai
Associate
Munekiyo Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Re: Chapter 343, Hawaii Revised Statutes (HRS) Early Consultation Request for the Proposed Launiupoko Exploratory Wells Project

Dear Ms. Murai:

This is in response to your letter dated January 31, 2023 requesting comments on the proposed Launiupoko Exploratory Wells project.

In review of the submitted documents, we have no objections to the upcoming construction project if it meets minimal standards set for by county codes and state laws. We have concerns of what plans are in place if there are any public protests regarding the drilling or access to the properties being utilized. Thank you for giving us the opportunity to comment on this project.

Sincerely,

Acting Assistant Chief Keola Tom
for: JOHN PELLETIER
Chief of Police

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Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

John Pelletier, Chief
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawai'i 96793

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr. Pelletier:

Thank you for your comment letter dated February 14, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we offer the following information in response to the comments received.

Comment:

In review of the submitted documents, we have no objections to the upcoming construction project if it meets minimal standards set for by county codes and state laws. We have concerns of what plans are in place if there are any public protests regarding the drilling or access to the properties being utilized.

Response: We acknowledge that the County of Maui, Police Department (MPD) has no objections to the proposed project if it meets minimal standrards set forth by County code and State law. We confirm that the proposed project will meet all minimal County code and State law standards.

We also acknowledge that MPD has concerns regarding project plans and potential public protests in response to drilling or access to the project properites being utilized. The DWS has been coordinating and will continue to coordinate with affected landowners and individuals regarding the project and site access.

Thank you again for your participation in the Chapter 343, Hawai‘i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Acting Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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From: Luana Mahi <Luana.I.Mahi@co.maui.hi.us>
Sent: Wednesday, February 22, 2023 9:32 AM
To: General eMail <planning@munekiyohiraga.com>
Subject: Attn: Emily Murai

Aloha Emily,

Sorry for the delay in sending you my comments, or technically no comments, in this situation...But thank you for including us in the early consultation for the subject project's draft environmental assessment. At this time, we have no comments or objections.

Mahalo...

Luana Mahi
Director
Office of Economic Development
County of Maui
2200 Main Street, Suite 305
Wailuku, Hawaii 96793
Phone # 808-270-7224

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VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Via email: Luana.I.Mahi@co.maui.hi.us

Luana Mahi, Director
Office of Economic Development
County of Maui
2200 Main Street, Suite 305
Wailuku, Hawai'i 96793

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Ms. Mahi:

Thank you for your comment email dated February 22, 2023, regarding the Proposed Launiupoko Exploratory Wells Project. On behalf of the County of Maui, Department of Water Supply (DWS), we acknowledge that the Office of Economic Development has no comments to offer at this time.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,

Korwyn Roberts

Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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From: Ke'eaumoku Kapu <kapukapuakea@gmail.com>
Sent: Tuesday, January 31, 2023 2:23 PM
To: Lynne Hiromoto <lynne@munekiyohiraga.com>
Cc: Emily Murai <emily@munekiyohiraga.com>; Tessa Munekiyo Ng <tessa@munekiyohiraga.com>; Angie Bayez <angie@munekiyohiraga.com>; Kaipo Kekona <kaeckaipo@gmail.com>; U'i Kapu <uilani.kapu@gmail.com>; FM <mauifay@me.com>
Subject: Re: Launiupoko Exploratory Wells - Early Consultation Letter

Aloha Lynne,

I did receive the information on the proposed well sites and will be forwarding this to our Moku representatives for further review. Mahalo for these attachments. Kaipo Kekona is our Ka'anapali Island moku representative and U'ilani Kapu is our Lahaina Moku rep. As for myself, I have a few questions. Because these well sites are in an area that may trigger State Historic Preservation review will there be a need for monitoring and will these well sites also be required to do a kapaakai analyst. I ask because site L-3 has historic properties. We want to be sure that the area is well surveyed before any land altercations are done. and also, is there any chance to do a site visit specifically site L-3 because this site is along our easement, and we have properties we care for along this area.

Mahalo and will look forward to hearing from you.

Ke'eaumoku

Ke'eaumoku Kapu (CEO)
Aha moku o Maui Inc.
562a Front Street
Lahaina HI 96761
ahamoku.org
Ph. (808) 298-5639
Fay McFarlane
Technical Kako'o
Aha moku o Maui Inc.
ph. (808)498-8200
email: mauifay@me.com

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Tessa Munekiyo Ng AICP
VICE PRESIDENT

Michael T. Munekiyo AICP
FOUNDER

August 6, 2025

Via email: kapukapuakea@gmail.com

Ke'eaumoku Kapu, CEO
Aha Moku o Maui

SUBJECT: Response to Early Consultation Comments Regarding the Proposed Launiupoko Exploratory Wells Project; Lāhainā, Maui, Hawai'i

Dear Mr.Kapu:

On behalf of the County of Maui, Department of Water Supply (DWS), thank you for your email, dated January 31, 2023, providing comments on the proposed Waiko Road Subdivision Sewer System project. We offer the following information in response to the comments received.

Comment No. 1:

I did receive the information on the proposed well sites and will be forwarding this to our Moku representatives for further review. Mahalo for these attachments. Kaipo Kekona is our Ka'anapali Island moku representative and U'ilani Kapu is our Lahaina Moku rep.

Response: We appreciate your participation in and facilitation of the consultation for this project. We understand that you, along with Moku representatives, participated in consultation meetings and site visits as part of the preparation of the Cultural Impact Assessment and Ka Pa'akai Analysis for the project.

Comment No. 2:

Because these well sites are in an area that may trigger State Historic Preservation review will there be a need for monitoring and will these well sites also be required to do a kapaakai analyst. I ask because site L-3 has historic properties.

Response: We confirm that the State Historic Preservation Division (SHPD) will be consulted on the proposed project and that monitoring will be conducted, should it be recommended.

A Ka Pa'akai Analysis was conducted in April 2024 for the Water Use Permit application that is being prepared for Sites L-1 and L-3. The Ka Pa'akai Analysis will be included in the Draft Environmental Assessment (EA). We further acknowledge that the original location for Site L-3 is understood to contain historic properties. As a result, Well Site L-3 was relocated approximately 400 feet downslope to avoid historic properties.

Comment No. 3:

We want to be sure that the area is well surveyed before any land altercations are done. and also, is there any chance to do a site visit specifically site L-3 because this site is along our easement, and we have properties we care for along this area.

Response: We acknowldege your concern that the project area be well surveyed prior to land altercation. We note that an archaeological field inspection was conducted for the project sites and that two (2) site visits were conducted as part of the Cultural Impact Assessment (CIA). The information from the site visit and CIA will be included in the Draft EA. As noted above, consultation with the SHPD will be undertaken, and the project will comply with the recommendations of the SHPD.

Thank you again for your participation in the Chapter 343, Hawai'i Revised Statutes environmental review process. A copy of your letter and this response will be included in the Draft Environmental Assessment (EA) being prepared for this project. Should you have any questions or require additional information, please feel free to contact me at (808) 983-1233.

Very truly yours,



Korwyn Roberts, AICP
Senior Associate

KR:ab
cc: John Stufflebean, Director, County of Maui, Department of Water Supply
Thomas Ochwat, County of Maui, Department of Water Supply
Eva Blumenstein, County of Maui, Department of Water Supply
Ronald Fukumoto, Fukumoto Engineering, Inc.
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REFERENCES X

X. REFERENCES

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APPENDIX

A

PRELIMINARY DESIGN REPORT

FINAL
PRELIMINARY DESIGN REPORT
For Launiupoko Aquifer Well Development

Lahaina, Maui, Hawaii



Image from Google Earth

Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Date: January 24, 2025

Prepared by:

Fukumoto Engineering, Inc.
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I. PURPOSE

The purpose of this report is to provide recommendations on the location, size, and capacity of four potential groundwater sources in West Maui.

II. PROJECT DESCRIPTION

The Maui County Department of Water Supply (DWS) will construct exploratory wells in West Maui within the Lahaina Sector as shown on the Hydrologic Units Map. (See Figure 1 – CWRM Hydrologic Units Map, page 22.) If the exploratory wells are successful, DWS intends to develop the wells to replace 1.55 million gallons per day (mgd) of surface water required to be released into Kanaha Stream. In November 2018, the State Commission on Water Resource Management (CWRM) established this requirement when it adopted the instream flow standards for Kahoma and Kanaha Streams. Groundwater sources within the Launiupoko Aquifer System are initially being considered since the Kanaha Stream is located within the aquifer. Due to potential limitations of the aquifer, other aquifers within West Maui will be considered.

A total of five sites have been considered as potential well sites: Sites L-1, L-2, and L-3 in the Launiupoko Aquifer and Sites H-1 and H-2 in the Honolua Aquifer. DWS has selected Sites L-1 and L-3 for construction of the exploratory wells. Two exploratory wells will be constructed at both Site L-1 and Site L-3 to provide backup capacity. As such, a total of four exploratory wells will be constructed. The remaining sites, Sites L-2, H-1, and H-2, will be assessed as potential alternative sites.

To achieve the replacement of 1.55 mgd, each well would need to produce 0.775 mgd. Based on pumping 16 hours per day, each well would be equipped with a pump with a capacity of 807 gallons per minute (gpm). The target pumpage of 0.775 mgd per well is relatively high in comparison to the actual pumpage of existing DWS wells in the Lahaina Sector; however, data from a recently constructed well indicates that it is achievable.

III. BACKGROUND

A. Existing Wells

CWRM established groundwater hydrologic units or sustainable yields for each island to manage groundwater resources. CWRM divided each island into broad regions or sectors, and further divided each region into sub-regions or systems. These dividing lines serve as management tools and do not necessarily represent subsurface boundaries as evidenced by communication of groundwater between these areas. Wells within the Lahaina Sector are shown on the Well Field Map (See Figure 8 – Well Field Map, page 29.) The map also shows the DWS distribution system.

Existing wells in the Launiupoko Aquifer System that currently produce drinking water include DWS wells, Waipuka 1, Waipuka 2, Kanaha 1, and Kanaha 2; and Launiupoko Water Company wells, Launiupoko 1, Launiupoko 2, and Launiupoko 3. In addition, wells that currently produce irrigation water include Launiupoko Irrigation Company wells, LIC-

1 and the Wainee Shaft wells.

Existing wells in the Honolua Aquifer System that currently produce drinking water include DWS wells, Napili A, Napili B, Napili C, Honokahua A, and Honokahua B; and Kapalua Water Company wells, Kapalua 1 and Kapalua 2. Kapalua Water Company drilled and tested a third well, Kapalua 3B; however, it has not been used.

Table 1 is a summary of data of the above drinking water wells.

TABLE 1
Drinking Water Wells in the Launiupoko and Honolua Aquifer Systems

Well Name	Well No.	Aquifer System	Owner	Year Drilled
Waipuka 1	5339-001	Launiupoko	DWS	1962
Waipuka 2	5339-002	Launiupoko	DWS	1963
Kanaha 1	5339-003	Launiupoko	DWS	1971
Kanaha 2	5339-004	Launiupoko	DWS	1974
Launiupoko 1	5138-001	Launiupoko	Launiupoko Water Co.	1979
Launiupoko 2	5137-001	Launiupoko	Launiupoko Water Co.	2000
Launiupoko 3	5238-001	Launiupoko	Launiupoko Water Co.	2002
Napili A	5838-001	Honolua	DWS	1971
Napili B	5838-002	Honolua	DWS	1972
Napili C	5838-004	Honolua	DWS	1979
Honokahua A	5838-003	Honolua	DWS	1978
Honokahua B	5938-001	Honolua	DWS	1987
Kapalua 1	5938-002	Honolua	Kapalua Water Co.	1989
Kapalua 2	5838-003	Honolua	Kapalua Water Co.	1991
Kapalua 3B	5938-004	Honolua	Kapalua Water Co.	1998

The State Department of Health, Safe Drinking Water Branch collects and publishes information on contamination of groundwater sources throughout the State. Agricultural chemicals including soil fumigants, 1,2-dibromo-3-chloropropane (DBCP), and solvent, 1,2,3-trichloropropane (TCP), used to control nematodes in pineapple production were found in these existing wells within the Honolua Aquifer System: Honokahua A, Napili A, and Napili C. Table 2 below identifies contaminants, detection date, detection level, and maximum contaminant level or allowable level. There is no contamination of groundwater sources in the Launiupoko Aquifer System.

TABLE 2
Contaminants in Honolua Aquifer System Wells

Well Name	Well No.	Contaminant	Detection Date	Detection Level (in parts per billion)	Maximum Contaminant Level (in parts per billion)
Honokahua A	5838-003	TCP	11/30/2005	0.09	0.6
Napili A	5838-001	TCP	12/16/2019	0.48	0.6
Napili A	5838-001	DBCP	12/16/2019	0.18	0.04
Napili C	5838-004	TCP	06/15/2016	0.05	0.6

B. Other Wells

DWS completed construction of the following exploratory wells for its Lahaina System in 2017: the Kahana Well (5738-002), located in the Honolua Aquifer System, and the Mahinahina Well (5638-004), located in the Honokowai Aquifer System. DWS selected the Kahana Well as the new production well and the Mahinahina Well as the backup source. DWS proceeded with preparation of construction documents for incorporation of those wells into its Lahaina water system. The combined project, known as the West Maui Source Development project, consists of construction of the Kahana Well pumping station, transmission pipelines, electrical line extensions, reservoirs, and control systems. Construction will extend from mid-2023 through late-2025. Construction documents call for equipping the Kahana Well with a 1,000-gpm pump with a daily production of 0.96 mgd based on pumping 16 hours per day. Preliminary designs call for equipping the Mahinahina Well with a 700-gpm pump with a daily production of 0.672 mgd based on pumping 16 hours per day. However, the construction timetable for the Mahinahina Well has not been determined.

The Department of Hawaiian Home Lands completed construction of the DHHL Honokowai Well 1 (5939-004) in 2010. The well is located in the Honokowai Aquifer System. Preliminary designs call for equipping the well with a 500-gpm pump with a daily production of 0.48 mgd based on pumping 16 hours per day and connecting the well to the DWS water system. Although drilled and tested, the well has not been used.

IV. SITE SELECTION

A. Hydrogeological Reports

Tom Nance Water Resource Engineering (TNWRE) provided hydrogeological consulting services for this report. TNWRE analyzed hydrogeological conditions and provided recommendations in a June 9, 2021 report for well sites in the Launiupoko Aquifer System (see Appendix 1), a July 21, 2020 report for well sites in the Honolua Aquifer System (see Appendix 2), and a June 5, 2024 report for well sites in the Launiupoko Aquifer System (see Appendix 3). The June 5, 2024 report included a third well site within the aquifer. The following descriptions of historic groundwater use, regulatory groundwater use limits, and recommended well sites are from the TNWRE reports. Supplementary technical data are from previous reports prepared for DWS.

B. Recommendations for Launiupoko Aquifer Site L-1, Site L-2, and Site L-3

Historic Groundwater Use

Figure 1 in Appendix 3 shows the monthly pumpage in the Launiupoko Aquifer System from January 1986 through July 2021. Up until its closing in September 1999, Pioneer Mill Company was the primary user with monthly usage often exceeding 15 million gallons per day (mgd). Since then, usage has been far less, with a peak usage of about 3 mgd and a 12-month moving average ranging from 1 to 2 mgd. Current active wells in the aquifer consist of four DWS wells which have averaged 0.4 mgd over the last 20 years (Figure 2 in Appendix

3), three private Launiupoko Water Company (LWC) drinking water wells, and the recently added LIC-1 well for the Launiupoko Irrigation Company (LIC). Usage by the LWC wells has increased substantially since mid-2018 in response to the adoption of Interim Instream Flow Standards by the Commission on Water Resource Management (CWRM) which severely restricted use of Kauaula Stream by LIC (Figure 3 in Appendix 3).

Regulatory Groundwater Use Limit

In the CWRM's first Water Resources Protection Plan adopted in 1990, the sustainable yield of the Launiupoko Aquifer System was set at 8 mgd based on the assumption that all groundwater occurrence was basal and that recharge to the aquifer was 16 mgd, based exclusively on rainfall recharge with no consideration of ongoing sugarcane cultivation by Pioneer Mill Co. For the second Water Resources Protection Plan adopted in 2008, the substantial yield was reduced from 8 mgd to 7 mgd.

Since then, more sophisticated water budget models have been used by the U. S. Geological Survey to calculate the aquifer's recharge. In comparison to the original recharge approximation of 16 mgd in 1990, results of three USGS studies were significantly greater: 33 mgd in 2007, 25.27 mgd in 2012, and 41 mgd in 2014. With these new recharge results available, the 2019 update of the Water Resource Protection Plan indicated a potential range of sustainable yield for 7 to 18 mgd, but retained the 7 mgd amount. Despite this limitation, well pumpage in the post-plantation period has been far less than the aquifer's 7 mgd sustainable yield (Figure 4 in Appendix 3). Even with the prospect of greater groundwater use for irrigation based on the CWRM's restriction of surface water use, there will still be a substantial unused amount that could accommodate new DWS wells.

Recommended Well Sites

Locations of existing wells of interest and three recommended DWS well sites are shown in various figures in this report. Private land ownership and planned well sites for private LWC and LIC water systems eliminates the southern half of the aquifer from consideration for new DWS well sites. Potential well sites therefore need to be in the northern portion of the aquifer and on government land. In light of the recent higher USGS recharge amounts, the salinity-limited production of four existing DWS in the northern part of the aquifer is cause for concern in selecting a location for new well development. Obstructions to subsurface groundwater flow due to less permeable Honolua Volcanics, as originally mapped by Stearns and MacDonald in 1942 and labelled as "Outcrop of Honolua Volcanics" on various figures, is likely the cause of the high salinity. The sites recommended herein were selected to avoid this issue.

Site L-1 is about 2.8 miles from the ocean on the north side of Kanaha Stream at an elevation of about 1,700 feet above mean sea level. The site is a portion of Tax Map Key (2) 4-6-018:007, a 338-acre parcel, owned by the State of Hawaii. Two small-diameter test holes, Test Hole 1 and Test Hole 2, drilled in 1970, both encountered high-level groundwater at 430 feet and 820 feet above mean sea level, respectively. Test Hole 1 is about 650 feet south of the site and Test Hole 2 is about 1,500 feet southeast of the site. Additional evidence of high-level groundwater at the site includes dikes in the Kanaha Stream gulch to the south of the site and

dikes in the Kahoma Stream gulch to the north of the site. Tapping into high-level ground water at this site is a reasonable expectation.

Site L-2 is about 2.7 miles from the ocean at an elevation of about 1,800 feet above mean sea level. Site L-2 is within a 2,013-acre parcel also owned by the State of Hawaii and designated on the tax maps as Tax Map Key (2) 4-3-025:002. The site is part of the State Forest Reserve within the State Conservation Land Use District. A Conservation District Use Permit would be required to develop the site. High-level groundwater may also be encountered at this site.

Site L-3 is about 1.1 miles from the ocean at an elevation of about 330 feet above mean sea level on the north side of Kauaula Stream. Site L-3 is within a 16.6-acre parcel also owned by the State of Hawaii and designated on the tax maps as Tax Map Key (2) 4-6-019:003. (See Figure 2 – Location Map (USGS Map) – Launiupoko Aquifer, page 23 and Figure 4 – Vicinity Map (Tax Map) – Launiupoko Aquifer, page 25.) Under normal circumstances, a well at this elevation and proximity to the ocean would not be expected to produce water suitable for drinking without reverse osmosis treatment. However, four recently developed wells on the south side of Kauaula Stream have all, quite unexpectedly, produced water that is drinking water fresh. Their locations in relation to Tax Map Key (2) 4-6-019:003 are shown on Figure 6 of Appendix 3 and additional information is presented below.

- LIC 1, State Well No. 5139-001: This well was completed and pump tested in 2017 for 72 hours at an average pumping rate of 556 gpm. There were slight salinity increases during its constant rate test: specific conductance rose from 383 to 400 micro-Siemens per centimeter (µS/cm) and chlorides increased from 26 to 30 milligrams per liter (mg/l). Its use as reported to the CWRM began in May 2019 and has varied since then (see Figure 7 in Appendix 3). It is still producing water that is drinking water fresh with a specific conductance of 450 µS/cm and chlorides of 56 mg/l. These parameters are within the range of good drinking water, but are a little higher than during the original pump test.

- McDonald 1, State Well No. 5139-002: This well was completed and pump tested for 30 hours at an average of 515 gpm in 2019. During the pump teste there was a slight salinity increase: specific conductance rose from 495 to 527 µS/cm; and chlorides rose from 65 to 70 mg/l. These salinity levels are also well within the limits of drinking water. It has an 85-gpm pump installed and its reported use began in early 2020. Usage has been at very nominal amounts since then.

- Makila Farms, State Well No. 5138-002: This well was completed and pump tested at 414 gpm for 24 hours in July 2000. As reported by the drilling contractor, all ten samples collected during the 24-hour test had identical salinity levels: specific conductance of 690 µS/cm; and chlorides of 111 mg/l. It has an installed pump rated at 385 gpm, but as far as is known, use of the well has not started yet.

- Strombeck, State Well No. 5139-003: This is a small capacity well that was completed in 2019. Its 45-gpm pump does not require a pump test to be done according to CWRM standards. However, a 4.9-foot water level and 109 mg/l

chloride reading were reported to the CWRM.

All four wells have static water levels that are substantially higher than expected. In the order of their listing above, the reported levels are 5.5 feet, 4.9 feet, 6.4 feet, and 4.9 feet. Pumped water salinity, although within the range of drinking water, increase with distance to the south of Kauaula Stream. Drawdowns in the three wells that were pump tested were just a fraction of a foot, indicating very high formation permeability.

There is one other existing well which is critical to assessing the potential success of a new well in Tax Map Key (2) 4-6-019:003. It is the LWC-3 well, State Well No. 5238-001 (shown on Figure 6 of Appendix 3). It was completed in 2003 and during its construction, two constant rate pump tests were run. The first test was in November 2002 in the open borehole for 96 hours at an average of 400 gpm. Ending specific conductance and chloride values were 125 µS/cm and 5 mg/l, respectively. The second test was run for 168 hours (7 days) at an average of 700 gpm after the casing had been installed and grouted into place. There was a steady salinity increase throughout the test. Specific conductance started at 135 and ended at 210 µS/cm. Chlorides started at 7 and ended at 18 mg/l. Based on these results, 500 gpm was selected as the capacity of the permanent pump. Its first reported use as a drinking water well was in September 2009. Since then, its average use has been about 0.3 mgd (see Figure 8 in Appendix 3). The conductivity data does not show a good correlation with pumpage but definitely indicates an increase in salinity over its period of use.

Based on the foregoing summary of results of nearby wells, a well developed on Tax Map Key (2) 4-6-019:003 should be located at the inland end of the parcel at about 390 feet above mean sea level. Until a pilot borehole pump test is conducted to provide actual data, it is assumed that the pump capacity would not be greater than 450 gpm and that its long-term safe yield would be about 0.3 mgd.

Potential Impact on Streamflow of Pumping High-Level Groundwater

Site L-1 is on a ridge between Kanaha Stream to the immediate south and Kahoma Stream to the north. Since Site L-1 is expected to tap into high-level groundwater, its potential impact on stream flow must be assessed. Fortunately, seepage runs performed by the U. S. Geological Survey (USGS) and the findings in test holes 5338-001 and 5338-002 provide conclusive evidence that pumping high-level groundwater from Site L-1 will not impact stream flow. Data for the seepage runs are documented in the United States Geological Survey Scientific Investigations Report 2014-5087, *Low-Flow Characteristics of Streams in the Lahaina District, West Maui, Hawaii*, prepared by Chui Ling Cheng. With regard to potential impacts on Kanaha Stream, the evidence is as follows:

- Results of test boreholes establish that the higher water level in Well 5338-002, at an elevation of 820 feet above mean sea level, is hundreds of feet lower than the adjacent stream elevation, making it impossible for the groundwater to flow into the stream;

- Results of the substantially lower water level in Well 5338-001, at an elevation of 430 feet above mean sea level, show a dramatic drop in high-level groundwater going makai; and

- Seepage runs by the USGS in January 2013 (Table 16 and Figure 11 in Cheng 2014) show Kanaha Stream to be a losing reach from above the ditch intake (directly across from the proposed well site) down to the confluence with Kahoma Stream. In other words, since the stream is not fed by high-level groundwater, pumpage by the proposed well will not impact stream flow.

With regard to the potential impact on Kahoma Stream, the seepage runs by the USGS in January 2010 and August 2012 as reported in Table 16 (Cheng 2014) show the stream to be a losing reach from inland of the proposed well site to the measurements at far lower elevations downstream. Since high-level groundwater is not feeding into and maintaining stream flow, it is reasonable to conclude that pumping from the proposed well site will also not impact Kahoma Stream.

The USGS also made seepage runs for Kauaula Stream. Site L-2 is about 1,500 feet to the north of Kauaula Stream and there are no nearby wells or development tunnels to establish the probability of groundwater occurrence at the well site. However, the report (Cheng, 2014, page 46, Figure 12, and Table 16) establishes that Kauaula Stream, in the reach that would potentially be impacted by pumping high-level groundwater at Site L-2, is a losing reach and therefore would not be impacted by such pumping.

C. Supplementary Information for Launiupoko Aquifer System

Previous reports prepared for DWS considered well sites within portions of the Lahaina Sector.

A report prepared by Fukunaga and Associates, Inc., *West Maui Source Development Site Selection Report*, dated July 2011, considered wells sites within the Honolua, Honokowai, and Launiupoko Aquifer Systems. The purpose of the study was to identify at least three candidate sites and to recommend one of the sites for drilling an exploratory well. Because of a requirement for a quick turnaround for land acquisition, the candidate sites were limited to public lands. The candidate sites are shown on Figure 8 – Well Field Map and identified in the map legend as "Site Recommended by Fukunaga and Associates, Inc." The candidate sites included the Napili Site in the Honolua Aquifer System, the Mahinahina Site and the Honokowai Site in the Honokowai Aquifer System, and the Kanaha Site and Waipuka Site in the Launiupoko Aquifer System. The report ranked the sites in the following order from highest to lowest: (1) Mahinahina, (2) Napili, (3) Waipuka, (4) Honokowai, and (5) Kanaha. Based on recommendations in the report, DWS constructed the Mahinahina Well (5638-004) in 2017. In a separate project, the Department of Hawaiian Home Lands constructed the DHHL Honokowai 1 Well (5639-004) in 2010 close to the proposed Honokowai Site called out in the Fukunaga report.

A report prepared by Fukumoto Engineering, Inc., *Preliminary Design Report for West Maui Well No. 2,* dated April 23, 2013, reevaluated the remaining candidate sites in the Fukunaga and Associates report and recommended an exploratory well in the Honolua Aquifer System. The report reevaluated the proposed Kanaha Site identified in the Fukunaga and Associates report and included information that explained the chlorides levels in the existing Kanaha 1

and Kanaha 2 wells. The proposed Kanaha Site is located about 1,700 feet downslope of Site L-1 and about 2,700 feet upslope of the existing Kanaha 2 Well. (See Figure 8 – Well Field Map, page 29, for location of Kanaha Site.)

Both Kanaha wells have a history of greatly fluctuating chloride levels that range between 100 mg/l to over 800 mg/l. The Environmental Protection Agency's National Secondary Drinking Water Regulations (NSDWRs) sets the maximum contaminant level for chloride at 250 mg/l. Noticeable effects above this level is a salty taste. NSDWRs are non-mandatory water quality standards for 15 contaminants established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the maximum contaminant levels.

According to previous studies, the geologic conditions that occur inland and seaward of the Kanaha wells affect their chloride levels. Such geologic conditions include dikes mapped within Kanaha Stream, a pit crater outcropping within Kanaha Stream, lavas that belong to the post-shield Honolua Volcanics (the same area described above as "Outcrop of Honolua Volcanics"), and lavas and vent that belong to the rejuvenated Lahaina Volcanics. The previous studies suggest that massive lava flows that ponded within the 1,000-foot diameter pit crater which is bounded by faults and breccia zones, and cut by Kanaha Stream forces any dike-impounded groundwater to the surface adding to the baseflow of the stream and thus depriving any leakage of groundwater into the basal aquifer upstream of the existing Kanaha wells. In addition, the rejuvenated Lahaina Volcanics vent downstream of the existing Kanaha wells probably disrupts groundwater flow to the coast due to impermeable subsurface feeder dikes. Because of the of the geological reasons and the salinity history of the existing Kanaha wells, the proposed Kanaha Site was not recommended.

The Fukumoto Engineering report also reevaluated the proposed Waipuka Site identified in the Fukunaga and Associates report. The site is also shown on the Well Field Map. The proposed Waipuka Site is at an elevation of 1,180 feet, and about 3,200 feet to the south of the proposed Kanaha Site, about 3,900 feet to the southeast of the existing Kanaha 2 well, about 4,700 feet to the southeast and upslope of the existing DWS Waipuka 1 and Waipuka 2 wells, and about 5,900 feet to the north of the existing Launiupoko 3 well. Between 1980 and 1990, chloride concentrations for Waipuka 1 and Waipuka 2 generally ranged between 100 mg/l and 250 mg/l. A slight reduction in pumpage from 1990 to 2010 resulted in reductions in chloride concentrations between 60 mg/l and 190 mg/l. In 2003, the initial 709 gallons per minute pump test of Launiupoko 3 resulted in a low drawdown of 2.8 feet and a chloride concentration of 18 mg/l. When regular pumping began in 2009, pumpage averaged 0.019 mgd with chloride concentrations of 138 mg/l. In 2011, pumpage averaged 0.127 mgd with chloride concentrations at 292 mg/l. Based on this data, Waipuka 1, Waipuka 2, and Launiupoko 3 appear to be very sensitive to pumping. Because of the characteristics of these adjoining wells, the proposed Waipuka Site was not recommended.

D. Existing Terrain at Site L-1, Site L-2, and Site L-3

In its publication, *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, the United States Department of Agriculture, Soil Conservation Service,

classified soils throughout the islands. According to the soil survey, the on-site soil at Site L-1 consists of Alaeloa silty clay, 15 to 35 percent slopes (AeE). The Alaeloa series consists of well-drained soils on uplands on the island of Maui derived from basic igneous rock. The soil survey characterizes the soil as having a dark reddish-brown surface layer about 10 inches thick, a dark-red and red subsoil layer about 48 inches thick, moderately rapid permeability, medium runoff, and moderate erosion hazard. (See Figure 6 – Soil Map – Launiupoko Aquifer, page 27.)

The on-site soil at Site L-2 consists of rough broken land (rRR). Rough broken land consists of very steep land broken by numerous intermittent drainage channels. The soil survey characterizes the soil as having a variable composition with about 20 to over 60 inches of soft, weathered rock, rapid runoff, and active geologic erosion.

The on-site soil at Site L-3 consists of stony alluvial land (rSM). Stony alluvial land consists of stones, boulders, and soil deposited by streams along the bottoms of gulches and on alluvial fans.

Site L-1 lies on mountainous terrain on the ridge between Halona Stream, a tributary of Kahoma Stream, to the north and Kanaha Stream to the south. The site is at an elevation of about 1,700 feet above mean sea level and has a ground slope of about 20 percent. The site is outside the State Forest Reserve, and about 1,300 feet to the west and downslope of the forest reserve boundary.

Site L-2 also lies on mountainous terrain on a narrow ridge between two unnamed gulches to the northwest and to the southeast. The unnamed gulch to the southwest is a tributary of Kauaula Stream. The site is at an elevation of about 1,800 feet above mean sea level and has a ground slope of about 20 percent. The site is inside the State Forest Reserve, and about 100 feet to the east and upslope of the forest reserve boundary. To the west and downslope of the forest reserve boundary is private property owned by Bishop Estate.

Site L-3 lies on gently sloping terrain about 150 feet to the north of the centerline of Kauaula Stream. The site is at an elevation of about 330 feet above mean sea level and has a ground slope of about 12 percent.

E. Recommendations for Honolua Aquifer Site H-1 and Site H-2

Historic Groundwater Use

Figure 1 in Appendix 2 shows the locations of wells in the Honolua Aquifer System which are relevant to the selection of new sites. Unlike the Honokowai Aquifer System and Launiupoko Aquifer System to the south, where sugarcane fields used substantial amounts of groundwater for irrigation, the fields within the Honolua Aquifer System were for pineapple cultivation with only modest amounts of irrigation water provided by the Honokohau Ditch. Because of this, groundwater use in the aquifer did not begin until the development of drilled wells in the 1970s for DWS.

To date, 18 wells have been drilled in the Honolua Aquifer System, only 10 of which are currently being pumped. Five of the active wells are owned and operated by DWS. Their individual use over the last 5-year and 10-year periods are summarized in Table 1 in Appendix 2 and depicted graphically as a combined total on Figure 2 in Appendix 3. The private Kapalua Water Company has three wells, only two of which have been put into use. Their average use is depicted graphically on Figure 3 in Appendix 3. Only three other wells are apparently active, but their use amounts are not consistently reported, and when reported, are at insignificant amounts.

As a result, the total well pumpage shown on Figure 4 in Appendix 3 is essentially due to DWS up until October 2002 and then a combination of DWS and the Kapalua Water Company since then. The combined total of groundwater pumpage averaged 2.31 mgd over the last five years and 2.43 mgd over the last 10 years.

Regulatory Groundwater Use Limit

In the CWRM's first Water Resources Protection Plan adopted in 1990, the sustainable yield of the Honolua Aquifer System was set at 8 mgd based on the assumption that all groundwater occurrence was basal and that the recharge to the aquifer was 19 mgd, based exclusively on rainfall recharge for "natural" land use conditions. For the second Water Resources Protection Plan adopted in 2008, the sustainable yield remained at 8 mgd.

Since then, more sophisticated water budget models have been used by the U. S. Geological Survey to calculate the aquifer's recharge. In comparison to the original recharge approximation of 19 mgd in 1990, results of three USGS studies were somewhat greater: 24.08 mgd in 2007, 27.05 mgd in 2012, and 26.85 mgd in 2014. With these new recharge results available, the 2019 update of the Water Resources Protection Plan indicated a potential range of the sustainable yield for the Honolua Aquifer System from 8 to 11 mgd, but retained the 8 mgd amount. In comparison, well pumpage in the aquifer has been far less than its adopted sustainable yield. In other words, there is a substantial unused amount that could accommodate new DWS wells.

Recommended Well Sites

The primary criteria for selecting new well sites are: (1) to provide water of potable quality; (2) to provided sufficient lateral spacing from existing wells to avoid interference effects; and (3) to be generally upgradient of former pineapple fields to avoid residual organic contaminants. Locations of existing wells of interest and two recommended DWS well sites are shown on various figures in this report. They are a sufficient distance away from wells to the south, including four Hawaii Water Service wells, P-4, P-6, P-5A, and P-5, and two yet unused DWS wells, Kahana and Mahinahina. They are also a sufficient distance from DWS's closest wells to the north, Napili A and Napili B.

Site H-1 and Site H-2 are about 2.8 miles from the ocean at elevations of about 1,280 feet and 1,240 feet above mean sea level, respectively, and are about 1,000 feet apart. Drilling will start out in the latter stage, massive, and poorly permeable Honolua Volcanics but will be into the thin-bedded and far more permeable Wailuku Volcanics when groundwater is

encountered. Groundwater will likely be basal at an elevation of 8 feet above mean sea level. The well sites are within a 1,377-acre parcel owned by Maui Land & Pineapple Company, Inc. and designated on the tax maps as Tax Map Key (2) 4-3-001:001. (See Figure 3 – Location Map (USGS Map) – Honolua Aquifer, page 24 and Figure 5 – Vicinity Map (Tax Map) – Honolua Aquifer, page 26.)

F. Supplementary Information for Honolua Aquifer System

As previously stated, a report prepared by Fukunaga and Associates, Inc., *West Maui Source Development Site Selection Report*, dated July 2011, considered wells sites within the Honolua, Honokowai, and Launiupoko Aquifer Systems.

A report prepared by Fukumoto Engineering, Inc., *Preliminary Design Report for West Maui Well No. 2,* dated April 23, 2013, reevaluated the remaining candidate sites in the Fukunaga and Associates report and recommended an exploratory well in the Honolua Aquifer System. The report reevaluated one site within the Honolua Aquifer System, the proposed Napili Site, identified in the Fukunaga and Associates report. The report also considered two alternative sites within the Honolua Aquifer System, the proposed Mailepai Site and Kahana Site. (See Figure 8 – Well Field Map.)

The proposed Napili Site is about 2.6 miles from the ocean at an elevation of 1,100 feet above mean sea level. Existing wells in the area include DWS wells, Napili A, Napili B, Napili C, Honokahua A, and Honokahua B. The proposed Napili Site is about 1,500 feet upslope and to the east of Napili B, the closest DWS well, and about 2,800 feet upslope and to the southeast of Honokahua B. Because of the number of DWS wells downslope and in relatively close proximity to the proposed Napili Site, it was not recommended.

The proposed Mailepai Site is about 2.6 miles from the ocean at an elevation of 1,140 feet above mean sea level. Existing wells in the area include Hawaii Water Service wells, P-5 and P-6, about 3,700 feet and 3,100 feet, respectively to the southwest, and the DWS Napili B about 4,700 feet to the north. Proposed Site H-1 and Site H-2 are upslope of the proposed Mailepai Site and about 1,200 feet to the east and 1,000 feet to the southeast, respectively. Proposed Site H-2 is directly upslope and on the same ridge as the proposed Mailepai Site.

The existing undeveloped DWS well, Kahana, is about 3.0 miles from the ocean at an elevation of 1,300 feet above mean sea level. Existing wells in the area include Hawaii Water Service wells, P-6, P-5, P-5A, and P-4, located downslope and 3,300 feet to the northwest, 2,900 feet to the west, 3,700 feet to the west, and 4,200 feet to the southwest, respectively. The existing undeveloped DWS well, Mahinahina, lies 3,500 feet to the south. As previously stated, DWS will develop the Kahana Well into a production well.

G. Existing Terrain at Site H-1 and Site H-2

According to the soil survey, the on-site soil at Site H-1 and Site H-2 consists of Honolua silty clay, 15 to 25 percent slopes (HwD). The Honolua series consists of well-drained soils on uplands on the island of Maui derived from basic igneous rock. The survey characterizes the soil as having a dark-brown surface layer about 12 inches thick, a dark reddish-brown

and reddish-brown subsoil layer about 58 inches thick, moderately rapid permeability, medium runoff, and moderate erosion hazard. (See Figure 7 – Soil Map – Honolua Aquifer, page 28.)

Site H-1 lies near the upper limits of an old pineapple field on the ridge between two streams. To the northeast of the site is Kaopala Gulch and to the southwest of the site is an unnamed tributary of Mailepai Stream. The site is at an elevation of about 1,280 feet above mean sea level and has a ground slope of about 16 percent.

Site H-2 lies about 900 feet upslope of an old pineapple field on the ridge between two streams. To the northeast of the site is the unnamed tributary of Mailepai Stream and to the southwest of the site is Mailepai Stream. The site is at an elevation of about 1,240 feet above mean sea level and has a ground slope of about 12 percent.

V. CONCEPTUAL IMPROVEMENTS

A. Site L-1, Site L-2, and Site L-3

Because of the mountainous, steep terrain, about two acres of land will be acquired for Site L-1 and Site L-2. The terrain at Site L-3 is less steep, therefore, about one acre of land will be acquired. This land area allows for future construction of a pumping station consisting of pump pad and piping, control building, reservoir, paved service yard, drainage sump, and emergency generator. Interim site improvements include grading of the immediate work area to create a gently sloping pad and constructing a chain link security fence around the site.

Based on the data from Kanaha Test Hole 1 (5338-001) and Kanaha Test Hole 2 (5338-002), tapping into high-level groundwater at Site L-1 is a reasonable expectation. As previously stated, Test Hole 1 and Test Hole 2 encountered high-level groundwater at 430 feet and 820 feet above mean sea level, respectively. These levels are much higher than tapping into the basal aquifer with groundwater at about 8 feet above mean sea level. High-level groundwater may also be encountered at Site L-2.

Construction of wells to tap into such high-level groundwater involve drilling a pilot borehole and running a preliminary pump test in the open hole to determine potential yield and water quality. If results warrant, construction proceeds to reaming of the borehole to full diameter, installing the well casing, and conducting full-scale pump tests. For conceptual design and cost estimate purposes, it is assumed that high-level groundwater will be encountered at 430 feet above mean sea level and the bottom of the well is at sea level. The conceptual design also calls for a well diameter and casing diameter that can accommodate a relatively large submersible pump and motor. A motor rated at 400 to 500 horsepower with an outside diameter of 17 inches will fit into a casing with an inside diameter of 20 inches.

Each well site will include two wells: a primary well and a backup well. The backup well will be constructed simultaneously with each primary well during the various construction phases.

Table 3 below summarizes conceptual well design data for Site L-1 and Site L-2.

TABLE 3 Conceptual Design Data for Site L-1 and Site L-2		
Feature	**Value**	**Unit**
Installed Peak Capacity	807	gallons per minute
24-hour Capacity	1.162	million gallons per day
16-hour Capacity	0.775	million gallons per day
Well Diameter	28	inches
Casing Diameter	20.75	inches outside diameter
L-1 Surface Elevation	1,700	feet above mean sea level
L-2 Surface Elevation	1,800	feet above mean sea level
Water Elevation	430	feet above mean sea level
Bottom Elevation	0	feet above mean sea level
L-1 Total Depth of Well	1,700	feet
L-2 Total Depth of Well	1,800	feet

Based on the data from wells in the vicinity, encountering basal groundwater at an elevation of about 5 feet above mean sea level is expected at Site L-3. After the preparation of the site, the exploratory well will be drilled, cased, and tested. Construction of wells to tap into basal groundwater involve drilling a pilot borehole, and enlarging or reaming the hole with larger bits. Before enlarging the hole, a preliminary pump test in the open hole may be performed to determine potential yield and water quality. The casing process involves welding sections of casing, installing the section in the drilled hole, and placing gravel, sand, and grout in the space between the drilled hole and the casing. The testing process involves installing a test pump in the well, performing a step-drawdown test and constant-rate test, taking water samples and performing water quality tests, and removing the test pump. The pump test and water quality data will then be analyzed to determine the feasibility of developing the exploratory well as a new potable water source.

Design of an exploratory will conform to requirements of the CWRM, State Department of Health (DOH) wellhead protection protocols, and DWS standards. CWRM standards will limit the depth of the well to one-fourth the thickness of the theoretical thickness of the basal freshwater lens or 41 times the basal head. Based on the CWRM formula in its Well Construction/Pump Installation Permit, the allowable maximum bottom elevation of the well is 46 feet below mean sea level. To account for a potential lower basal groundwater elevation, the conceptual design calls for a bottom elevation of 40 feet below mean sea level.

For conceptual design purposes, the anticipated pump peak capacity is 450 gpm. The new pump can be either a submersible pump or a line shaft pump. DWS has recently installed submersible pumps and motors for wells of this depth range; therefore, the conceptual design will be based on a submersible installation. A pump with a 60 to 75 horsepower motor will be able to produce the required peak capacity. Such a pump and motor will have an outside diameter of about 10 inches and will fit into a casing with an inside diameter of 14 inches.

The well site will include two wells: a primary well and a backup well. The backup well will be constructed simultaneously with the primary well during the various construction phases.

Table 4 below summarizes conceptual well design data for Site L-3.

TABLE 4
Conceptual Design Data for Site L-3

Feature	Value	Unit
Installed Peak Capacity	450	gallons per minute
24-hour Capacity	0.648	million gallons per day
16-hour Capacity	0.432	million gallons per day
Well Diameter	22	inches
Casing Diameter	14.75	inches outside diameter
Surface Elevation	330	feet above mean sea level
Water Elevation	5	feet above mean sea level
Bottom Elevation	-40	feet above mean sea level
Total Depth of Well	370	feet

Site L-1, Site L-2, and Site L-3 are isolated and require long extensions of infrastructure to connect to the existing DWS water system. Site L-1 will connect to the existing 1.5-million gallon (MG) Wahikuli Reservoir and requires 15,300 feet of 12-inch transmission pipeline and access road, and 16,700 feet of electrical line extension. In addition, it requires a new 1.0-MG reservoir. Site L-2 will connect to the existing 1.0-MG reservoir at the Lahaina Water Treatment Plant and requires 9,800 feet of 12-inch transmission pipeline and access road, and 10,200 feet of electrical line extension. Site L-3 will connect to an existing 12-inch line on Ipu Aumakua Lane in the vicinity of the Lahaina Recreation Center ball fields. This connection requires 4,700 feet of 12-inch transmission pipeline, access road, and electrical line extension. In addition, it requires a new 1.0 MG reservoir. (See Site L-1, L-2, and Site L-3 Conceptual Plan – Figure 9, page 30.)

B. Site H-1 and Site H-2 – Option 1

About one acre of land will be acquired for each well site. This land area allows for future construction of a pumping station consisting of pump pad and piping, control building, reservoir, paved service yard, drainage sump, and emergency generator. Interim site improvements include grading of the immediate work area to create a gently sloping pad and constructing a chain link security fence around the site.

After the preparation of the site, the exploratory well will be drilled, cased, and tested. Unlike Site L-1 and Site L-2, basal groundwater at about 8 feet above mean sea level is expected at Site H-1 and Site H-2. Construction of wells to tap into basal groundwater involve drilling a pilot borehole, and enlarging or reaming the hole with larger bits. Before enlarging the hole, a preliminary pump test in the open hole may be performed to determine potential yield and water quality. The casing process involves welding sections of casing, installing the section in the drilled hole, and placing gravel, sand, and grout in the space between the drilled hole and the casing. The testing process involves installing a test pump in the well, performing a step-drawdown test and constant-rate test, taking water samples and performing water quality tests, and removing the test pump. The pump test and water quality data will then be analyzed to determine the feasibility of developing the exploratory well as a new potable water source.

Design of an exploratory will conform to requirements of the CWRM, State Department of Health (DOH) wellhead protection protocols, and DWS standards. CWRM standards will limit the depth of the well to one-fourth the thickness of the theoretical thickness of the basal freshwater lens or 41 times the basal head. Based on the CWRM formula in its Well Construction/Pump Installation Permit, the allowable maximum bottom elevation of the well is 74 feet below mean sea level. To account for a potential lower basal groundwater elevation, the conceptual design calls for a bottom elevation of 60 feet below mean sea level. The conceptual design also calls for a well diameter and casing diameter that can accommodate a relatively large submersible pump and motor. A motor rated at 350 to 450 horsepower with an outside diameter of 17 inches will fit into a casing with an inside diameter of 20 inches.

Each well site will include two wells: a primary well and a backup well. The backup well will be constructed simultaneously with each primary well during the various construction phases.

Table 5 below summarizes conceptual well design data for Site H-1 and Site H-2.

TABLE 5
Conceptual Design Data for Site H-1 and Site H-2

Feature	Value	Unit
Installed Peak Capacity	807	gallons per minute
24-hour Capacity	1.162	million gallons per day
16-hour Capacity	0.775	million gallons per day
Well Diameter	28	inches
Casing Diameter	20.75	inches outside diameter
H-1 Surface Elevation	1,280	feet above mean sea level
H-2 Surface Elevation	1,240	feet above mean sea level
Water Elevation	8	feet above mean sea level
Bottom Elevation	60	feet below mean sea level
H-1 Total Depth of Well	1,340	feet
H-2 Total Depth of Well	1,300	feet
Bottom of Basal Lens	328	feet below mean sea level

Site H-1 and Site H-2 are isolated and require long extensions of infrastructure to connect to the existing DWS water system. Three options for connecting the well sites to the existing DWS water system in Lahaina Town will be considered to replace the loss of treated surface water supplied to Lahaina Town. All options will convey water from north to south, and connect to the existing Wahikuli Reservoir.

Option 1 involves conveying water from the well sites to Honoapiilani Highway, installing a new transmission line within the highway, and connecting the new transmission line to the existing Wahikuli Reservoir.

Components within the northerly portion of this option near the well sites include a 12-inch transmission line and access road from the well sites to a connection point at the existing 16-inch transmission line, and an electrical line extension from the existing Maui Electric transmission line to the well sites. Other improvements consist of another connection to the existing 16-inch transmission line downslope of the first connection, a 1.0-MG reservoir, and

a 16-inch line to Honoapiilani Highway. From this point, improvements continue with a 16-inch line along Honoapiilani Highway.

Components within the southerly portion of this option include the continuation of the 16-inch transmission line along the highway, and a control valve and connection point at the existing Wahikuli Reservoir. To provide additional connectivity, future improvements may include a new 12-inch transmission line between the existing Wahikuli Reservoir and the existing 16-inch transmission line near the existing Waipuka Tanks along Lahainaluna Road.

(See Site H-1 and H-2 Conceptual Plan North – Option 1 – Figure 10, page 31 and Site H-1 and H-2 Conceptual Plan South – Option 1 – Figure 11, page 32.)

C. Site H-1 and Site H-2 – Option 2

Option 2 involves conveying water from the well sites to the existing Honokohau Ditch/Tunnel, using the ditch/tunnel to transport water to the Mahinahina Water Treatment Facility, treating the water, and pumping the treated water into a new 16-inch transmission line that follows the route of the existing ditch.

Components within the northerly portion of this option near the well sites include a 12-inch transmission line and access road from the well sites to the Honokohau Ditch/Tunnel and an electrical line extension from the existing Maui Electric transmission line to the well sites. Improvements at the Mahinahina Water Treatment Facility consist of a treatment capacity upgrade and a booster pump to pump water to a new 16-inch transmission line. From this point, the 16-inch transmission line and access road follow the route of the existing Honokohau Ditch towards Lahaina Town.

Components within the southerly portion of this option include the continuation of the 16-inch transmission line and access road, and a control valve and connection at the existing Wahikuli Reservoir.

(See Site H-1 and H-2 Conceptual Plan North – Option 2 – Figure 12, page 33 and Site H-1 and H-2 Conceptual Plan South – Option 2 – Figure 13, page 34.)

D. Site H-1 and Site H-2 – Option 3

Option 3 involves conveying water from the well sites to Lower Honoapiilani Road, using the existing DWS system to transport water toward Lahaina Town when feasible, and upgrading portions of the existing DWS system.

Components within the northerly portion of this option near the well sites include a 12-inch transmission line and access road from the well sites to the mauka end of existing Hui Road A, and an electrical line extension from the existing Maui Electric transmission line to the well sites. Improvements continue with a 12-inch transmission line along Hui Road A to Honoapiilani Highway, a 12-inch transmission line in Napilihau Street from the highway to Lower Honoapiilani Road, and connections to existing 12-inch and 8-inch lines in Lower Honoapiilani Road.

From this point, the existing lines within Lower Honoapiilani Road convey water to the existing Kahana Pump Station to the south. Due to age, portions of an existing 8-inch line before the pump station will be replaced. In addition, the pump station will be upgraded. Improvements within the northerly portion of this option also include a 16-inch transmission from the existing lines within Lower Honoapiilani Road to the existing Honokowai Reservoir.

Components within the southerly portion of this option include use of the existing lines within Lower Honoapiilani Road and Honoapiilani Highway to transport water to the south, an upgrade to the Wahikuli Pump Station, and a 16-inch transmission line along the highway that connects to the existing line to the Wahikuli Reservoir.

(See Site H-1 and H-2 Conceptual Plan North – Option 3 – Figure 14, page 35 and Site H-1 and H-2 Conceptual Plan South – Option 3 – Figure 15, page 36.)

E. Conceptual Project Costs

Conceptual opinions of probable project costs for each well site and connection option are shown in Figure 17 (see pages 38 and 39). In addition to construction costs, the spreadsheets include estimates for engineering and permitting, and land acquisition. The locations of private lands to be acquired are shown in Figure 16 - Land Acquisition Plan (see page 37). For the Honolua Aquifer wells, Site H-1 will be considered as the baseline well with Connection Options 1, 2, and 3 as the variables. Because Site H-1 and Site H-2 are close together and will use the same connection infrastructure, the cost of Site H-2 represents the additional amount to develop Site H-2 and to connect it to the Site H-1 system. Table 6 below provides a breakdown of the total costs.

TABLE 6
Project Cost Summary

Option Description	Exploratory Well ($ million)	Well Develop-ment ($ million)	Engineering and Permitting ($ million)	Land Acquisition ($ million)	Total Project Cost ($ million)
Site L-1	12.29	30.12	2.54	0.29	45.24
Site L-2	11.75	17.20	1.74	0.00	30.69
Site L-3	2.30	16.90	1.15	0.75	21.10
Site H-1 with Connection Option 1	8.07	50.59	3.52	2.14	64.32
Addition of Site H-2 to Connection Option 1	7.34	8.94	0.98	0.41	17.67
Site H-1 with Connection Option 2	7.68	37.80	2.73	1.76	49.97
Addition of Site H-2 to Connection Option 2	7.34	9.17	0.99	0.41	17.91
Site H-1 with Connection Option 3	7.79	32.88	2.44	1.41	44.52
Addition of Site H-2 to Connection Option 3	7.34	9.17	0.99	0.41	17.91

VI. ANALYSIS & RECOMMENDATIONS

Lowest construction cost is the usual criteria for selecting the preferred option; however, because cost does not address other important criteria, a ranking matrix will be used to assess the candidate sites. Besides cost, other important criteria include the likelihood of a successful well, ease of land acquisition, ease of permitting, and potential yield of the well. Although the well sites were selected based on their technical merit, the likelihood of a successful well criteria is an indicator of the subtle differences among the well sites. The ease of land acquisition and ease of permitting criteria are important considerations because DWS would like to implement the project soon. In addition, the potential yield is important because all sites do not have the same potential yield. These selection criteria will be ranked for each candidate site. A rank of 1 is low, a rank of 2 is medium, and a rank of 3 is high. The option with the highest total will be the preferred option.

Low Construction Cost

The following is a listing of the options from least cost to highest cost: Site L-3 ($21.1 million), Site L-2 ($30.7 million), Site H-1 with Connection Option 3 ($44.5 million), Site L-1 ($45.2 million), Site H-1 with Connection Option 2 ($50.0 million), and Site H-1 with Connection Option 1 ($64.3 million). The first through fourth options will be considered as candidate sites and subject to further analysis and ranking. The other two higher-cost options will be eliminated.

Ranking for low construction cost of candidate sites: HIGH-Site L-3, MEDIUM-Site L-2, LOW-Site H-1 with Connection Option 3, and LOW-Site L-1.

Likelihood of a Successful Well

HIGH: Site L-1 is ranked high for the likelihood of a successful well. Site L-1, located about 650 feet north of Kanaha Test Hole 1, is very close to the test hole. Kanaha Test Hole 1 encountered groundwater at an elevation of 430 feet; thus, there is a high probability that high-level groundwater will be encountered. High-level groundwater is usually of excellent quality as evidenced by DWS's two active high-level groundwater production sites in Wailuku: Iao Tunnel (Kepaniwai) (5332-002) and Kepaniwai Well (5332-005). Additionally, because Site L-1 is located about 2.8 miles from the ocean and about 4,400 feet upslope from the nearest active DWS well, there is a high probability of encountering basal groundwater if high-level groundwater is not encountered.

HIGH: Site L-3 is ranked high for likelihood of a successful well due to other successful wells in the vicinity of Site L-3.

MEDIUM: Site H-1, located about 2.8 miles from the ocean and at an elevation of 1,280 feet above mean sea level, is similar to the existing Kahana Well and has a good probability of encountering basal groundwater. The existing Kahana Well, located about 3.0 miles from the ocean and at an elevation of about 1,317 feet above mean sea level, lies about 3,400 feet to the south of Site H-1. Basal groundwater was encountered at 7.4 feet above mean sea level.

DWS will develop the Kahana Well as a new source that will produce 0.96 mgd. Exploratory drilling of Site H-1 will probably result in similar yields as the existing Kahana Well.

LOW: Site L-2 is ranked low for likelihood of a successful well. Although high-level groundwater is expected at Site L-2 due to its distance from the ocean of about 2.7 miles and its elevation of 1,800 feet above mean sea level, there are no nearby wells or test holes to confirm this. If high-level groundwater is not encountered at this location, basal groundwater will likely be encountered, but its elevation of 1,800 feet will make it more difficult to develop than Site H-1 at an elevation of 1,280 feet or Site L-1 at an elevation of 1,700 feet.

Ease of Land Acquisition

HIGH: Site L-2, located entirely on State-owned land, is ranked high for ease of land acquisition. The State has been supportive of the use of public land for infrastructure development. MEDIUM: Site L-1, located on State-owned land with a small portion on privately-owned land, is ranked medium. Acquisition of private land consists of an 1,800-foot long by 20-foot wide easement for a pipeline and access road. MEDIUM: Site L-3 is ranked medium since it is located on State-owned land with major portions of the access road and utility corridors on private lands. Acquisition of private land consists of a 4,700-foot long by 20-foot wide easement for the road and utility corridor. LOW: Site H-1 with Connection Option 3, located primarily on privately-owned land, is ranked low. The main reason for the low rank is that previous attempts to acquire land for previous DWS projects near Site H-1 were not successful. In addition, recent discussions with the developer of an affordable housing project in the region indicated that the developer may already have rights to acquire proposed well sites in the region.

Ease of Permitting

MEDIUM: Site L-1 is of above-average complexity due to the site being in the Conservation State Land Use District. In addition to the usual environmental review process, Site L-1 will require a Conservation District Use Permit. MEDIUM: Site L-3 is ranked medium due to its above-average complexity for work on private lands. MEDIUM: Site H-1 with Connection Option 3 is ranked medium due to its above-average complexity. This option involves work on private land within fallow pineapple fields, County and State streets and highways, and within DWS pump stations and tank sites. The multiple improvement sites on private and public lands will add to the permitting difficulty. LOW: Site L-2 with portions in the Conservation State Land Use District and the West Maui Natural Area Reserve is ranked low. In addition to the usual environmental review process, Site L-2 will require a Conservation District Use Permit and a special use permit from the Board of Land and Natural Resources for construction within the West Maui Natural Area Reserve.

Potential Yield

HIGH: Site L-1 is ranked high due to the high probability of encountering high-level groundwater and if such high-level water is not encountered, there is a high probability of encountering basal groundwater MEDIUM: Site H-1 with Connection Option 3 is ranked medium due to a good probability of encountering basal groundwater. MEDIUM: Site L-2 is

ranked medium due to the unknown probability of encountering high-level groundwater and a good probability of encountering basal groundwater. LOW: Site L-3 is ranked low due to limited capacities of existing wells in the vicinity.

Recommendations

Table 7 below ranks each candidate option. As shown, the options are closely ranked with Site L-1 and Site L-3 with the same high rank, and followed by Site L-2 and Site H-1 with Connection Option 3. Based on the ranking, DWS should proceed with Site L-1 and Site L-3.

TABLE 7
Options Ranking Matrix

Selection Criteria	Site L-1	Site L-2	Site L-3	Site H-1 Option 3
Low construction cost	1	2	3	1
Likelihood of success	3	1	3	2
Ease of land acquisition	2	3	2	1
Ease of permitting	2	1	2	2
Potential Yield	3	2	1	2
Total	**11**	**9**	**11**	**8**

During its review of an early consultation request, the State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) pointed out that Site L-2 falls within the West Maui Natural Area Reserve (NAR) – Panaewa Section and that the Hawaii Administrative Rules (HAR) Chapter 209 prohibits certain activities within the NAR. Drilling an exploratory well and development of a production well would fall under the following prohibited activity: "(6) To engage in any construction or improvement." Because of this, DOFAW asked that the site be removed from further consideration. Although HAR Chapter 209 allows the Board of Land and Natural Resources to consider granting special use permits for prohibited activities, obtaining such a special use permit is highly unlikely; therefore, as requested, Site L-2 will be removed from further consideration.

VII. REFERENCES

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4. Fukunaga & Associates, Inc., *Final West Maui Source Development Site Selection Report*, Honolulu, Hawaii, prepared for County of Maui Department of Water Supply, July 2011.
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9. Tom Nance Water Resource Engineering, Inc., "Recommended Well Sites in the Honolua Aquifer System in West Maui memorandum report," July 21, 2020.
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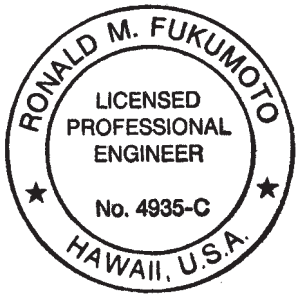
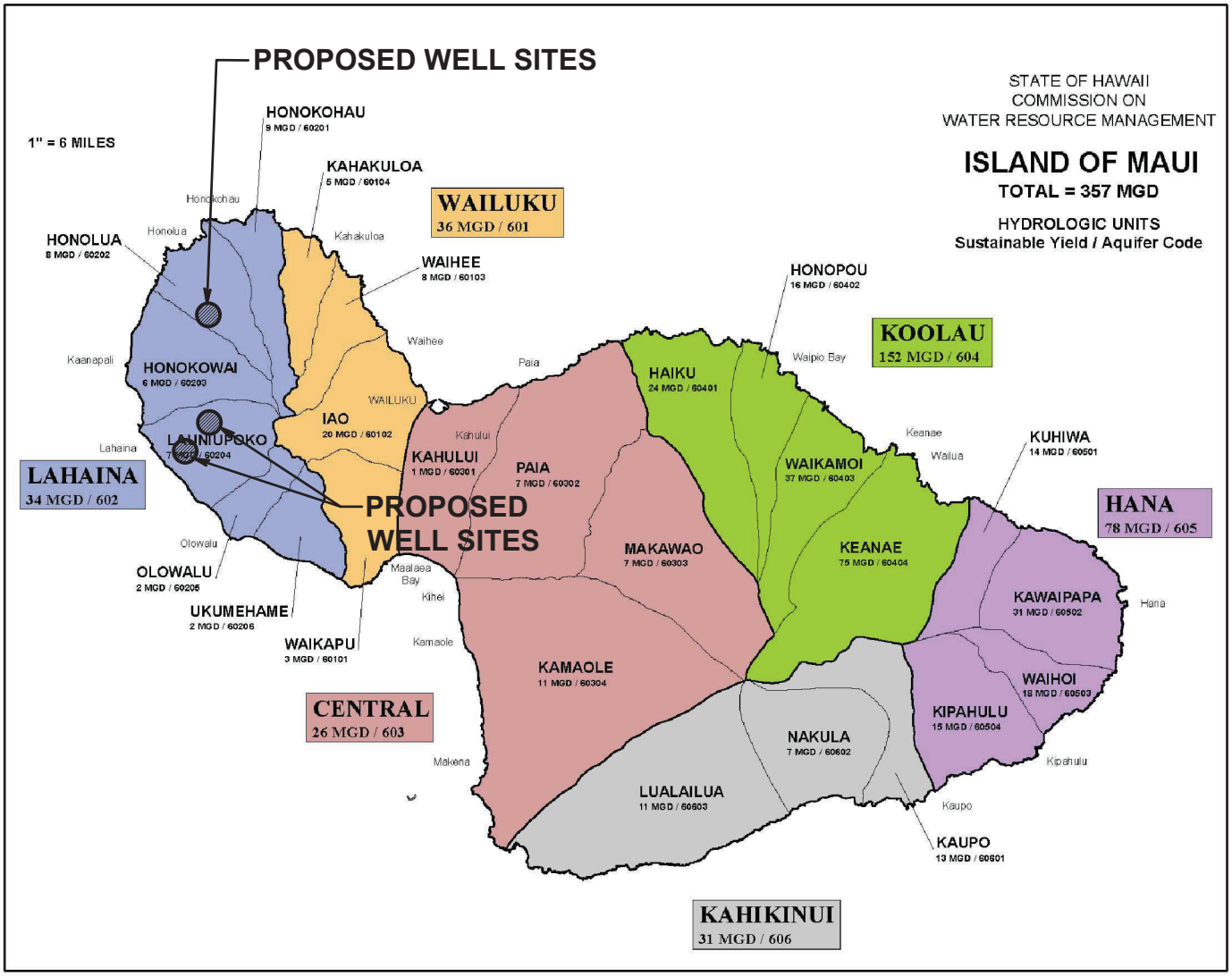


This work was prepared by
me or under my supervision.

Ronald M. Fukumoto



06/20/2018

Map Projection: Universal Transverse Mercator

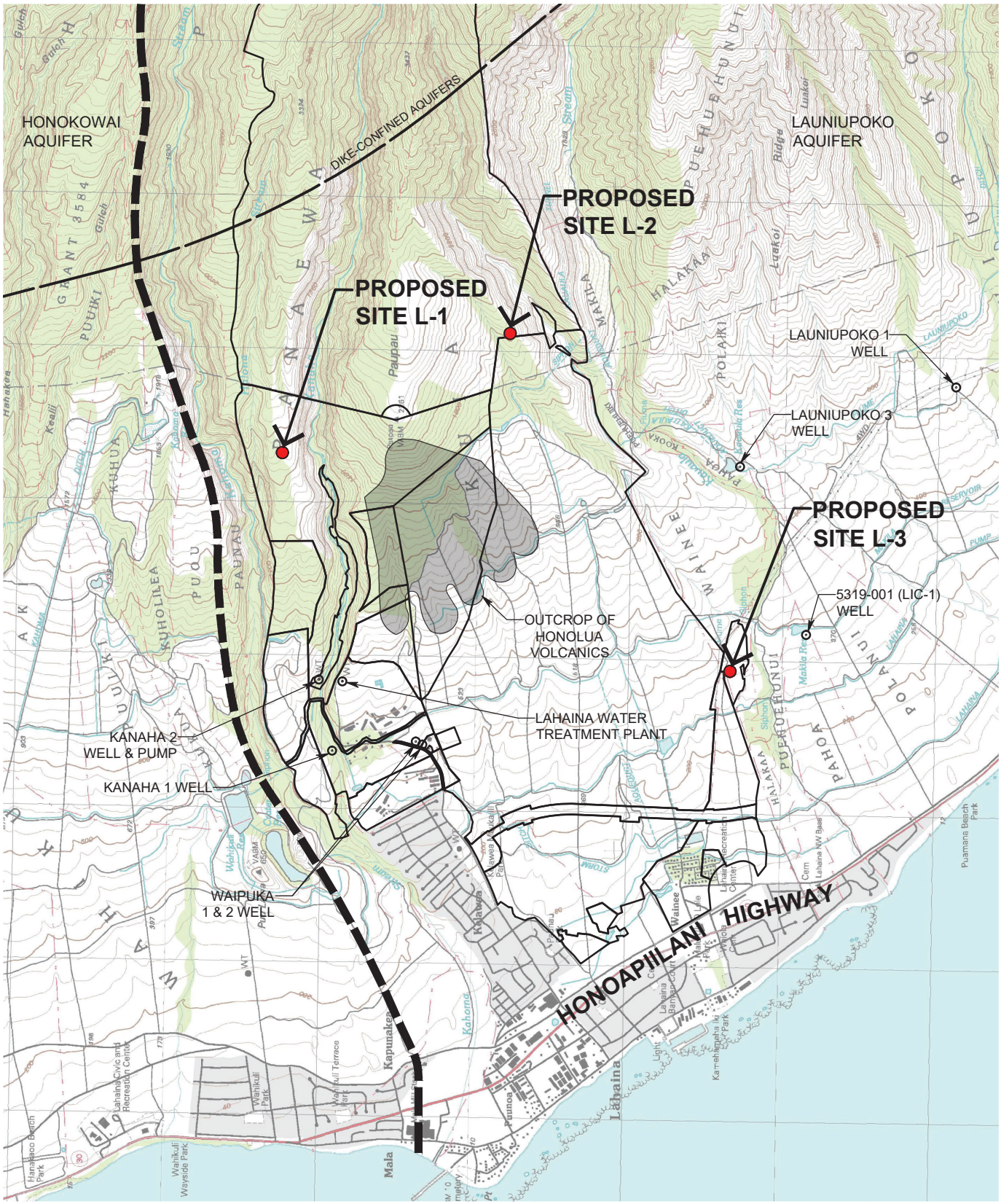
CWRM HYDROLOGIC UNITS MAP

Figure 1

SCALE IN MILES

NORTH 0 4 8 16 24

SOURCE: COMMISSION ON WATER RESOURCE MANAGEMENT



LOCATION MAP (USGS Map) - LAUNIUPOKO AQUIFER

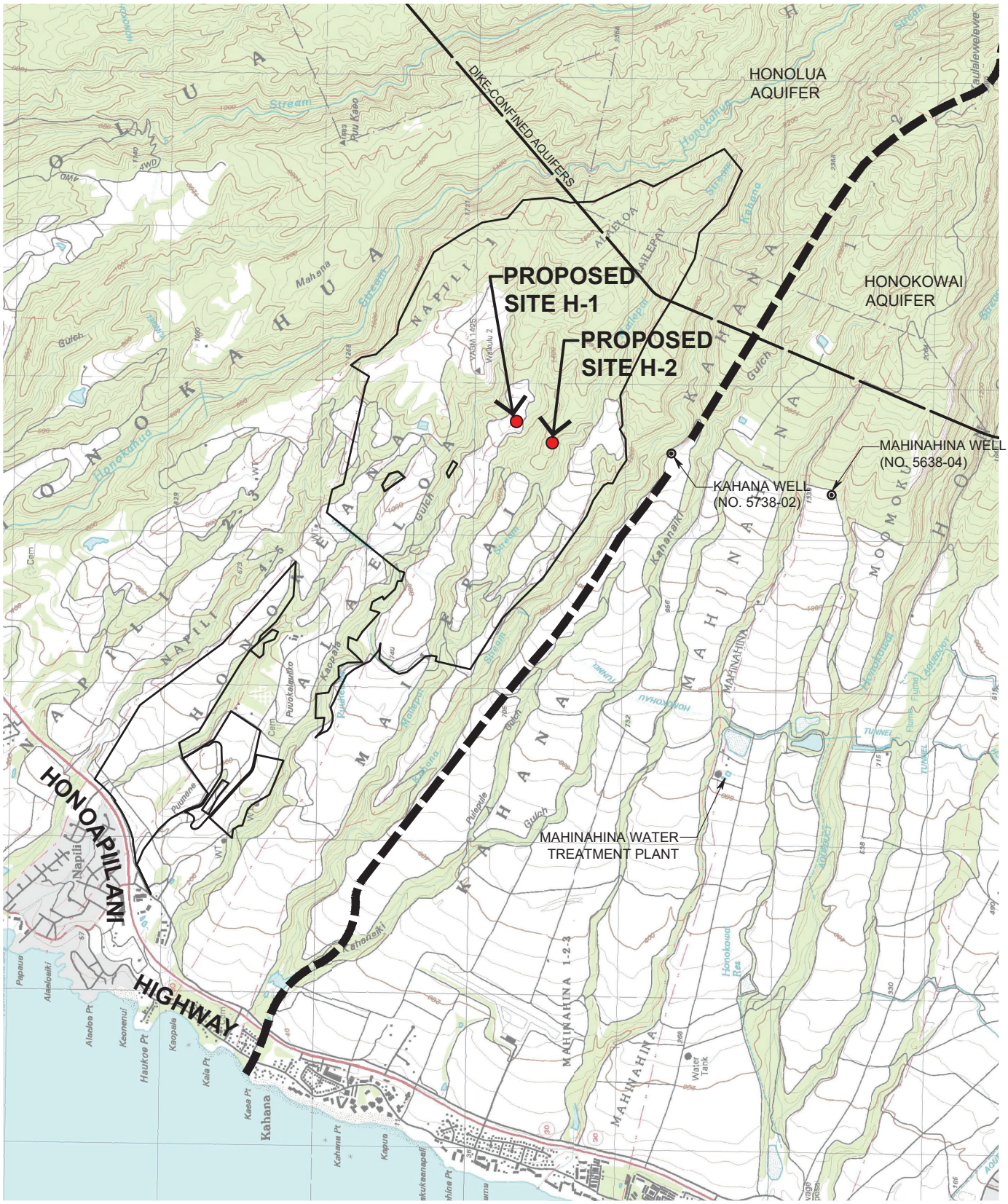
Figure 2

SCALE IN FEET

SOURCE: USGS LAHAINA QUADRANGLE MAP

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

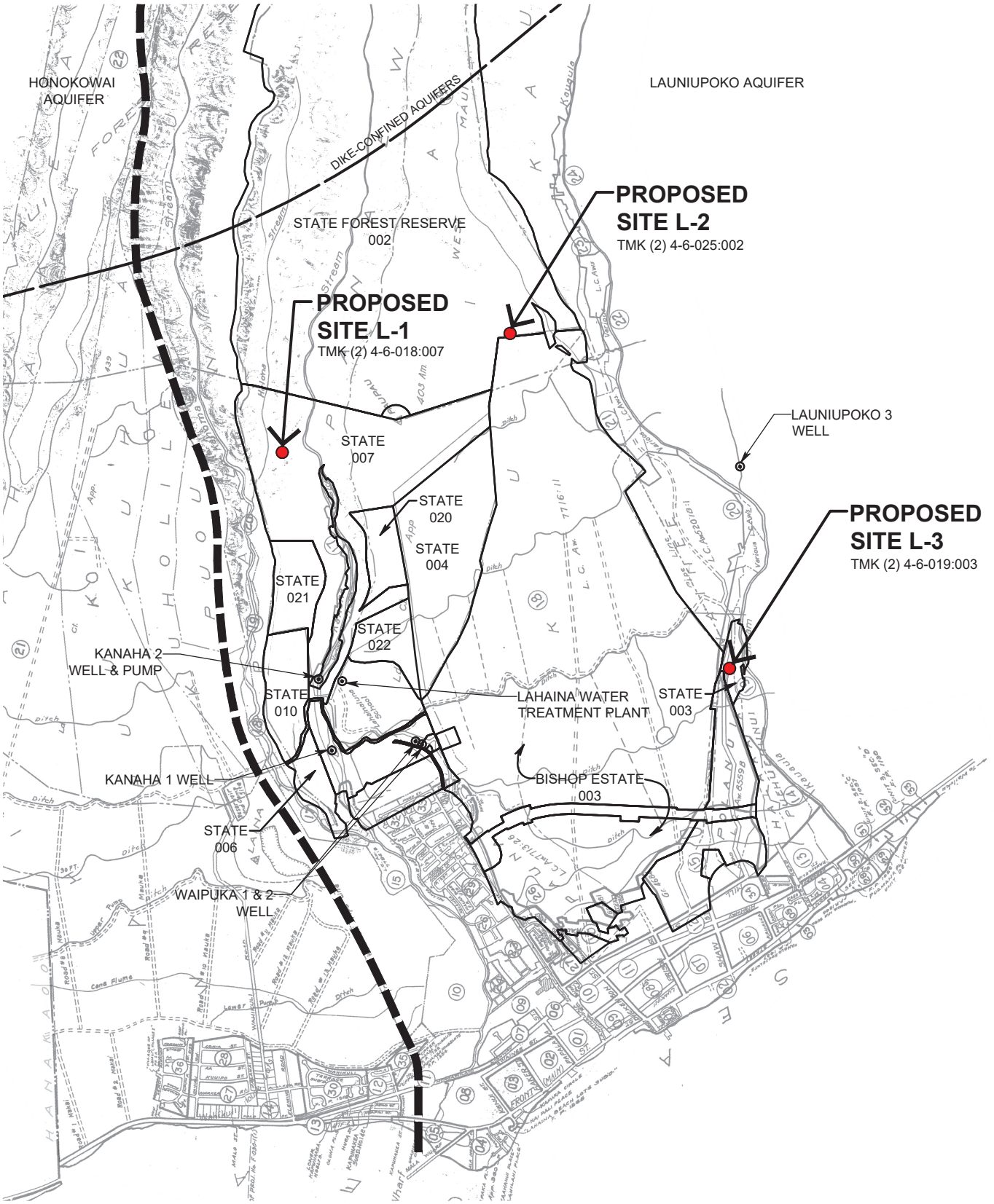


LOCATION MAP (USGS Map) - HONOLUA AQUIFER Figure 3

SCALE IN FEET

NORTH 0 1500 3000 6000 9000

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE MAP



VICINITY MAP (Tax Map) - LAUNIUPOKO AQUIFER

Figure 4

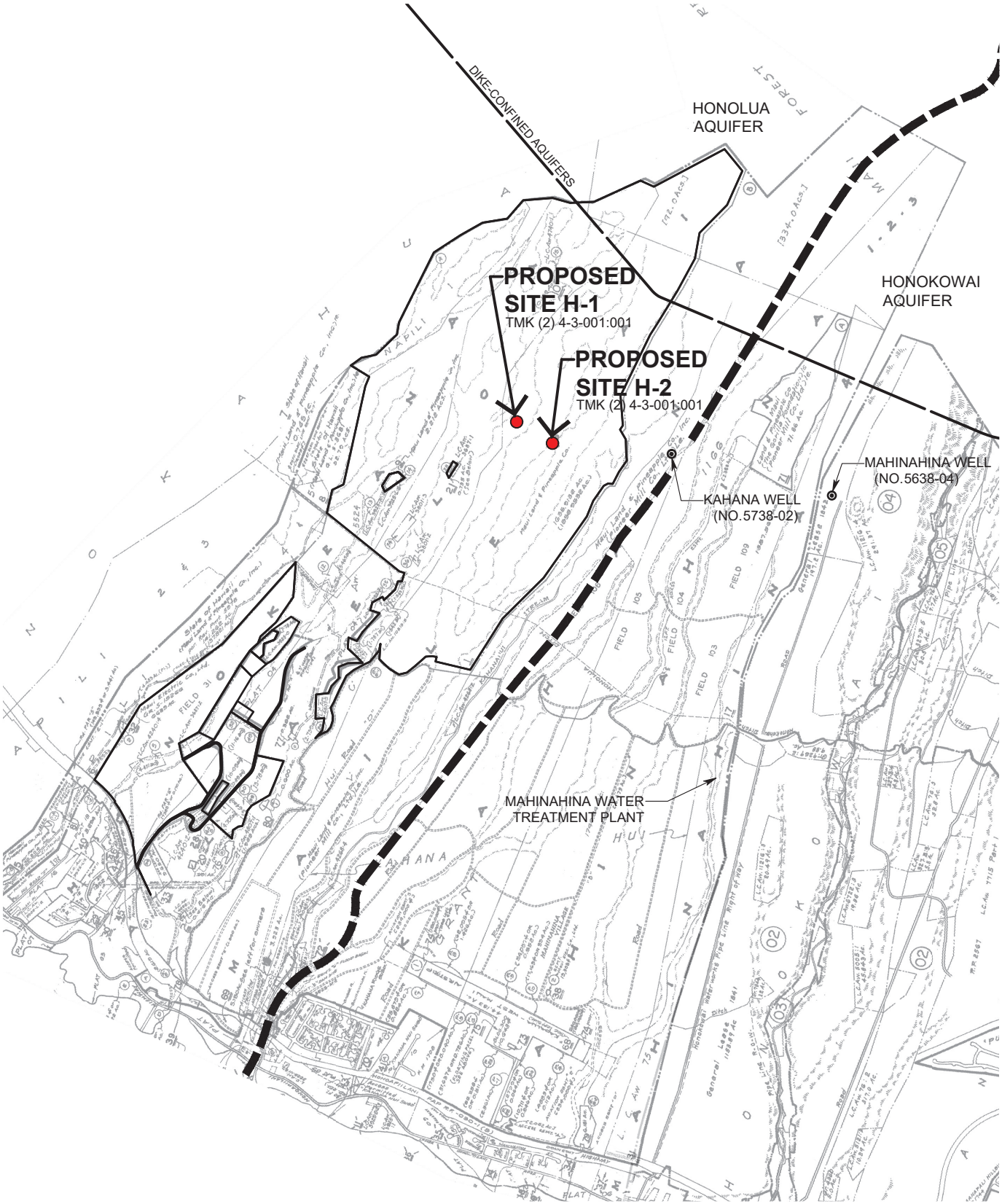
SCALE IN FEET

NORTH 0 1500 3000 6000 9000

SOURCE: TAX MAP KEY (2) 4–6–000 AND (2) 4–5–000

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



VICINITY MAP (Tax Map) - HONOLUA AQUIFER

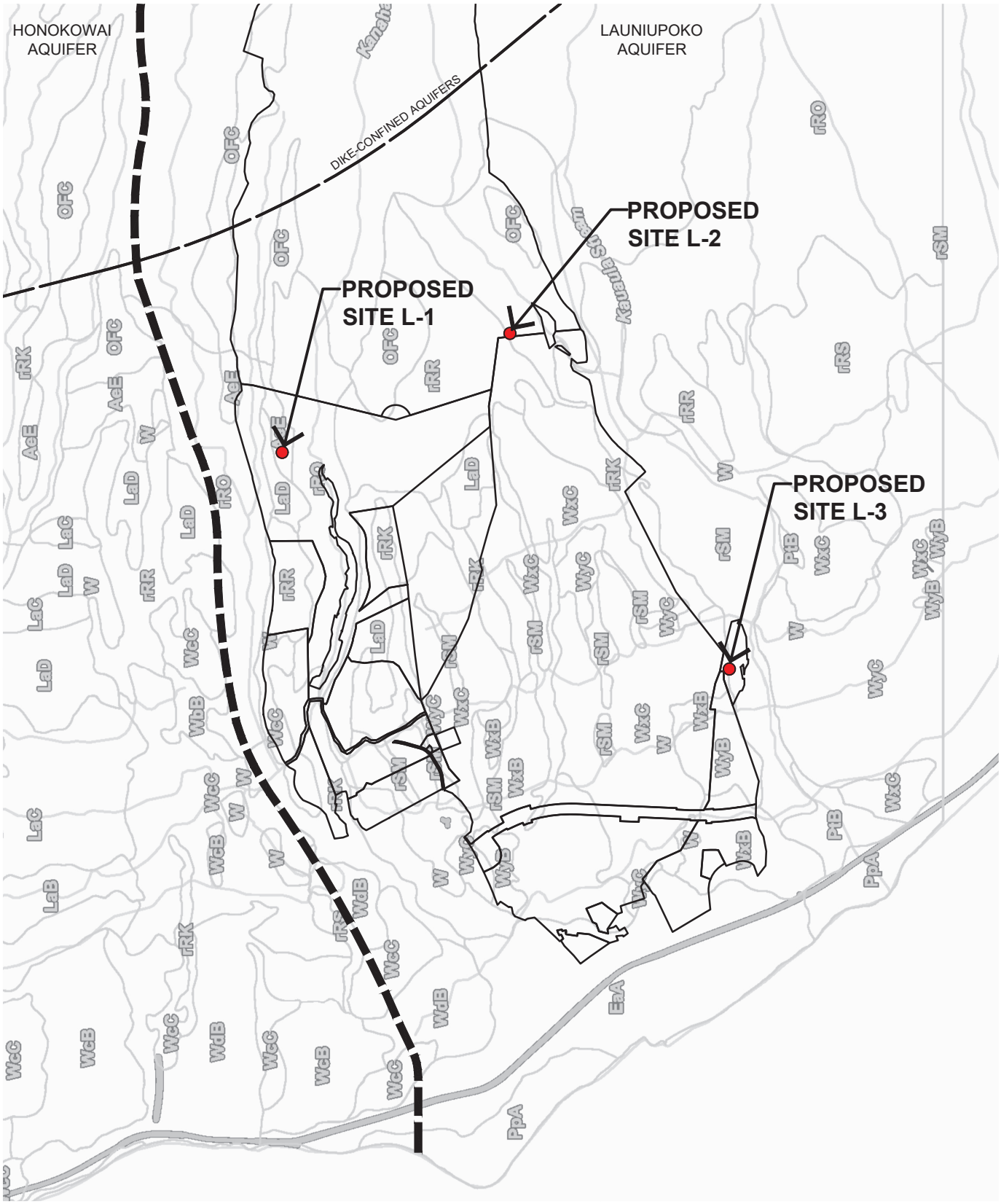
Figure 5

NORTH

SCALE IN FEET

0 1500 3000 6000 9000

SOURCE: TAX MAP KEY (2) 4–4–000 AND (2) 4–3–001



SOIL MAP - LAUNIUPOKO AQUIFER

Figure 6

SOURCE: SOIL SURVEY

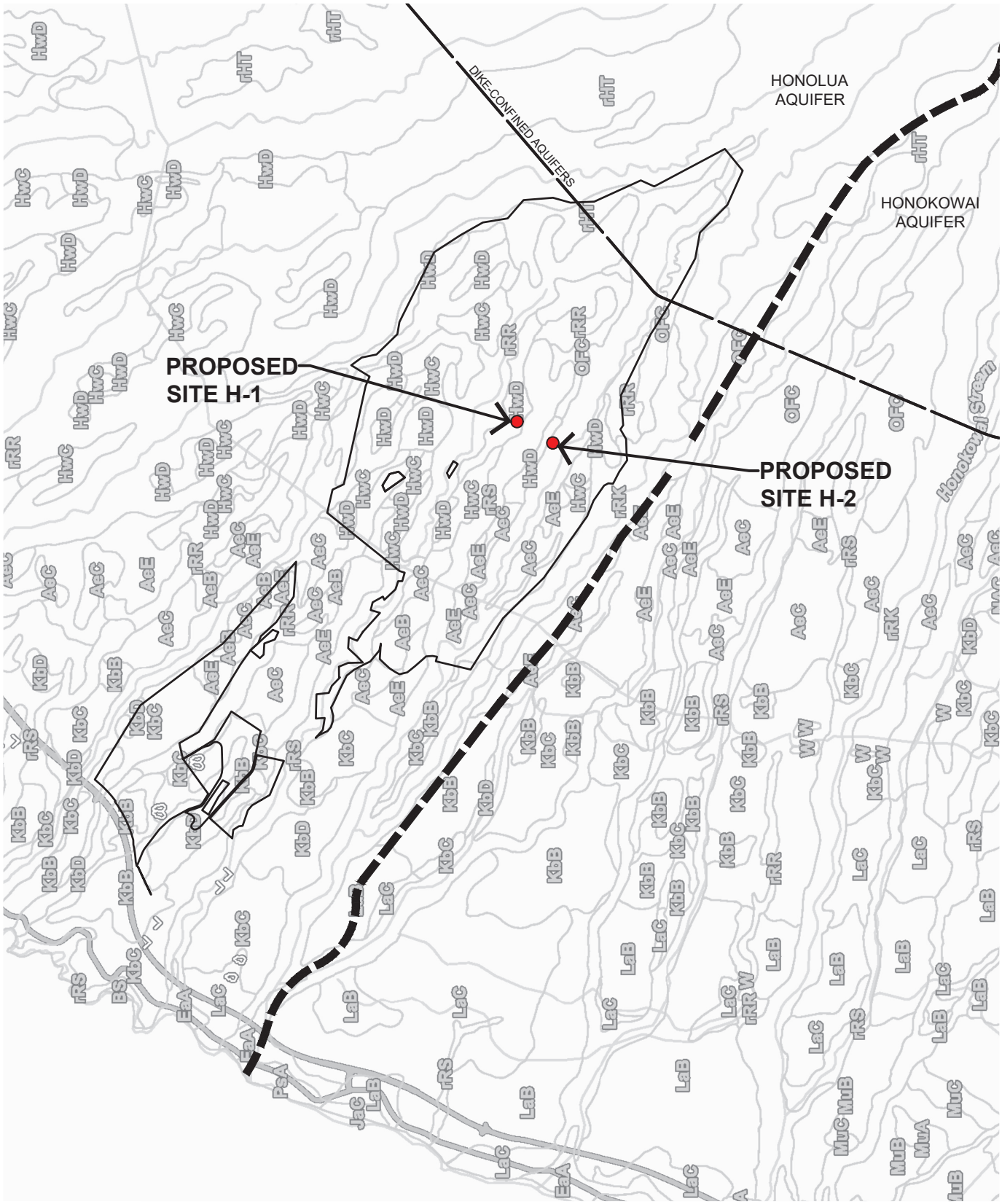
NORTH

SCALE IN FEET

0 1500 3000 6000 9000

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



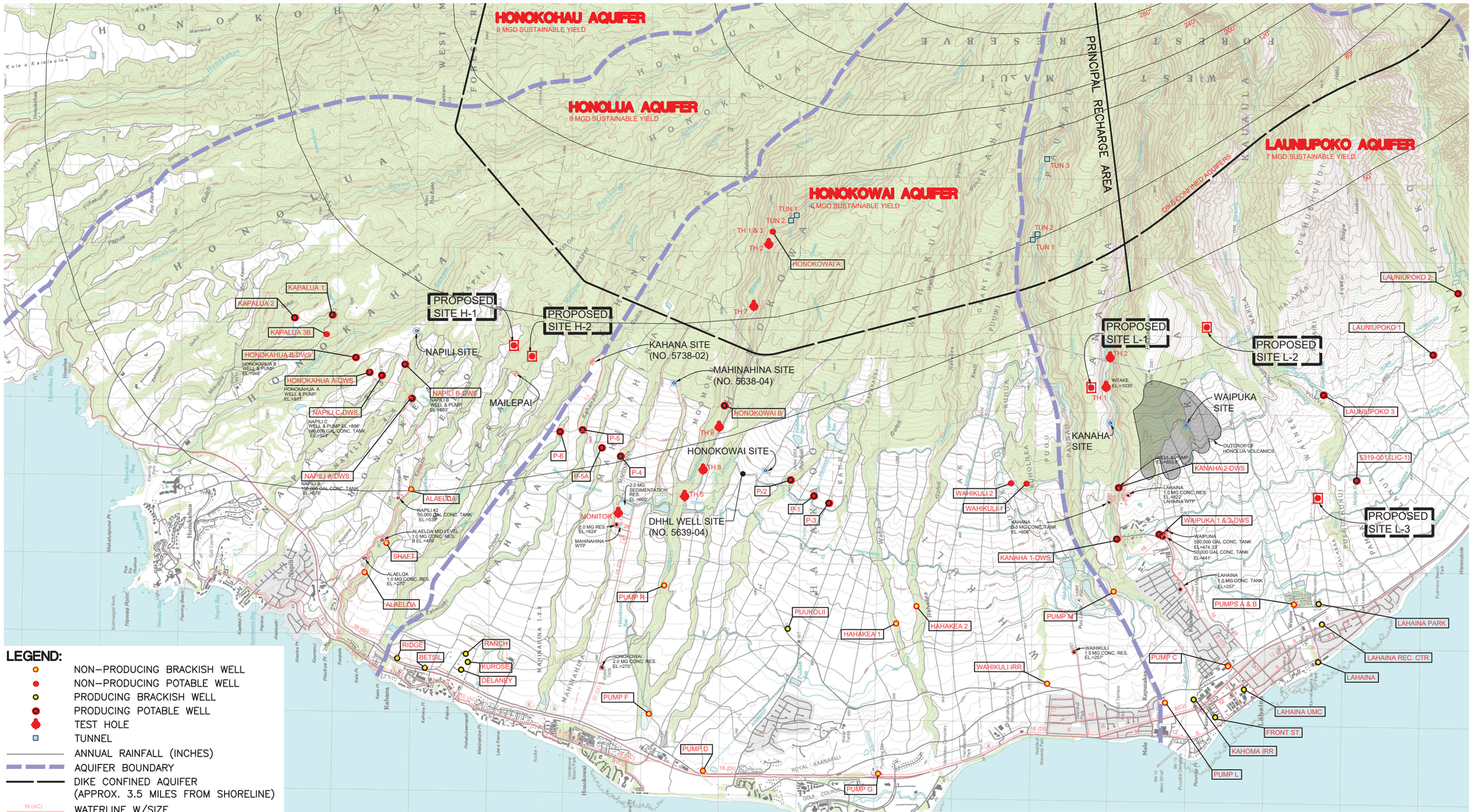
SOIL MAP - HONOLUA AQUIFER

SCALE IN FEET

NORTH 0 1500 3000 6000 9000

Figure 7

SOURCE: SOIL SURVEY



LEGEND:

- NON–PRODUCING BRACKISH WELL
- NON–PRODUCING POTABLE WELL
- PRODUCING BRACKISH WELL
- PRODUCING POTABLE WELL
- TEST HOLE
- TUNNEL
- ANNUAL RAINFALL (INCHES)
- AQUIFER BOUNDARY
- DIKE CONFINED AQUIFER (APPROX. 3.5 MILES FROM SHORELINE)
- 16 (AC) WATERLINE W/SIZE
- SITE RECOMMENDED BY FUKUNAGA AND ASSOCIATES, INC.
- SITE RECOMMENDED BY RONALD M. FUKUMOTO ENGINEERING, INC. AND GLENN BAUER.
- SITE RECOMMENDED BY TOM NANCE WATER RESOURCE ENGINEERING, INC.

NORTH

0 2000 4000 8000 12000

WELL FIELD MAP

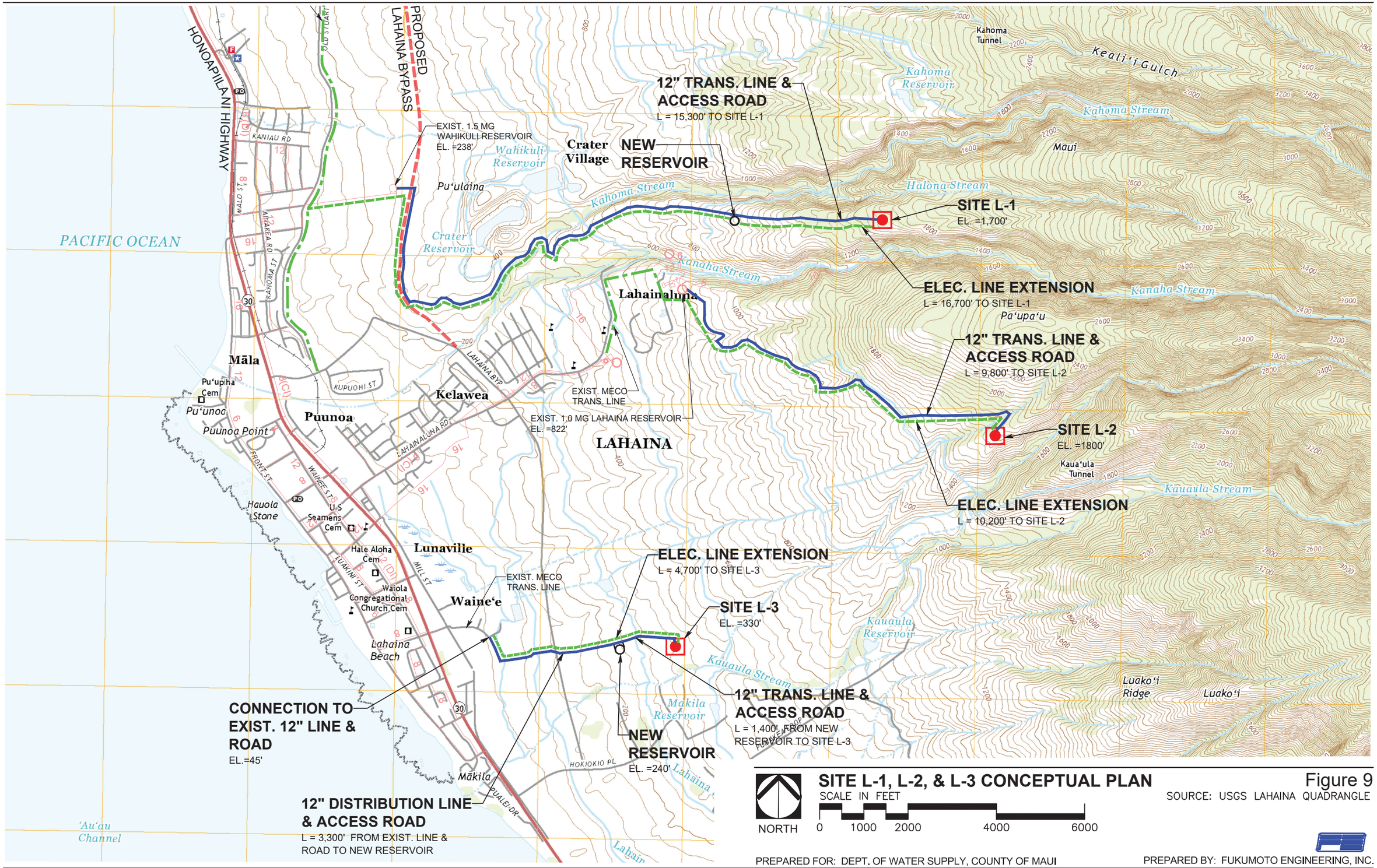
SCALE IN FEET

Figure 8

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



SITE L-1, L-2, & L-3 CONCEPTUAL PLAN

NORTH

SCALE IN FEET

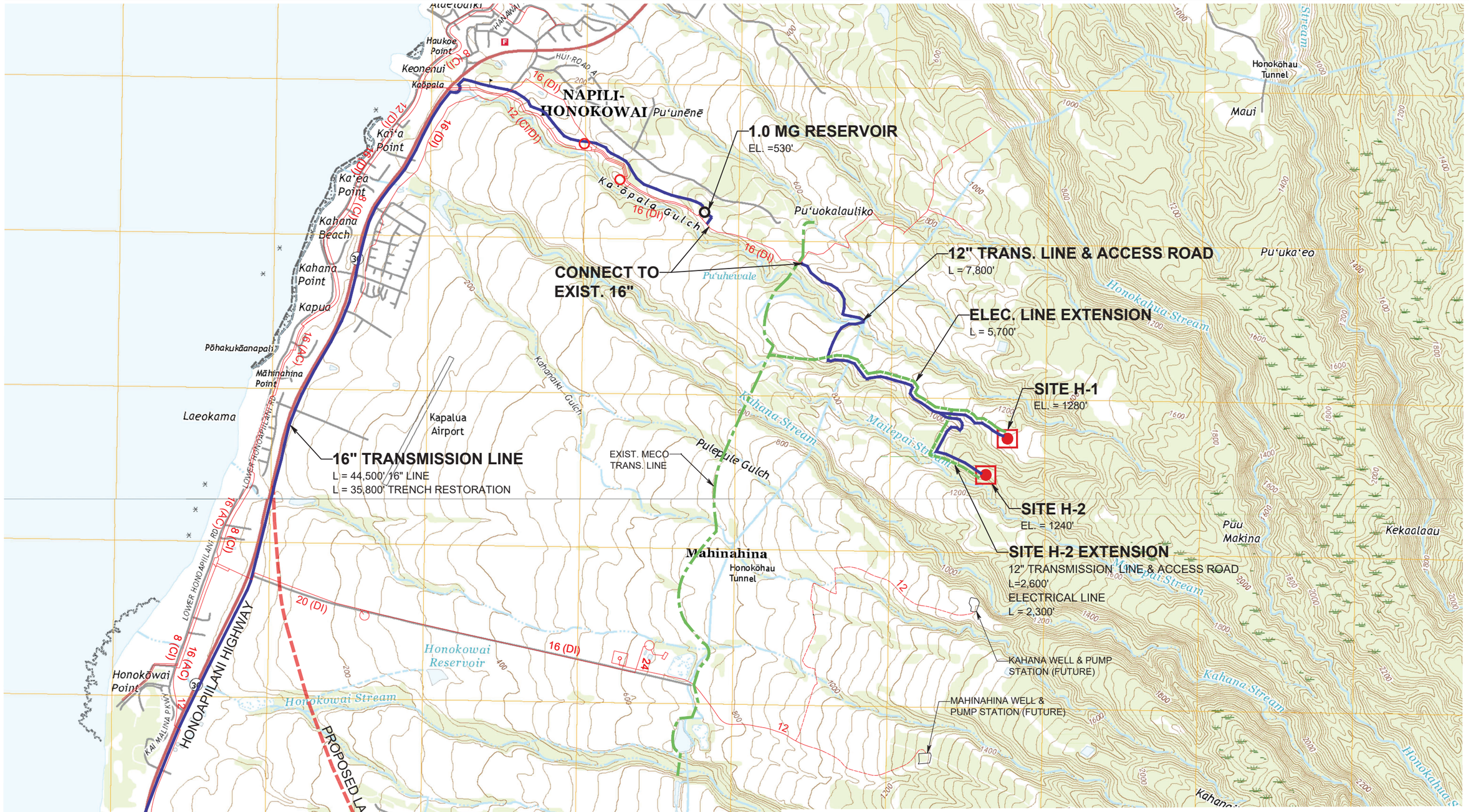
0 1000 2000 4000 6000

Figure 9

SOURCE: USGS LAHAINA QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

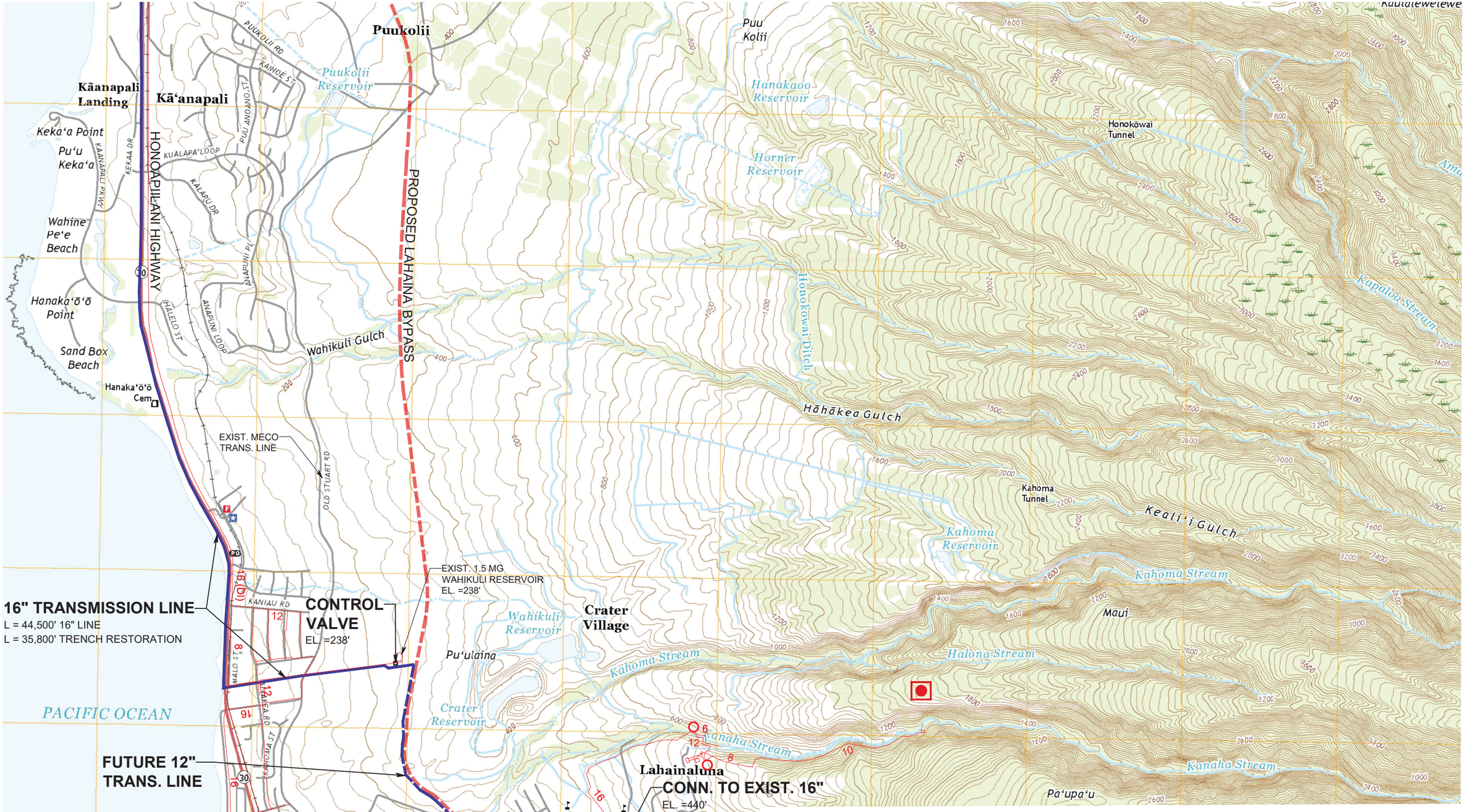


SITE H-1 & H-2 CONCEPTUAL PLAN NORTH - OPTION 1 Figure 10

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



SITE H-1 & H-2 CONCEPTUAL PLAN SOUTH - OPTION 1 Figure 11

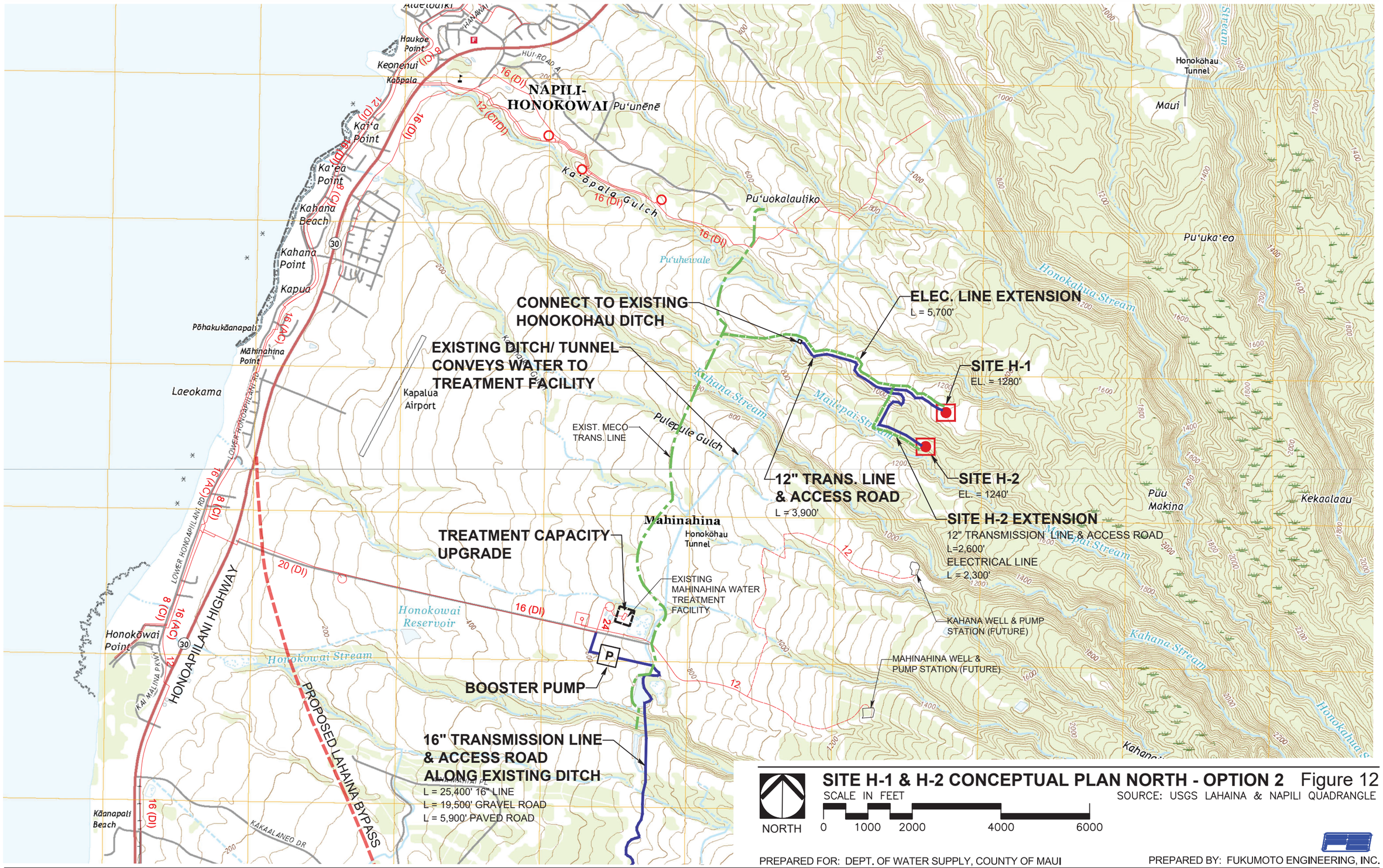
SCALE IN FEET

NORTH 0 1000 2000 4000 6000

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



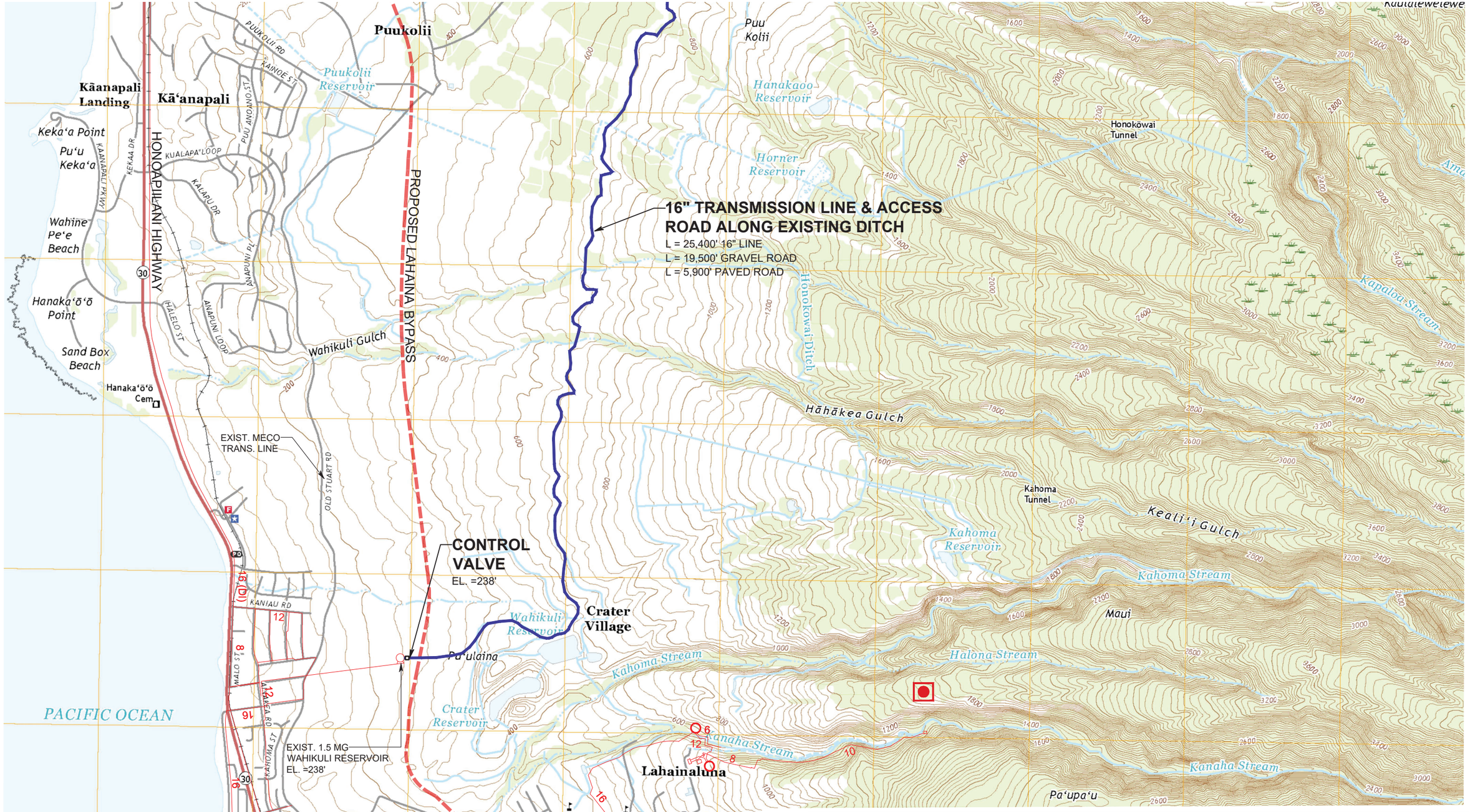
SITE H-1 & H-2 CONCEPTUAL PLAN NORTH - OPTION 2 Figure 12

SCALE IN FEET

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



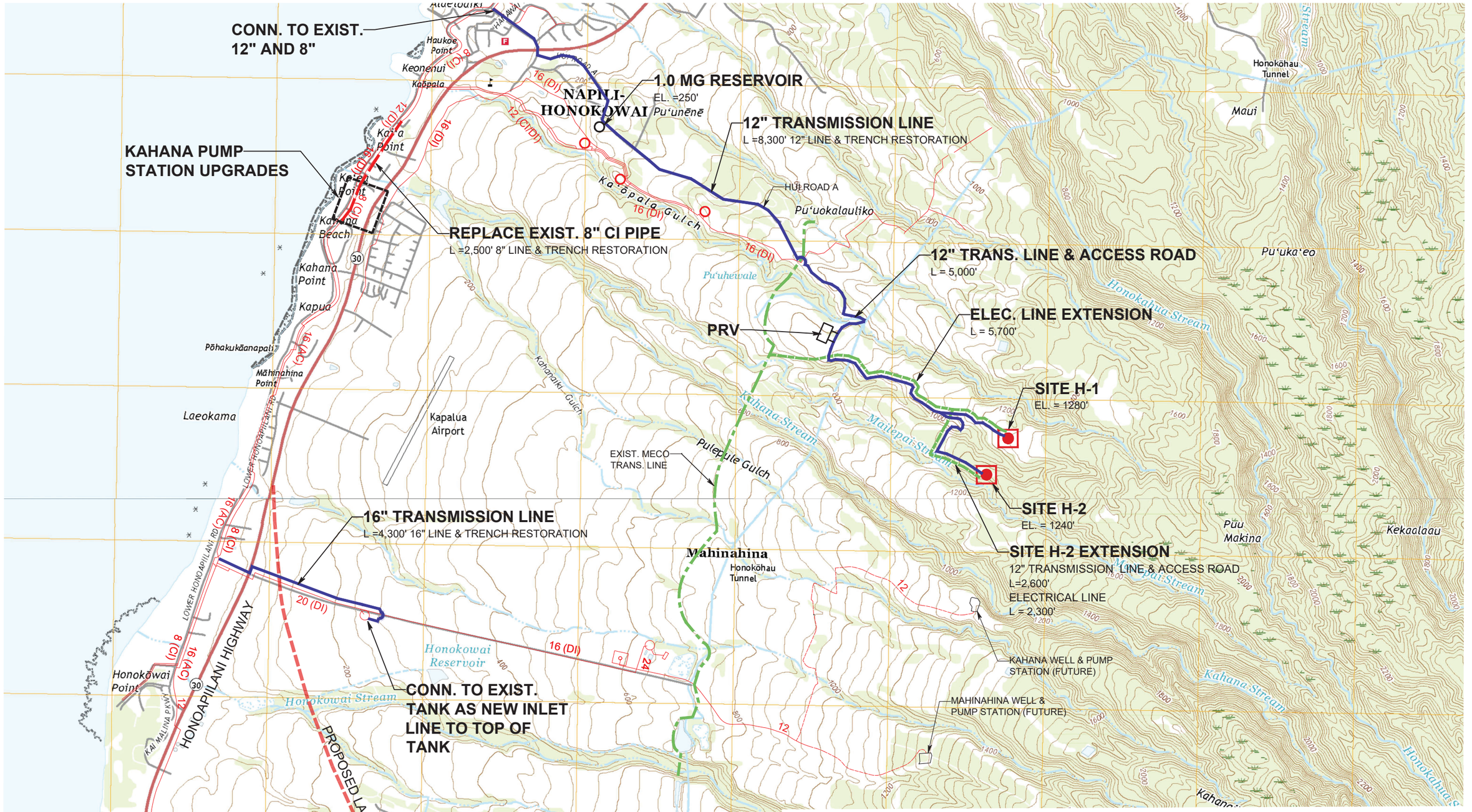
SITE H-1 & H-2 CONCEPTUAL PLAN SOUTH - OPTION 2 Figure 13

SCALE IN FEET

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



SITE H-1 & H-2 CONCEPTUAL PLAN NORTH - OPTION 3 Figure 14

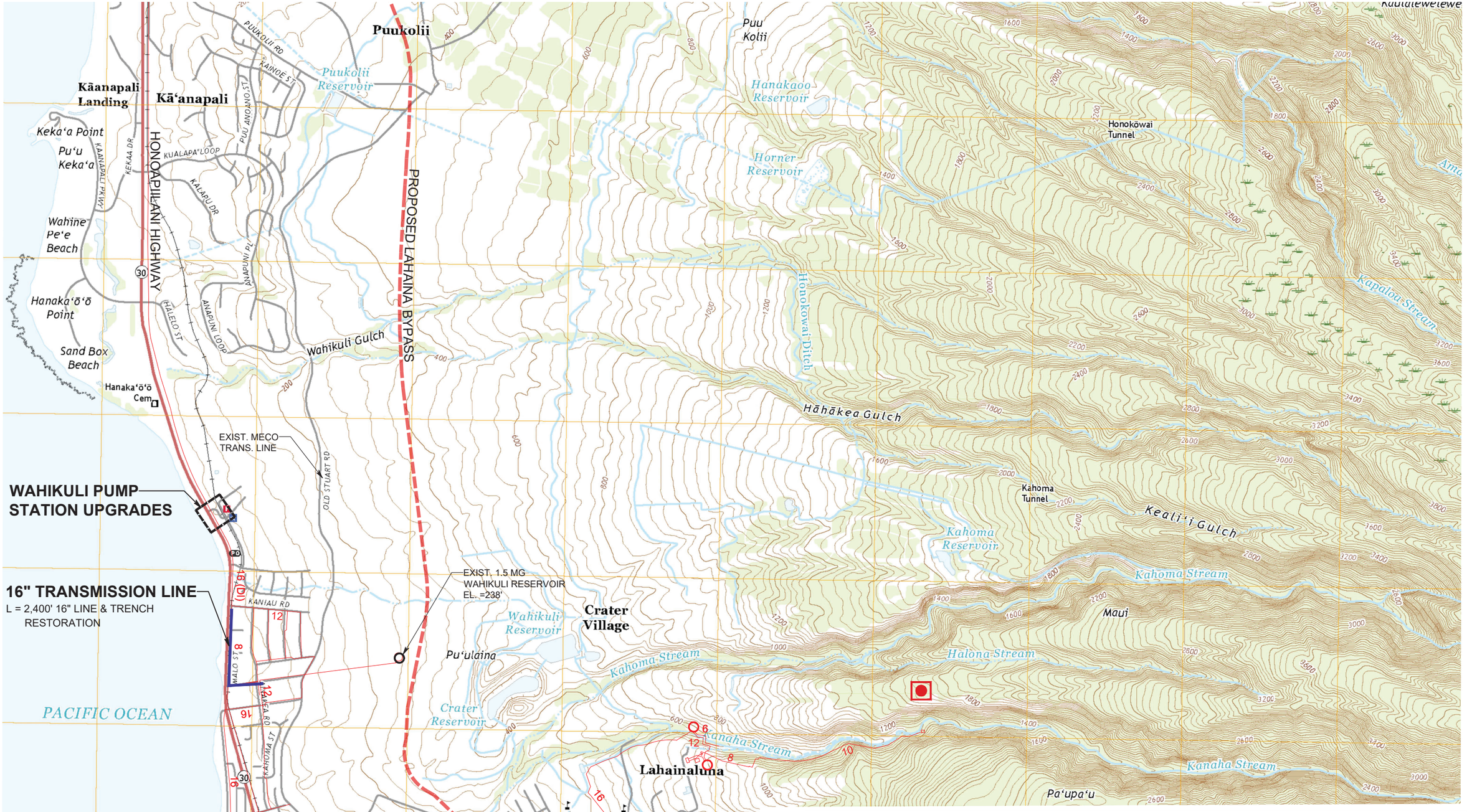
SCALE IN FEET

NORTH 0 1000 2000 4000 6000

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



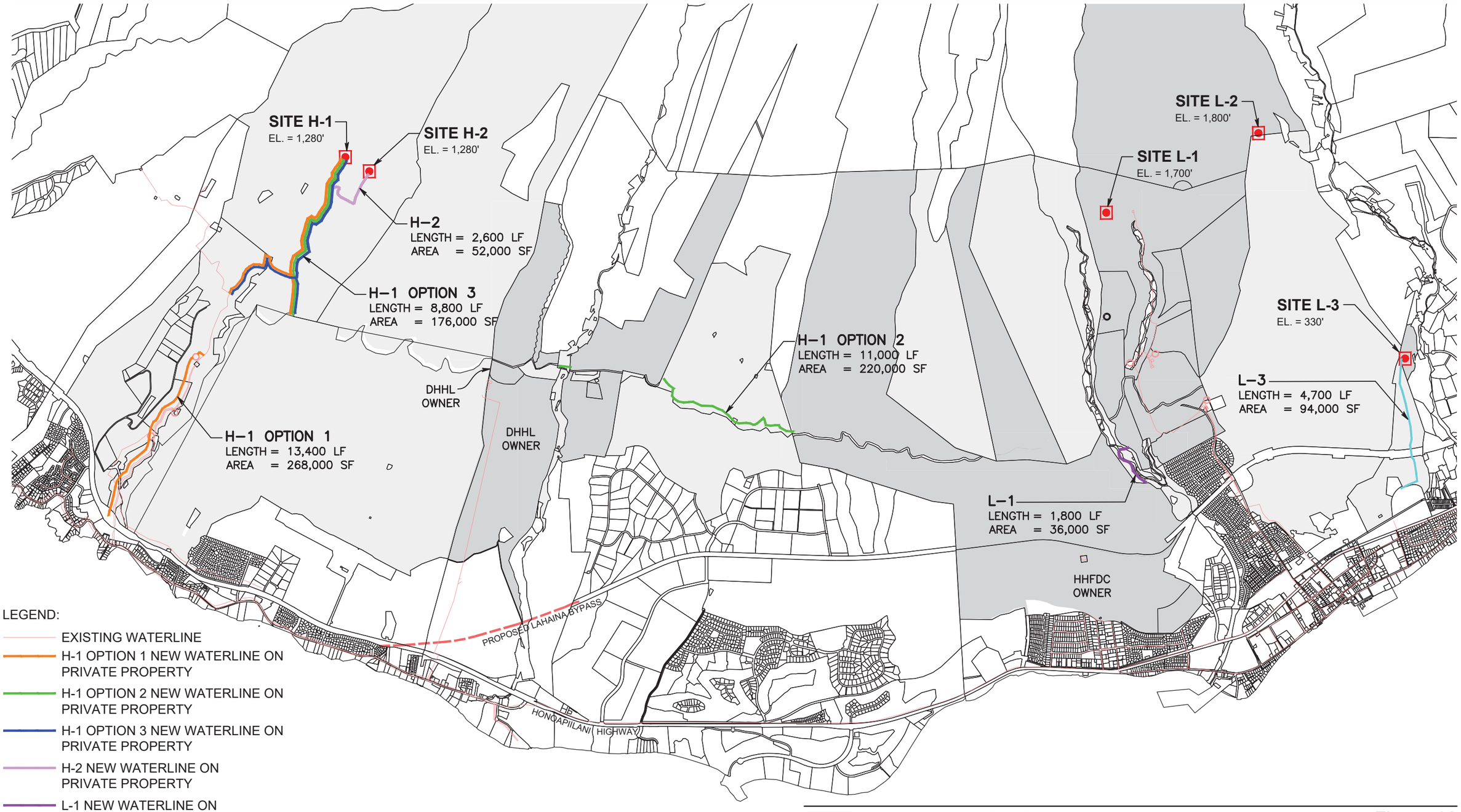
SITE H-1 & H-2 CONCEPTUAL PLAN SOUTH - OPTION 3 Figure 15

SCALE IN FEET

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.



LAND ACQUISITION PLAN

Figure 16

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

FIGURE 17 **(2025-01-16 REV)**

CONCEPTUAL OPINION OF PROBABLE PROJECT COSTS

Project: Preliminary Design Report for Launiupoko Aquifer Well Development

Prepared for: Department of Water Supply

Prepared by: Fukumoto Engineering, Inc.

				Site L-1		Site L-2		Site L-3		Site H-1 / Option 1		Site H-2 / Option 1	
Item	Description	Unit	Unit Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
A	EXPLORATORY WELL												
1	Site preparation	acre	$ 320,000	1.6	$ 512,000	1.6	$ 512,000	1.0	$ 320,000	1.0	$ 320,000	1.0	$ 320,000
2	Drilling, casing, and testing two 20" diameter wells	lin. ft.	2,600	3,400	8,840,000	3,600	9,360,000	-	-	2,680	6,968,000	2,600	6,760,000
3	Drilling, casing, and testing two 14" diameter wells	lin. ft.	2,400	-	-	-	-	740	1,776,000	-	-	-	-
4	Temporary access road	lin. ft.	100	-	-	2,000	200,000	2,000	200,000	7,800	780,000	2,600	260,000
5	Temporary access road in mountainous terrain	lin. ft.	280	10,500	2,940,000	6,000	1,680,000	-	-	-	-	-	-
	Total Exploratory Well				12,292,000		11,752,000		2,296,000		8,068,000		7,340,000
B	WELL DEVELOPMENT												
1	Site preparation	acre	150,000	1.6	240,000	1.6	240,000	1.0	150,000	1.0	150,000	1.0	150,000
2	Site piping	each	100,000	1	100,000	1	100,000	1	100,000	1	100,000	1	100,000
3	Site drainage	each	140,000	1	140,000	1	140,000	1	140,000	1	140,000	1	140,000
4	Pump and motor - two each	lin. ft.	1,200	3,400	4,080,000	3,600	4,320,000	740	888,000	2,680	3,216,000	2,600	3,120,000
5	Pump discharge piping - two each	each	90,000	2	180,000	2	180,000	2	180,000	2	180,000	2	180,000
6	35,000-gallon control tank	each	240,000	1	240,000	1	240,000	1	240,000	1	240,000	1	240,000
7	Chain link fence	lin. ft.	100	1,000	100,000	1,000	100,000	800	80,000	800	80,000	800	80,000
8	Control building (20'x65')	sq. ft.	800	1,300	1,040,000	1,300	1,040,000	1,300	1,040,000	1,300	1,040,000	1,300	1,040,000
9	Chlorination equipment	each	50,000	1	50,000	1	50,000	1	50,000	1	50,000	1	50,000
10	Water level monitoring equipment	each	30,000	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000
11	Safety equipment	each	12,000	1	12,000	1	12,000	1	12,000	1	12,000	1	12,000
12	Electrical system including emergency generator	each	1,200,000	1	1,200,000	1	1,200,000	1	1,200,000	1	1,200,000	1	1,200,000
13	Site paving	sq. ft.	30	14,000	420,000	14,000	420,000	14,000	420,000	14,000	420,000	14,000	420,000
14	Grassing	sq. ft.	1.00	56,000	56,000	56,000	56,000	30,000	30,000	30,000	30,000	30,000	30,000
15	Testing and chlorination	each	14,000	1	14,000	1	14,000	1	14,000	1	14,000	1	14,000
16	Off-site reservoir	gal.	8.00	1,000,000	8,000,000	-	-	1,000,000	8,000,000	1,000,000	8,000,000	-	-
17	Off-site paved access road	lin. ft.	550	15,300	8,415,000	9,800	5,390,000	4,700	2,585,000	7,800	4,290,000	2,600	1,430,000
18	Off-site gravel access road	lin. ft.	300	-	-	-	-	-	-	-	-	-	-
19	Treat. plant upgrade and booster pump (Option 2)	each	2,800,000	-	-	-	-	-	-	-	-	-	-
20	Kahana booster pump upgrade (Option 3)	each	2,800,000	-	-	-	-	-	-	-	-	-	-
21	Wahikuli booster pump upgrade (Option 3)	each	2,800,000	-	-	-	-	-	-	-	-	-	-
22	Off-site 16" waterline	lin. ft.	600	-	-	-	-	-	-	44,500	26,700,000	-	-
23	Off-site 12" waterline	lin. ft.	270	15,300	4,131,000	9,800	2,646,000	4,700	1,269,000	7,800	2,106,000	2,600	702,000
24	Off-site 8" waterline	lin. ft.	230	-	-	-	-	-	-	-	-	-	-
25	Off-site trench surface restoration	lin. ft.	50	-	-	-	-	-	-	35,800	1,790,000	-	-
26	Off-site 3-phase electrical line extension	lin. ft.	100	16,700	1,670,000	10,200	1,020,000	4,700	470,000	8,000	800,000	-	-
	Total Well Development				30,118,000		17,198,000		16,898,000		50,588,000		8,938,000
	CONSTRUCTION				42,410,000		28,950,000		19,194,000		58,656,000		16,278,000
	ENGINEERING & PERMITTING (6%±)	l.s.			2,545,000		1,737,000		1,152,000		3,519,000		977,000
	LAND ACQUISITION	sq. ft.	8	36,000	288,000	-	-	94,000	752,000	268,000	2,144,000	52,000	416,000
	TOTAL PROJECT COSTS				**$ 45,243,000**		**$ 30,687,000**		**$ 21,098,000**		**$ 64,319,000**		**$ 17,671,000**

FIGURE 17 **(2025-01-16**

CONCEPTUAL OPINION OF PROBABLE PROJECT COSTS

Project: Preliminary Design Report for Launiupoko Aquifer Well Development

Prepared for: Department of Water Supply

Prepared by: Fukumoto Engineering, Inc.

Item	Description	Unit	Unit Price	Site H-1 / Option 2 Quantity	Site H-1 / Option 2 Price	Site H-2 / Option 2 Quantity	Site H-2 / Option 2 Price	Site H-1 / Option 3 Quantity	Site H-1 / Option 3 Price	Site H-2 / Option 3 Quantity	Site H-2 / Option 3 Price
A	EXPLORATORY WELL										
1	Site preparation	acre	$ 320,000	1.0	$ 320,000	1.0	$ 320,000	1.0	$ 320,000	1.0	$ 320,000
2	Drilling, casing, and testing two 20" diameter wells	lin. ft.	2,600	2,680	6,968,000	2,600	6,760,000	2,680	6,968,000	2,600	6,760,000
3	Drilling, casing, and testing two 14" diameter wells	lin. ft.	2,400	-	-	-	-	-	-	-	-
4	Temporary access road	lin. ft.	100	3,900	390,000	2,600	260,000	5,000	500,000	2,600	260,000
5	Temporary access road in mountainous terrain	lin. ft.	280	-	-	-	-	-	-	-	-
	Total Exploratory Well				7,678,000		7,340,000		7,788,000		7,340,000
B	WELL DEVELOPMENT										
1	Site preparation	acre	150,000	1.0	150,000	1.0	150,000	1.0	150,000	1.0	150,000
2	Site piping	each	100,000	1	100,000	1	100,000	1	100,000	1	100,000
3	Site drainage	each	140,000	1	140,000	1	140,000	1	140,000	1	140,000
4	Pump and motor - two each	lin. ft.	1,200	2,680	3,216,000	2,600	3,120,000	2,680	3,216,000	2,600	3,120,000
5	Pump discharge piping - two each	each	90,000	2	180,000	2	180,000	2	180,000	2	180,000
6	35,000-gallon control tank	each	240,000	1	240,000	1	240,000	1	240,000	1	240,000
7	Chain link fence	lin. ft.	100	800	80,000	800	80,000	800	80,000	800	80,000
8	Control building (20'x65')	sq. ft.	800	1,300	1,040,000	1,300	1,040,000	1,300	1,040,000	1,300	1,040,000
9	Chlorination equipment	each	50,000	1	50,000	1	50,000	1	50,000	1	50,000
10	Water level monitoring equipment	each	30,000	1	30,000	1	30,000	1	30,000	1	30,000
11	Safety equipment	each	12,000	1	12,000	1	12,000	1	12,000	1	12,000
12	Electrical system including emergency generator	each	1,200,000	1	1,200,000	1	1,200,000	1	1,200,000	1	1,200,000
13	Site paving	sq. ft.	30	14,000	420,000	14,000	420,000	14,000	420,000	14,000	420,000
14	Grassing	sq. ft.	1.00	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
15	Testing and chlorination	each	14,000	1	14,000	1	14,000	1	14,000	1	14,000
16	Off-site reservoir	gal.	8.00	-	-	-	-	1,000,000	8,000,000	-	-
17	Off-site paved access road	lin. ft.	550	9,800	5,390,000	2,600	1,430,000	5,000	2,750,000	2,600	1,430,000
18	Off-site gravel access road	lin. ft.	300	19,500	5,850,000	-	-	-	-	-	-
19	Treat. plant upgrade and booster pump (Option 2)	each	2,800,000	1	2,800,000	-	-	-	-	-	-
20	Kahana booster pump upgrade (Option 3)	each	2,800,000	-	-	-	-	1	2,800,000	-	-
21	Wahikuli booster pump upgrade (Option 3)	each	2,800,000	-	-	-	-	1	2,800,000	-	-
22	Off-site 16" waterline	lin. ft.	600	25,400	15,240,000	-	-	6,700	4,020,000	-	-
23	Off-site 12" waterline	lin. ft.	270	3,900	1,053,000	2,600	702,000	13,300	3,591,000	2,600	702,000
24	Off-site 8" waterline	lin. ft.	230	-	-	-	-	2,500	575,000	-	-
25	Off-site trench surface restoration	lin. ft.	50	-	-	-	-	17,500	875,000	-	-
26	Off-site 3-phase electrical line extension	lin. ft.	100	5,700	570,000	2,300	230,000	5,700	570,000	2,300	230,000
	Total Well Development				37,805,000		9,168,000		32,883,000		9,168,000
	CONSTRUCTION				45,483,000		16,508,000		40,671,000		16,508,000
	ENGINEERING & PERMITTING (6%±)	l.s.			2,729,000		990,000		2,440,000		990,000
	LAND ACQUISITION	sq. ft.	8	220,000	1,760,000	52,000	416,000	176,000	1,408,000	52,000	416,000
	TOTAL PROJECT COSTS				**$ 49,972,000**		**$ 17,914,000**		**$ 44,519,000**		**$ 17,914,000**

APPENDIX 1

Tom Nance Water
Resource Engineering

No. of pages: 9
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greg@tnwre.com
todd@tnwre.com

Original will not be mailed to you.

June 9, 2021
20-233.r3 | 20-19

MEMORANDUM

To: Ronald M. Fukumoto – Fukumoto Engineering, Inc.

From: Tom Nance

Subject: Recommended Well Sites in the Launiupoko Aquifer

Introduction

This memo and its attachments provide the basis for selecting two potential sites in the Launiupoko Aquifer for the Maui County Department of Water Supply (MDWS) to develop drinking water wells.

History of Groundwater Use in the Launiupoko Aquifer

Figure 1 depicts the total reported monthly pumpage by wells in the Launiupoko Aquifer from January 1986 through May 2020. Up until its closing in September 1999, Pioneer Mill Co. was the dominant user in the Aquifer with monthly usage often exceeding 15 million gallons per day (MGD). Since then, usage has been far less. Currently active wells in the Aquifer consist of four MDWS wells which have averaged just 0.4 MGD over the last 20 years (Figure 2), three private Launiupoko Water Company (LWC) drinking water wells, and the recently added LIC-1 well for the Launiupoko Irrigation Company (LIC). Usage by the LWC wells has increased substantially since mid-2018 in response to the adoption of Interim Instream Flow Standards by the Commission on Water Resource Management (CWRM) which severely restricted use of Kauaula Stream by LIC (Figure 3).

Regulatory Limit on Pumping from the Launiupoko Aquifer

In the CWRM's first Water Resources Protection Plan adopted in 1990, the sustainable yield of the Launiupoko Aquifer was set at eight (8) MGD based on the assumption that all groundwater occurrence was basal and that recharge to the aquifer is 16 MGD, the latter a calculation based exclusively on rainfall recharge with no consideration of ongoing sugarcane cultivation by Pioneer Mill Co. (George A. L. Yuen and Associates, 1990). For the second Water Resource Protection Plan adopted in 2008, the substantial yield was reduced from eight (8) to seven (7) MGD.

Since then, more sophisticated water budget models have been used by the U. S. Geological Survey to calculate the Aquifer's recharge. In comparison to the original recharge approximation of 16 MGD in 1990, results of three USGS studies were significantly greater: 33 MGD (Engott and Vana,

2007); 25.27 MGD (Gingerich and Engott, 2012); and 41 MGD (Johnson, Engott, and Bassiouni, 2014). With these new recharge results available, the 2019 updated of the Water Resource Protection Plan indicated a potential range of the sustainable yield for the Launiupoko Aquifer from 7 to 18 MGD but retained the seven (7) MGD amount (Townscape, 2019). Despite this limitation, well pumpage in the post-plantation period has been far less than the Aquifer's adopted sustainable yield (Figure 4). Even with the prospect of greater groundwater use for irrigation based on the CWRM's restriction on surface water use, there will still be a substantial unused amount that could accommodate new MDWS wells.

Recommended New Well Sites

Locations of existing wells of interest in the Launiupoko Aquifer and two recommended well sites for MDWS to pursue are shown on Figure 5. Private land ownership and planned new well sites for the private LWC and LIC water systems eliminates the southern half of the Aquifer from consideration for MDWS Well Sites. Potential sites need to be north of Kauaula Stream and preferably on government land. In light of the recent USGS recharge amounts of between 21 and 41 MGD, the salinity limited production of the four MDWS wells in the northern part of the Aquifer is cause for concern in selecting a location for new well development. In my opinion, the obstructions to groundwater flow created by subsurface "plumbing" of the latter stage and far less permeable Honolua volcanics as originally mapped in Stearns and MacDonald (1942) and reproduced on Figure 5 is the cause. The two sites recommended herein were selected to avoid this issue.

Site No. 1 is at approximately 1700-foot elevation on the north side of Kanaha Stream. It is in TMK 4-6-018:021, a large parcel owned by the by the state. Two small diameter test holes drilled in 1970 (Nos. 5338-001 and -002 on Figure 5) both encountered high-level groundwater standing 430- and 820-feet above sea level, respectively. Also, dikes have been mapped in the Kanaha Stream gulch on the south side of the recommended well site and in the Kahoma Stream gulch or the north side. Tapping into high-level groundwater at this site is an expectable result.

Site No. 2 is at 1800-foot elevation on TMK 4-6-025:002, another State-owned parcel. It is in the Forest Reserve which would require a CDUA to access and develop. High-level groundwater may also be encountered at this site although this potential is less obvious than at Site No. 1.

Potential Impact on Streamflow of Pumping High-Level Groundwater at the Recommended Well Sites

Recommended Well Site No. 1 is on a ridge between Kanaha Stream to the immediate south and Kahoma Stream to the north. As a well at Site 1 is expected to tap into high-level groundwater, its potential impact or stream flow must be assessed. Fortunately, seepage runs done by the U.S. Geological Survey (USGS) and the findings in test holes 5338-001 and -002 provide conclusive evidence that pumping high-level groundwater from Site 1 will not impact stream flow. With regard to a potential impact on Kanaha Stream, the evidence is as follows:

- Results of test boreholes establish that the higher water level in Well 5338-002 (820 feet) is hundreds of feet lower than the adjacent stream invert, making it impossible for the groundwater to flow into the stream;

- Results of the substantially lower water level in Well 5338-001 (430 feet) shows a dramatic drop in high-level groundwater going makai;
- Seepage runs by the USGS in January 2013 (Table 16 and Figure 11 in Chang 2014) show Kanaha Stream to be a losing reach from above the Ditch Intake (directly across from the proposed well site) down to the confluence with Kahoma Stream. In other words, as the stream is not fed by high-level groundwater, pumpage by the proposed well will not impact stream flow.

With regard to the potential impact on Kahoma Stream, the seepage runs by the USGS in January 2010 and August 2012 as reported in Table 16 in Chang (2014) show the stream to be a losing reach from inland of the proposed well site to the measurements at far lower elevations downstream. Since high-level groundwater is not feeding into and maintaining stream flow, it is reasonable to conclude that pumping from the proposed well site will also not impact Kahoma Stream.

Recommended Well Site No. 2 is about 1500 feet to the north of Kauaula Stream and there are no nearby wells or development tunnels to establish the probable groundwater occurrence at the well site. However, Cheng (2014: page 46, Figure 12, and Table 16) establishes that Kauaula Stream, in the reach that would potentially be impacted by pumping high-level groundwater at Well Site No. 2, is a losing reach and therefore would not be impacted by such pumping.

Attachments: References and Figures 1-5

Email Copy: Jeff Pearson, Tom Ochwat and Wendy Taomoto – Department of Water Supply, County of Maui
Greg Fukumitsu and Todd Yonamine – TNWRE Inc.

References

Cheng, Chui Ling. 2014. Low Flow Characteristics of Streams in the Lahaina District, West Maui, Hawaii. Scientific Investigations Report 2014-5087, U. S. Geological Survey.

Engott, J. A. and T. T. Vana. 2007. Effects of Agricultural Land-Use Changes and Rainfall on Ground-Water Recharge in Central and West Maui, Hawaii, 1926-2004. Scientific Investigations Report 2007-5103, U. S. Geological Survey.

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Wilson Okamoto Corporation. 2008. Water Resource Protection Plan. Consultant Report Prepared for the Commission on Water Resource Management, DLNR, State of Hawaii.

Figure 1
Total Reported Pumpage by Wells in the Launiupoko Aquifer
from January 1986 through May 2020

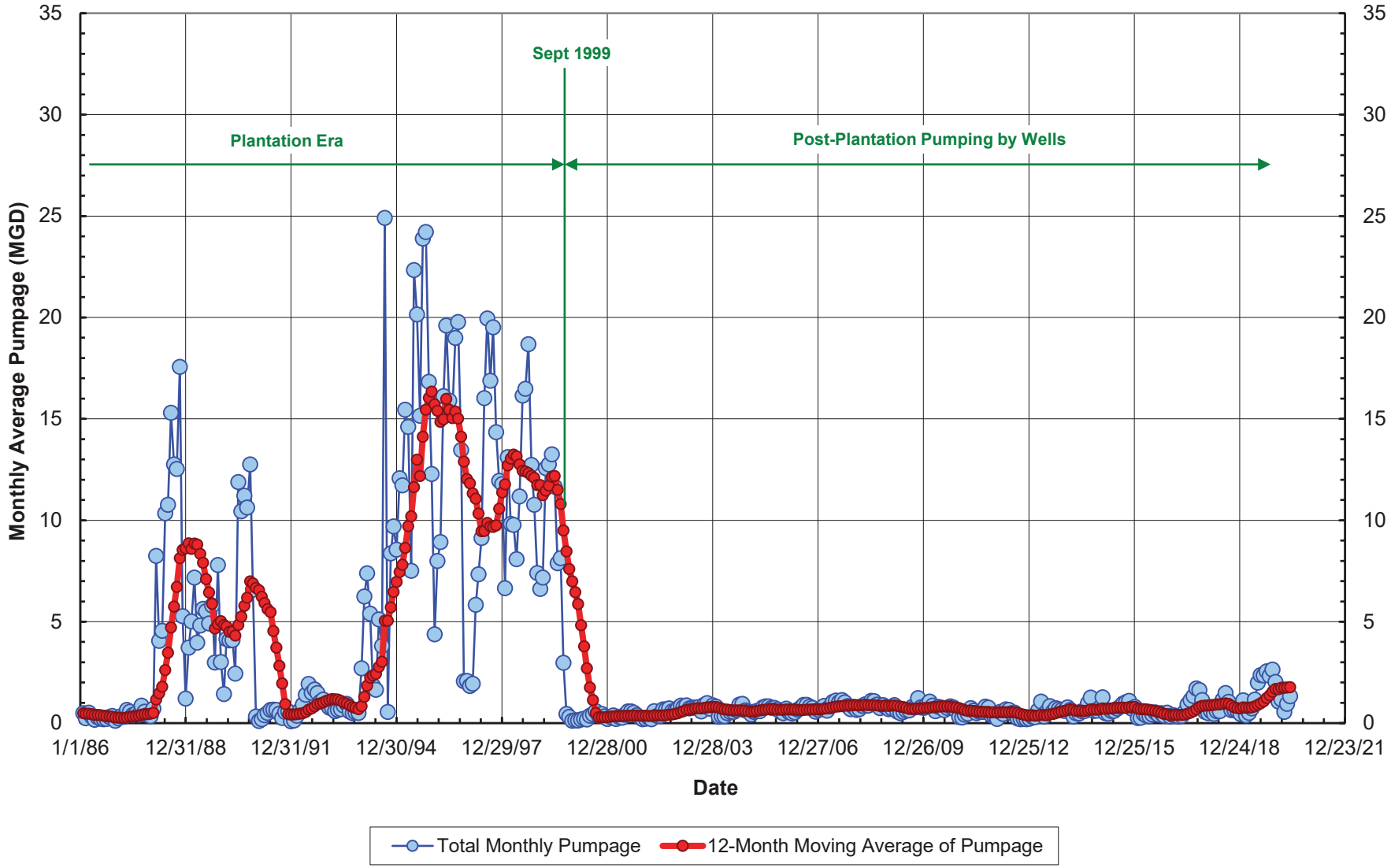


Figure 2
Pumpage by Maui DWS' Four Wells in the Launiupoko Aquifer System
from February 1986 through May 2020

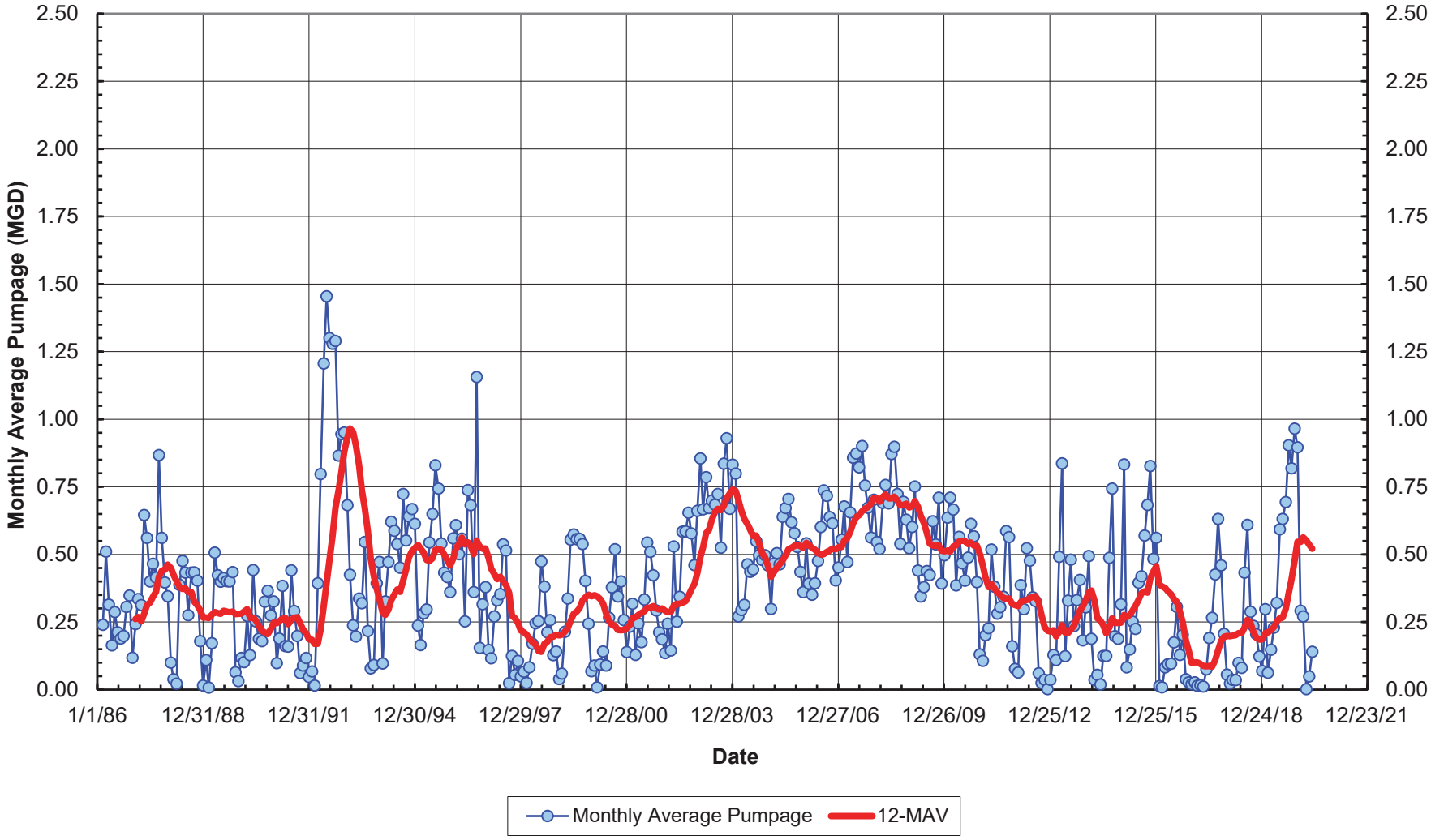


Figure 3
Total Pumpage by the Launiupoko Water Company and Launiupoko Irrigation Company Wells from their Start of Use in August 2004 through May 2020

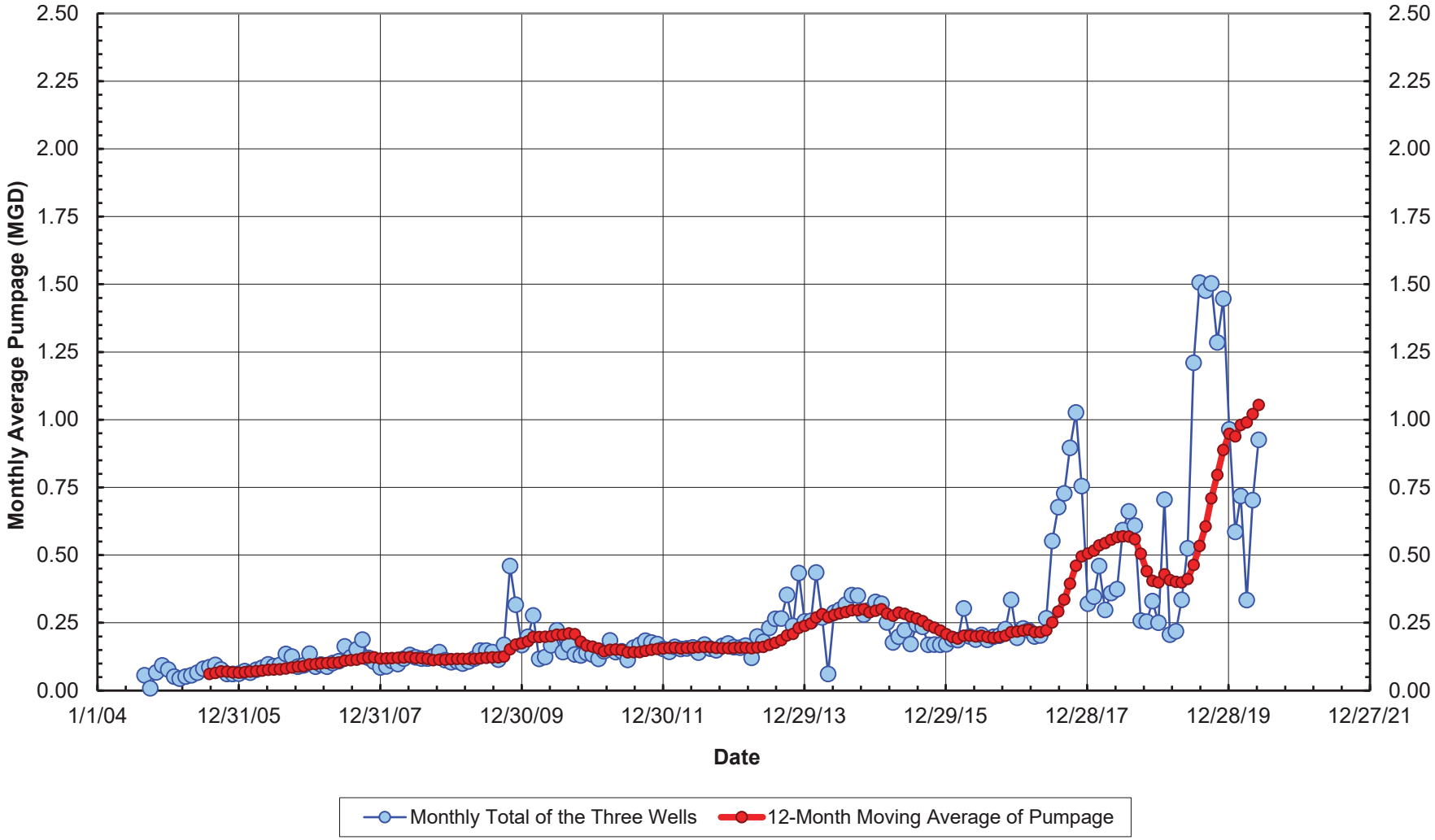
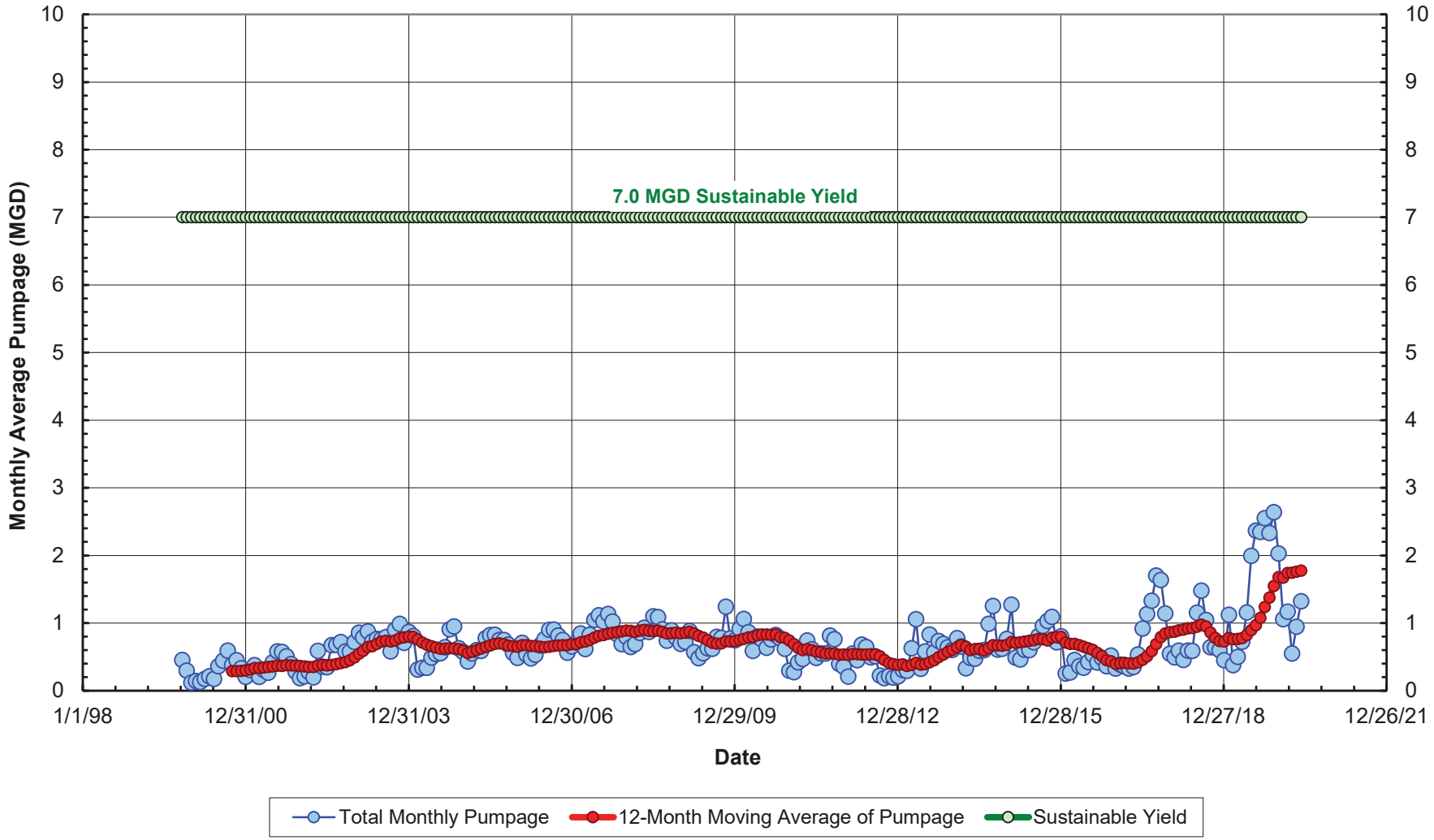


Figure 4
Total Pumpage by Active Wells in the Launiupoko Aquifer
in the Post-Planatation Period from October 1999 to May 2020



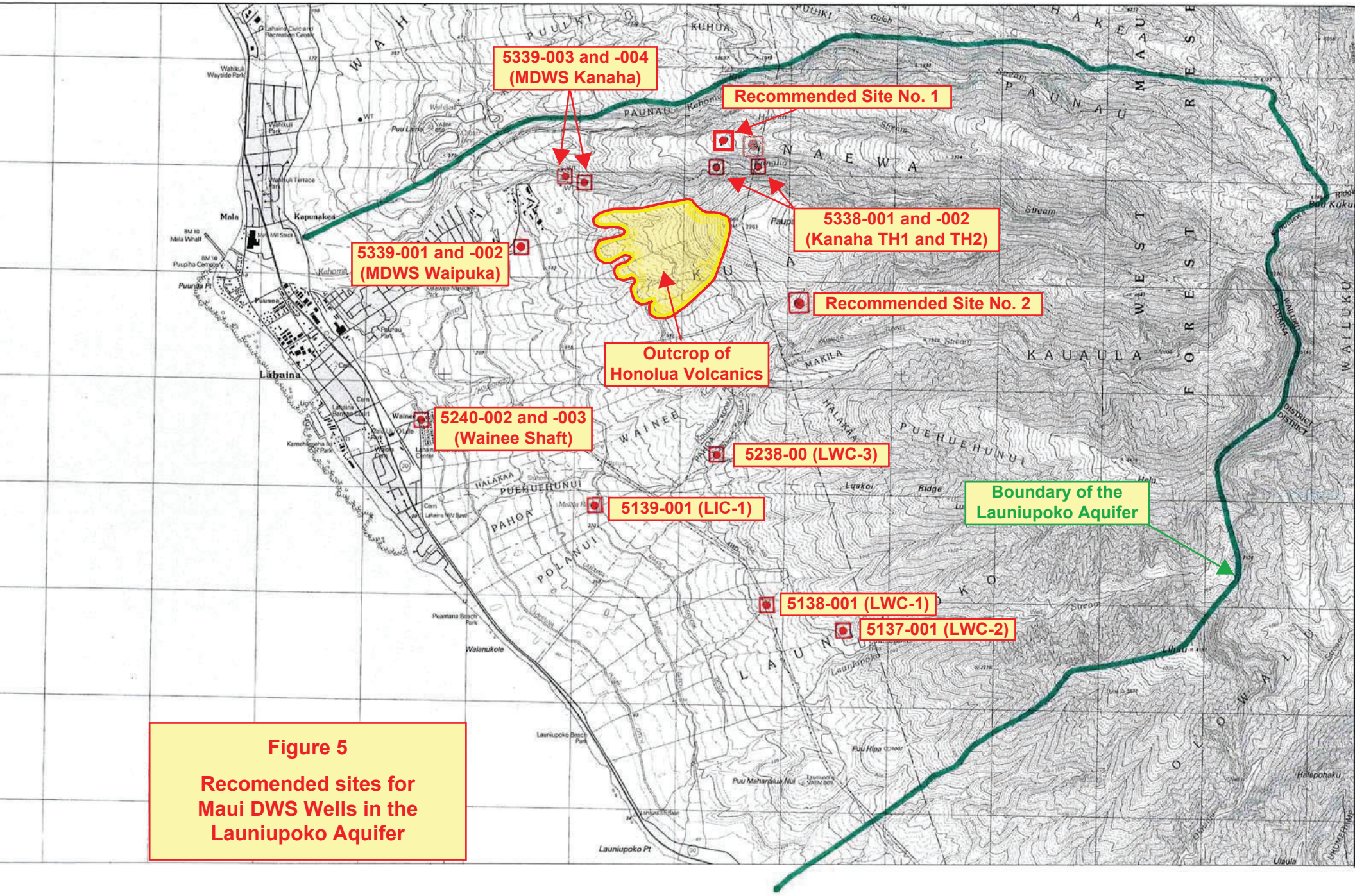


Figure 5

Recomended sites for Maui DWS Wells in the Launiupoko Aquifer

APPENDIX 2

Tom Nance Water
Resource Engineering

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Original will not be mailed to you.

July 21, 2020
20-243 | 20-19

MEMORANDUM

To: Ronald M. Fukumoto – Fukumoto Engineering, Inc.

From: Tom Nance

Subject: Recommended Well Sites in the Honolua Aquifer System in West Maui

Introduction

This memo and its attachments present the basis for selecting two potential sites for the development of drinking water wells for the Maui Department of Water Supply (MDWS) in the Honolua Aquifer System.

Historic Groundwater Use in the Honolua Aquifer System

Locations of wells in the Honolua Aquifer System which are relevant to the selection of new sites are shown on Figure 1. Unlike the Honokowai and Launiupoko aquifer systems to the south across within which sugarcane cultivation used substantial amounts of groundwater for irrigation, fields within the Honolua Aquifer System were for pineapple cultivation with only modest amounts of irrigation provided by the Honokohau Ditch system. As such, groundwater use in the Aquifer did not begin until the development of drilled wells in the 1970s for MDWS.

To date, 18 wells have been drilled in the Aquifer System, only 10 of which are currently being pumped. Five of the active wells are owned and operated by MDWS. Their individual use over the last five- and 10-year periods are summarized on Table 1 and depicted graphically as a combined total on Figure 2. The private Kapalua Water Company has three wells, only two of which have ever been put into use. Their average use are also included in Table 1 and their combined use is presented on Figure 3. Only three other wells are apparently active, but their use amounts are not consistently reported and when reported, are at inconsequential amounts.

As a result, the total well pumpage presented on Figure 4 is essentially all MDWS up until October 2002 and then a combination of MDWS and the Kapalua Water Company since then. The combined total of groundwater pumpage averaged 2.31 million gallons per day (MGD) over the last five years and 2.43 MGD over the last 10 years.

Regulatory Limit on Groundwater Use from the Honolua Aquifer System

In the Commission on Water Resource Management's first Water Resources Protection Plan adopted in 1990, the sustainable yield of the Honolua Aquifer was set at eight (8) MGD based on the assumption that all groundwater occurrence was basal and that the recharge to the aquifer was 19 MGD, the latter a calculation based exclusively on rainfall recharge for "natural" land use conditions (George A. L. Yuen and Associates, 1990). For the second Water Resource Protection Plan adopted in 2008, the sustainable yield remained at eight (8) MGD.

Since then, more sophisticated water budget models have been used by the U. S. Geological Survey to calculate the Aquifer's recharge. In comparison to the original recharge approximation of 19 MGD in 1990, results of three USGS studies were somewhat greater: 24.08 MGD (Engott and Vana, 2007); 27.05 MGD (Gingerich and Engott, 2012 for LUC3 land use); and 26.85 MGD (Johnson, Engott, and Bassiouni, 2014). With these new recharge results available, the 2019 update of the Water Resource Protection Plan indicated a potential range of the sustainable yield for the Honolua Aquifer from 8 to 11 MGD but retained the eight (8) MGD amount (Townscape, 2019). In comparison, well pumpage in the Aquifer has been far less than its adopted sustainable yield (Figure 5). In other words, there is a substantial unused amount that could accommodate new MDWS wells.

Recommended Sites for New Wells

The primary criteria for selecting new well sites are: (1) to provide water of potable quality; (2) to provide sufficient lateral spacing from existing wells to avoid interference effects; and (3) to be generally upgradient of former pineapple fields to avoid residual organic contaminants. The two recommended sites which meet these criteria are shown on Figure 6. They are a sufficient distance from wells to the south, including four Hawaii Water Service wells (Nos. 5739-001, -002, -004, and 5738-001) and two as yet unused MDWS Wells (Nos. 5738-002 and 5638-004). They are also a sufficient distance from MDWS' closest Napili Wells (Nos. 5831-001 and -002) to the north.

Recommended Sites 1 and 2 are at respective elevations of 1280 and 1240 feet and are approximately 1000 feet apart. Drilling will start out in the latter stage, massive, and poorly permeable Honolua volcanics but will be into the thin bedded and far more permeable Wailuku series volcanics when groundwater is encountered, most likely as basal groundwater standing about eight (8) feet above sea level.

Attachments: References, Figures 1-6, and Table 1

Email Copy: Greg Fukumitsu and Todd Yonamine – TNWRE Inc.

References

Engott, J. A. and T. T. Vana. 2007. Effects of Agricultural Land-Use Changes and Rainfall on Ground-Water Recharge in Central and West Maui, Hawaii, 1926-2004. Scientific Investigations Report 2007-5103, U. S. Geological Survey.

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Table 1.

Pumpage Amounts for Maui Department of Water Supply and
Kapalua Water Company Over the Last Five and 10 Years

Owner Operator	Well Name	State Well Number	Average Pumpage in MGD	
			Last Five Years	Last 10 Years
Maui Department of Water Supply (MDWS)	Napili A	5838-001	0.201	0.398
	Napili B	5838-002	0.336	0.406
	Napili C	5838-004	0.898	0.727
	Honokahua A	5838-003	0.000	0.000
	Honokahua B	5938-001	0.302	0.332
	Total for MDWS		**1.717**	**1.854**
Kapalua Water Company	Kapalua 1	5938-0032	0.295	0.270
	Kapalua 2	5938-003	0.298	0.288
	Kapalua 3B	5938-004	0.000	0.000
	Total for Kapalua Water Company		**0.592**	**0.557**
Honolua Aquifer System Total			**2.312**	**2.429**

Note: Data provided electronically by the Commission on Water Resource Management

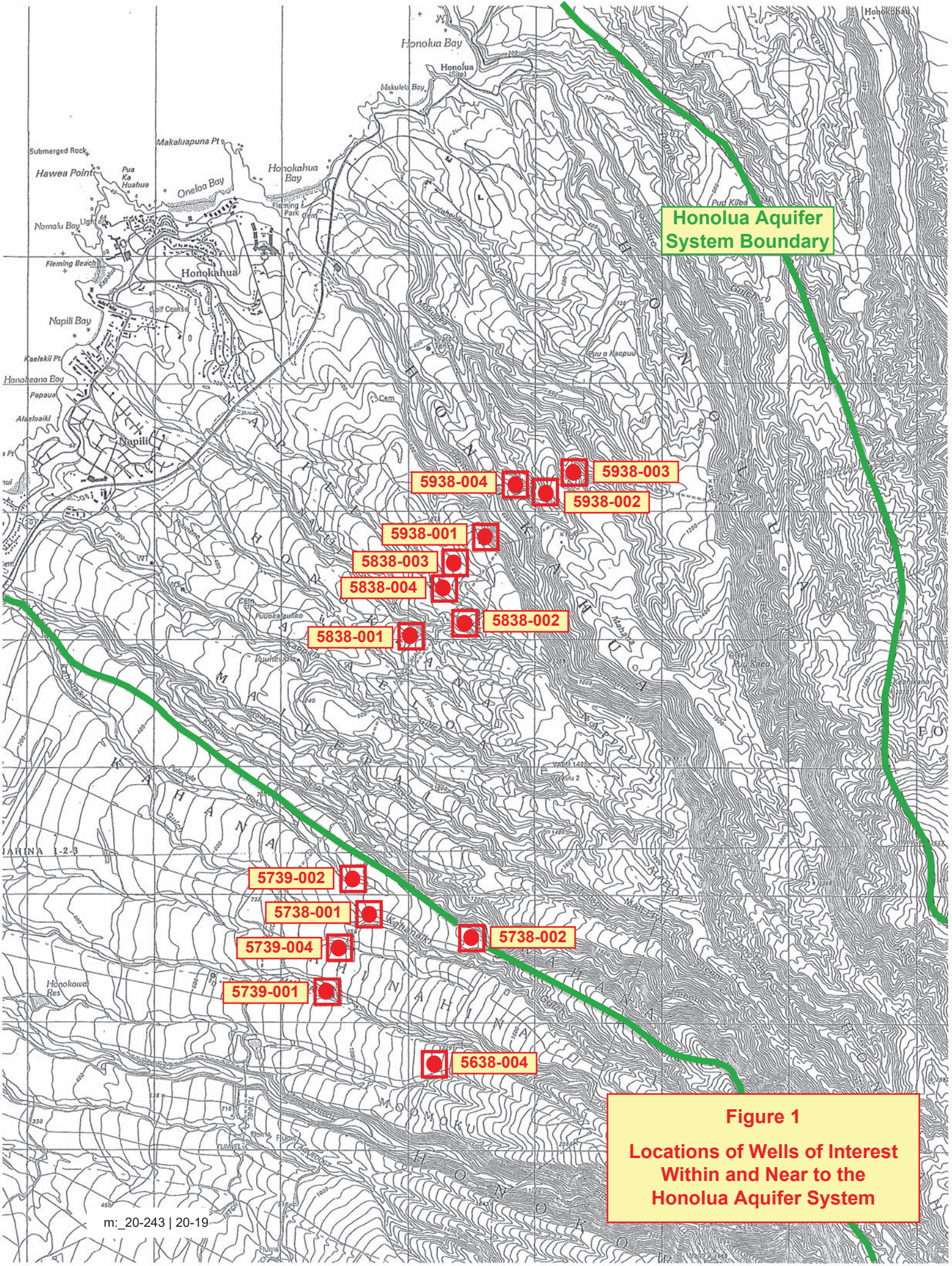

Figure 1

Locations of Wells of Interest Within and Near to the Honolua Aquifer System

Figure 2. Monthly Pumpage of MDWS Wells in the Honolua Aquifer

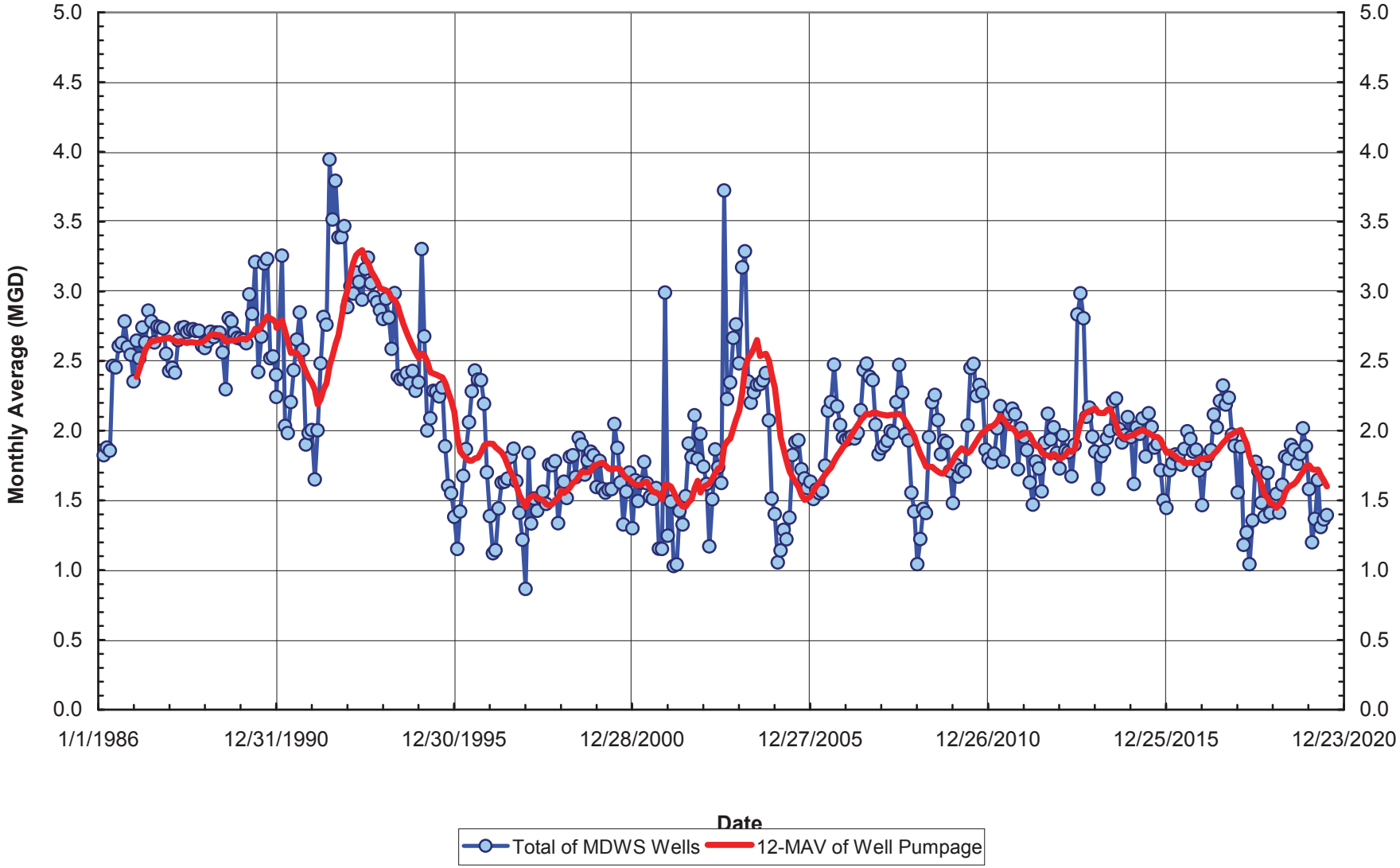

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Figure 3. Monthly Pumpage of the Kapalua Wells in the Honolua Aquifer

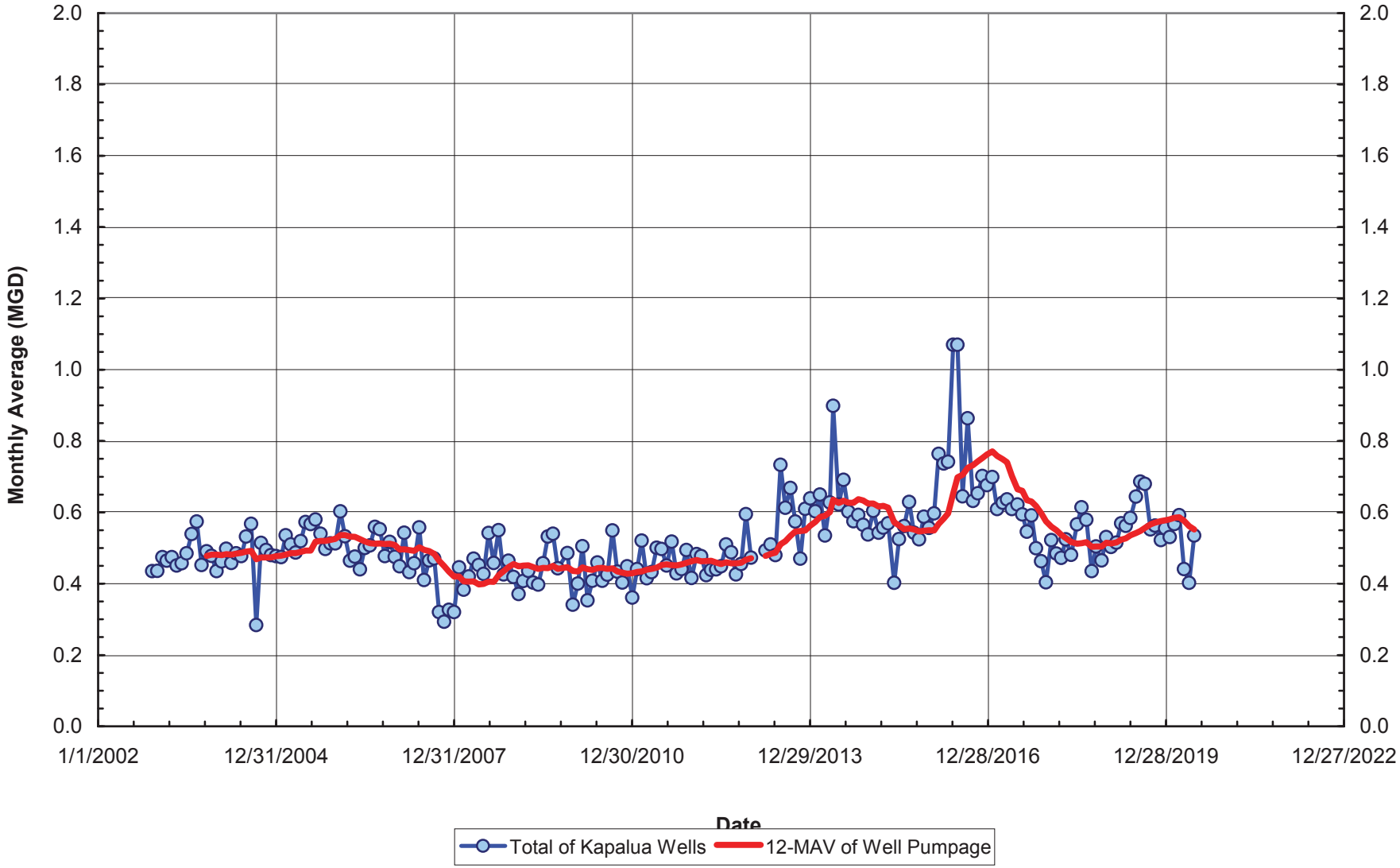

Figure 4. Total Reported Well Pumpage in the Honolua Aquifer System

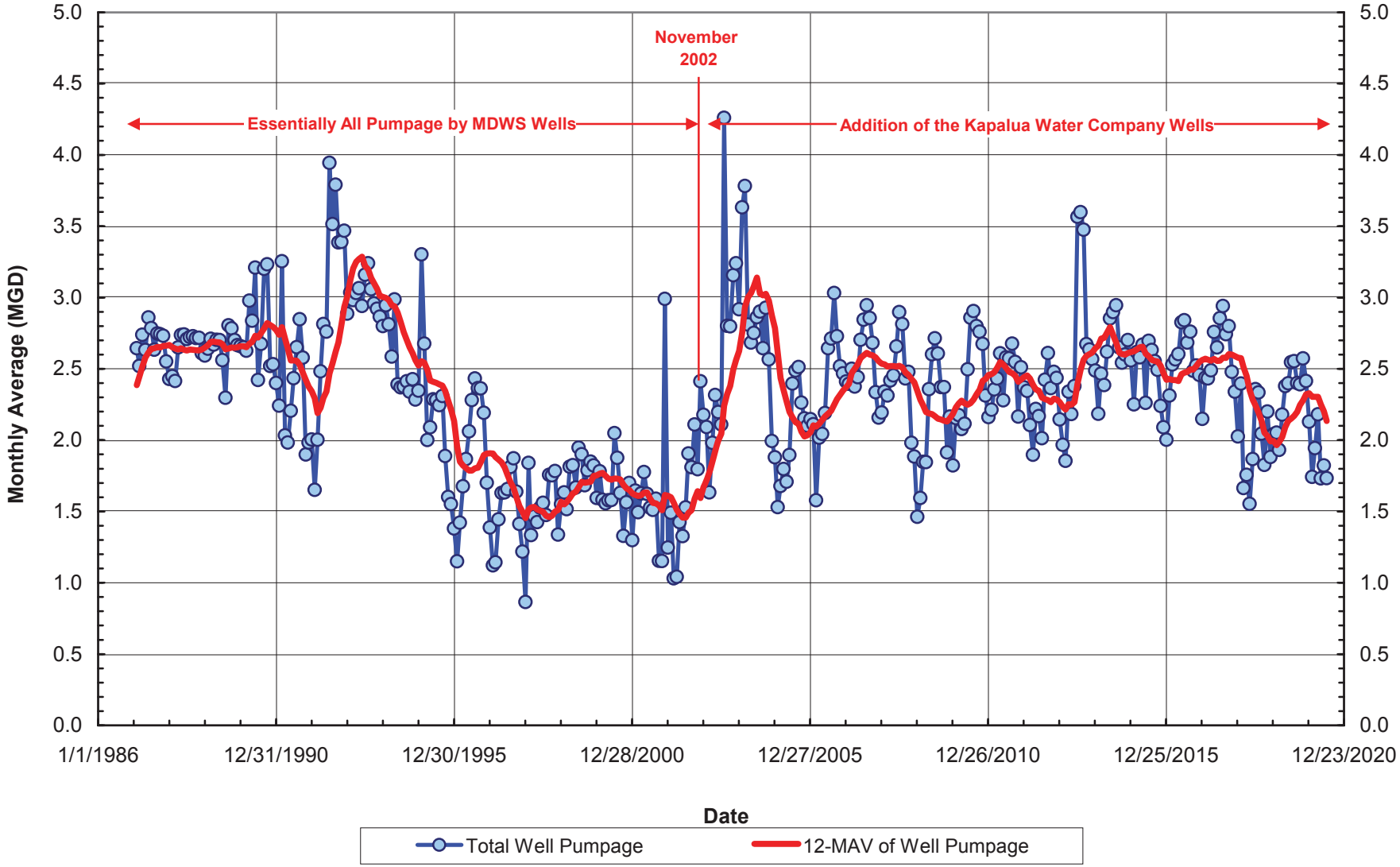

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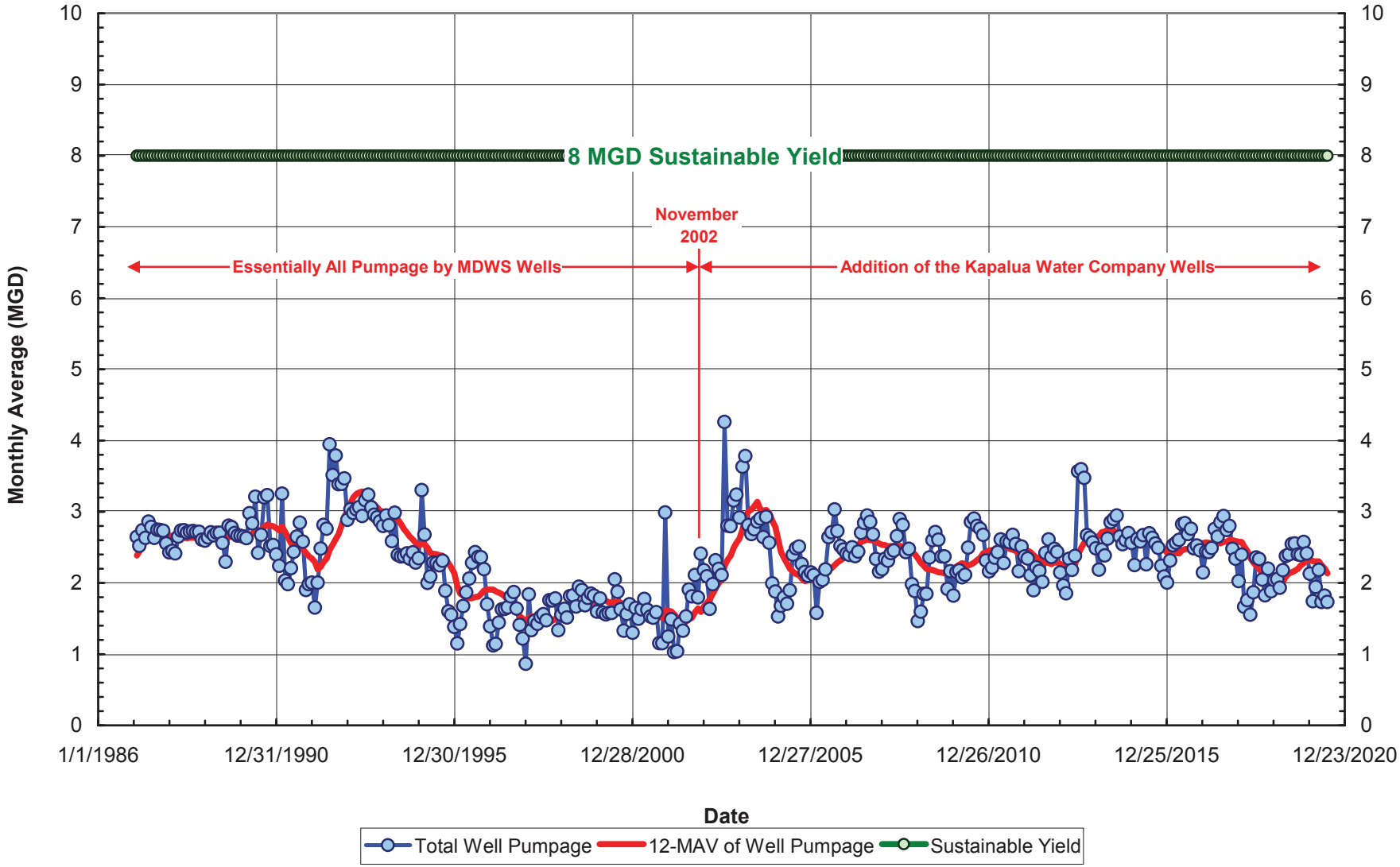
Figure 5. Total Reported Well Pumpage in the Honolua Aquifer System Compared to Its Sustainable Yield



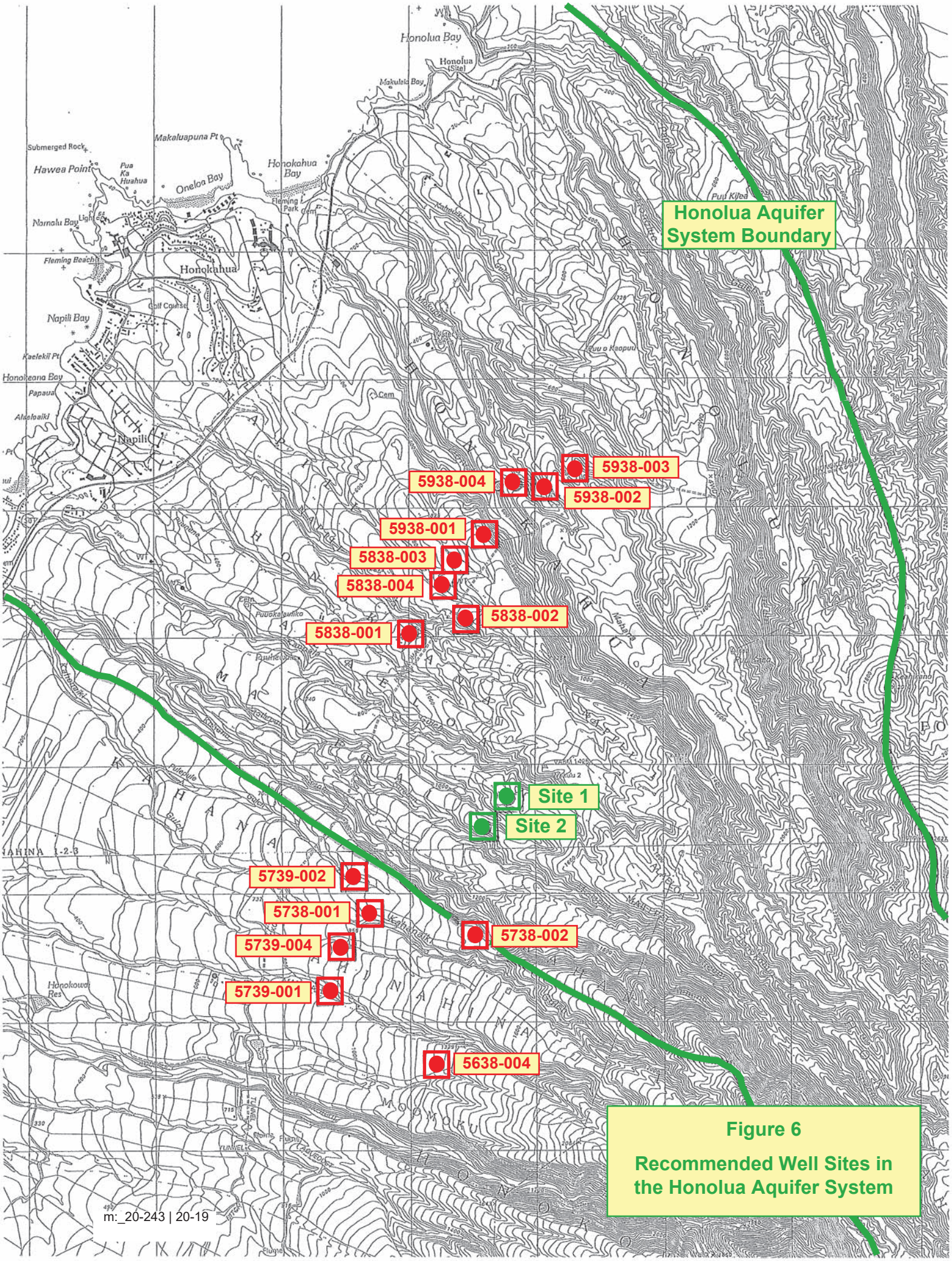


Figure 6

Recommended Well Sites in the Honolua Aquifer System

APPENDIX 3

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Electronic Submission Only

June 5, 2024
24-080 | 20-19

MEMORANDUM

To: Ronald M. Fukumoto – Fukumoto Engineering, Inc.

From: Tom Nance

Subject: Potential Well Sites in the Launiupoko Aquifer

Introduction

This memo and its attachments provide the basis for selecting three potential sites in the Launiupoko Aquifer for the Maui County Department of Water Supply (MDWS) to develop drinking water wells. Two of the sites, referred to herein as Site Nos. 1 and 2, are at inland locations selected to provide substantial fresh water supply without the salinity issues arising that have been an issue with most of the lower elevation wells in use in the Launiupoko Aquifer in the post-plantation period.

The high elevation, inland locations of Site Nos. 1 and 2 would involve substantial development costs. In response to a request from Maui Department of Water Supply (MDWS), a third site is included herein as far less costly to develop, albeit at a more limited potential yield.

History of Groundwater Use in the Launiupoko Aquifer

Figure 1 depicts the total reported monthly pumpage by wells in the Launiupoko Aquifer from January 1986 through July 2021. Up until its closing in September 1999, Pioneer Mill Co. was the dominant user of groundwater in the Aquifer with monthly usage often exceeding 15 million gallons per day (MGD). Since the plantation's closing, usage has been far less. Currently active wells in the Aquifer consist of four MDWS wells which have averaged just 0.3 MGD over the last 10 years (Figure 2), three private Launiupoko Water Company (LWC) drinking water wells, and the recently added LIC-1 Well for the Launiupoko Irrigation Company (LIC). Usage by the LWC and LIC wells has increased substantially since mid-2018 in response to the adoption of Interim Instream Flow Standards by the Commission on Water Resource Management (CWRM) which severely restricted use of Kauaula Stream by LIC (Figure 3).

Regulatory Limit on Pumping from the Launiupoko Aquifer

In the CWRM's first Water Resources Protection Plan adopted in 1990, the sustainable yield of the Launiupoko Aquifer was set at eight (8) MGD based on the assumption that all groundwater occurrence is basal and that recharge to the aquifer is 16 MGD, the latter a calculation based exclusively on rainfall recharge with no consideration of ongoing sugarcane cultivation by Pioneer Mill Co. (George A. L. Yuen and Associates, 1990). For the second Water Resource Protection Plan adopted in 2008, the sustainable yield was reduced from eight (8) to seven (7) MGD.

Since then, more sophisticated water budget models have been used by the U. S. Geological Survey to calculate the Aquifer's recharge. In comparison to the original recharge approximation of 16 MGD in 1990, recharge amounts of three USGS studies were significantly greater: 33 MGD (Engott and Vana,

2007); 25.27 MGD (Gingerich and Engott, 2012); and 41 MGD (Johnson, Engott, and Bassiouni, 2014). With these new recharge results available, the 2019 update of the Water Resource Protection Plan indicated a potential range of the sustainable yield for the Launiupoko Aquifer from 7 to 18 MGD but retained the seven (7) MGD amount (Townscape, 2019). Despite this limitation, well pumpage in the post-plantation period has been far less than the Aquifer's adopted sustainable yield (Figure 4). Even with the prospect of greater groundwater use for irrigation by LIC based on the CWRM's restriction on surface water use, there will still be a substantial unused amount that could accommodate a new MDWS well.

Potential Well Sites

Locations of existing wells of interest in the Launiupoko Aquifer and the two potential new well sites presented herein are shown on Figure 5. Private land ownership and planned new well sites for the private LWC and LIC water systems eliminates sites on the south side of Kauaula Stream from consideration for MDWS Well Sites. Potential sites need to be north of Kauaula Stream and preferably on government land. In light of the recent USGS recharge amounts of between 21 and 41 MGD, the salinity limited production of the four MDWS Wells in the northern part of the Aquifer is cause for concern in selecting a location for new well development. In my opinion, the obstructions to groundwater flow created by subsurface "plumbing" of the latter stage and far less permeable Honolua volcanics as originally mapped in Stearns and MacDonald (1942) and located as shown on Figure 5 is the cause. The sites presented herein were selected to avoid this issue.

Site No. 1 is at approximately 1700-foot elevation on the north side of Kanaha Stream. It is in TMK 4-6-018:021, a large parcel owned by the by the state. Two small diameter test holes drilled in 1970 (State Well Nos. 5338-001 and -002 on Figure 5) both encountered high-level groundwater standing 430- and 820-feet above sea level, respectively. Also, dikes have been mapped in the Kanaha Stream gulch on the south side of the recommended well site and in the Kahoma Stream gulch on the north side. Tapping into high-level groundwater at this site is an expectable result.

Site No. 2 is at 1800-foot elevation on TMK 4-6-025:002, another State-owned parcel. It is in the Forest Reserve which would require a CDUA to access and develop. High-level groundwater may also be encountered at this site although this potential is less obvious than at Site No. 1.

Site No. 3 is located on the north side of Kauaula Stream on TMK 4-6-19:003, a 16.6-acre parcel owned by the State of Hawaii (Figure 6). Under normal circumstances, a well at this elevation and proximity to the shoreline would not be expected to produce fresh water suitable for drinking water use without reverse osmosis treatment. However, four relatively recently developed wells on the south side of Kauaula Stream have all, quite unexpectedly, produced water that is drinking water fresh. Their locations with respect to TMK 4-6-019:003 are shown on Figure 6 and summary information on them is presented below.

- LIC1, State Well No. 5139-001. This well was developed and pump tested in 2017 for 72 hours at an average of 556 GPM. There were slight salinity increases during its constant rate test: specific conductance rose from 383 to 400 µS/cm; and chlorides increased from 26 to 30 MG/L. Its use as reported to the CWRM began in May 2019 and has varied substantially since then (Figure 7). It is still producing water that is drinking water fresh (specific conductance = 450 µS/cm and chlorides of 56 MG/L), both well within the range of good drinking water but a little higher than during its original pump test.
- McDonald 1, State Well No. 5139-002. This well was completed and pump tested for 30 hours at an average of 515 GPM in 2019. During the pump test there was a slight salinity increase: specific conductance rose from 495 to 527 µS/cm; and chlorides rose from 65 to 76 MG/L. These salinity levels are also well within the limits of drinking water. It has

an 85 GPM pump installed and its reported use began in early 2020. Usage has been at very nominal amounts since then.

- Makila Farms, State Well No 5138-002. This well was completed and pump tested at 414 GPM for 24 hours in July 2000. As reported by the drilling contractor, all ten samples collected during the 24-hour test had identical salinity levels: specific conductance of 690 µS/cm; and chlorides of 111 MG/L. It has an installed pump rated at 385 GPM but as far as is known, use of the well has not started yet.
- Strombeck, State Well No. 5139-003. This is a small capacity well that was completed in 2019. Its 45 GPM capacity pump does not require a pump test to be done according to CWRM standards. However, a 4.9-foot water level and 109 MG/L chloride level were reported to the CWRM.

Common and contrasting results of these four wells are significant. All four have reported static water levels substantially higher than expected. In order of their listing above, the reported levels are 5.5 feet, 4.9 feet, 6.4 feet, and 4.9 feet. Pumped water salinity, although all are in the range of drinking water, increased with distance to the south of Kauaula Stream. Drawdowns in the three wells that were pump tested were just a fraction of a foot, indicative of very high formation permeability.

There is one other well, the performance of which is critical to assessing the potential success of a well in TMK 4-6-019:003. It is the LWC-3 Well, State No. 5238-001 (its location is shown on Figure 6). It was completed in 2003 and, during its construction, two constant rate pump tests were run. The first was in November 2002 in the open borehole for 96 hours at an average of 400 GPM. Ending specific conductance and chloride values were 125 µS/cm and 5 MG/L, respectively. The second test was run for 168 hours (7 days) at an average of 700 GPM after the casing had been installed and grouted into place. There was a steady salinity increase throughout the test. Specific conductance started at 135 and ended at 210 µS/cm. Chlorides started at 7 and ended at 18 MG/L. Based on these results, 500 GPM was selected as the capacity for the permanent pump. Its first reported use as a drinking water well was in September 2009. Since then, its average use in recent years has been about 0.3 MGD (Figure 8). The available conductivity data does not show a good correlation with pumpage but definitely indicates an increase in salinity over its period of use.

In addition to the results of wells on the south side of Kauaula Stream, a recent pump test of the Lahaina Shaft A (State No. 5240-002) located downgradient of TMK 4-6-019:003. It was pump tested for 96 hours at an average of 1400 GPM. The chlorides in the test were in the range of drinking water, 104 MG/L at the start with a slow increase to 121 MG/L at the end of the 96 hours. This result as well as those of the wells on the south side of Kauaula Stream suggest a well in TMK 4-6-019:003 would produce water that will be drinking water fresh as long as the pump capacity is carefully selected.

Based on the foregoing summary of results of nearby wells, a well developed on TMK 4-6-019:003 must be located as shown on Figure 6 to avoid potential stream flow flooding of the site. A well at this location appears likely to encounter water of potable quality. Until a pilot borehole pump test is conducted to provide actual data, it should be assumed that the pump capacity would not be greater than 450 GPM and that its long-term safe use would be in the range of 0.3 MGD.

Potential Impact on Streamflow of Pumping High-Level Groundwater at the Two Upper Elevation Potential Well Sites

Potential Well Site No. 1 is on a ridge between Kanaha Stream to the immediate south and Kahoma Stream to the north. As a well at Site 1 is expected to tap into high-level groundwater, its potential impact or stream flow must be assessed. Fortunately, seepage runs done by the U.S. Geological Survey (USGS) and the findings in test holes 5338-001 and -002 provide conclusive evidence that pumping high-level groundwater from Site 1 will not impact stream flow. With regard to a potential impact on Kanaha Stream, the evidence is as follows:

- Results of test boreholes establish that the higher water level in Well No. 5338-002 (820 feet) is hundreds of feet lower than the adjacent stream invert, making it impossible for the groundwater to flow into the stream;
- Results of the substantially lower water level in Well No. 5338-001 (430 feet) shows a dramatic drop in high-level groundwater going makai;
- Seepage runs by the USGS in January 2013 (Table 16 and Figure 11 in Chang 2014) show Kanaha Stream to be a losing reach from above the Ditch Intake (directly across from the proposed well site) down to the confluence with Kahoma Stream. In other words, as the stream is not fed by high-level groundwater, pumpage by the proposed well will not impact stream flow.

With regard to the potential impact on Kahoma Stream, the seepage runs by the USGS in January 2010 and August 2012 as reported in Table 16 in Chang (2014) show the stream to be a losing reach from inland of the proposed well site to the measurements at far lower elevations downstream. Since high-level groundwater is not feeding into and maintaining stream flow, it is reasonable to conclude that pumping from the proposed well site will also not impact Kahoma Stream.

Potential Well Site No. 2 is about 1500 feet to the north of Kauaula Stream and there are no nearby wells or development tunnels to establish the probable groundwater occurrence at the well site. However, Cheng (2014: page 46, Figure 12, and Table 16) establishes that Kauaula Stream, in the reach that would potentially be impacted by pumping high-level groundwater at Well Site No. 2, is a losing reach and therefore would not be impacted by such pumping.

Attachments: References and Figures 1-8

Email Copy: Tom Ochwat – Department of Water Supply, County of Maui
Greg Fukumitsu – TNWRE Inc.

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Figure 1
Total Reported Pumpage in the Launiupoko Aquifer System from January 1990 to August 2021

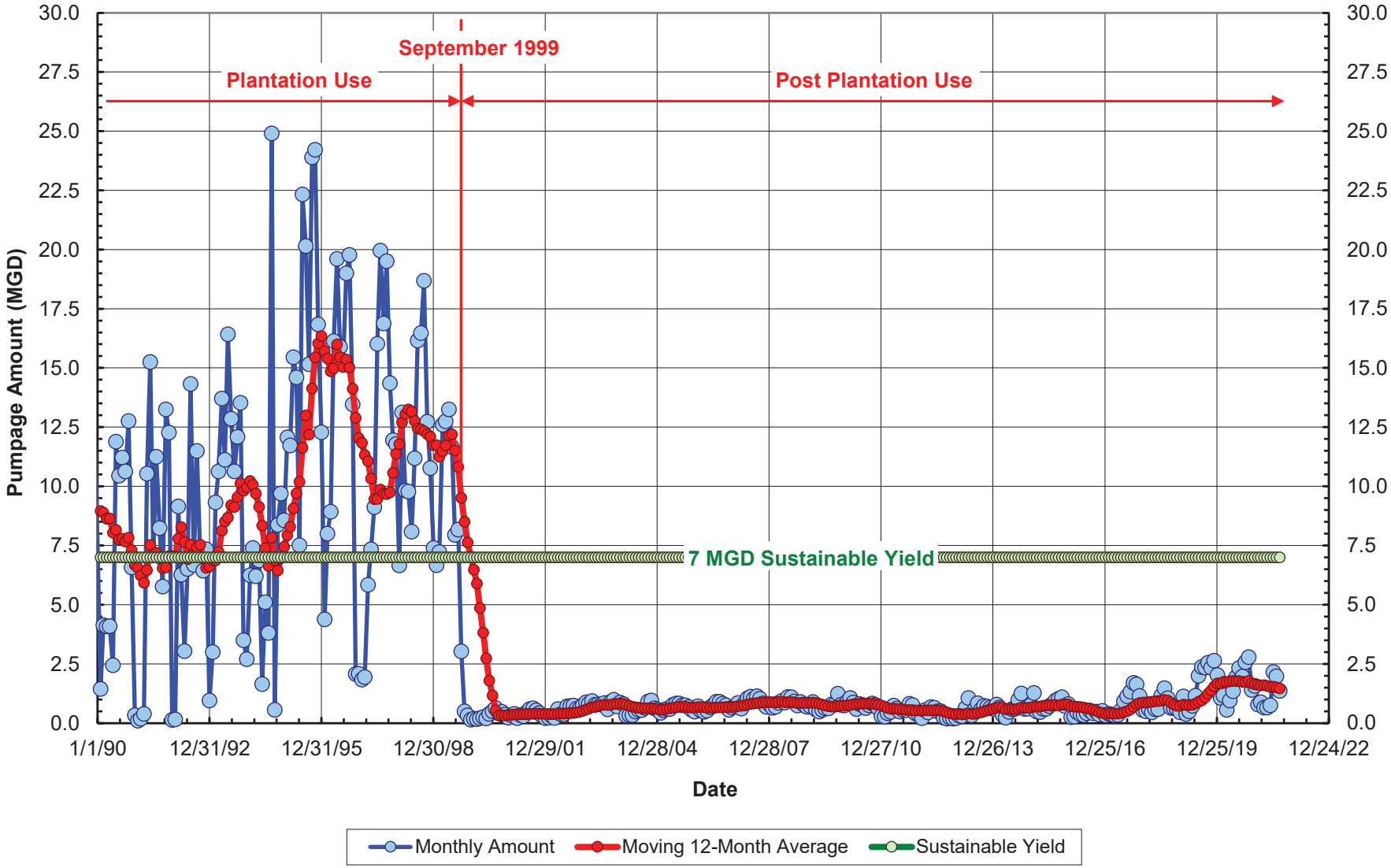


Figure 2
Pumpage by Maui DWS' Four Wells in the Launiupoko Aquifer System from January 1986 through August 2021

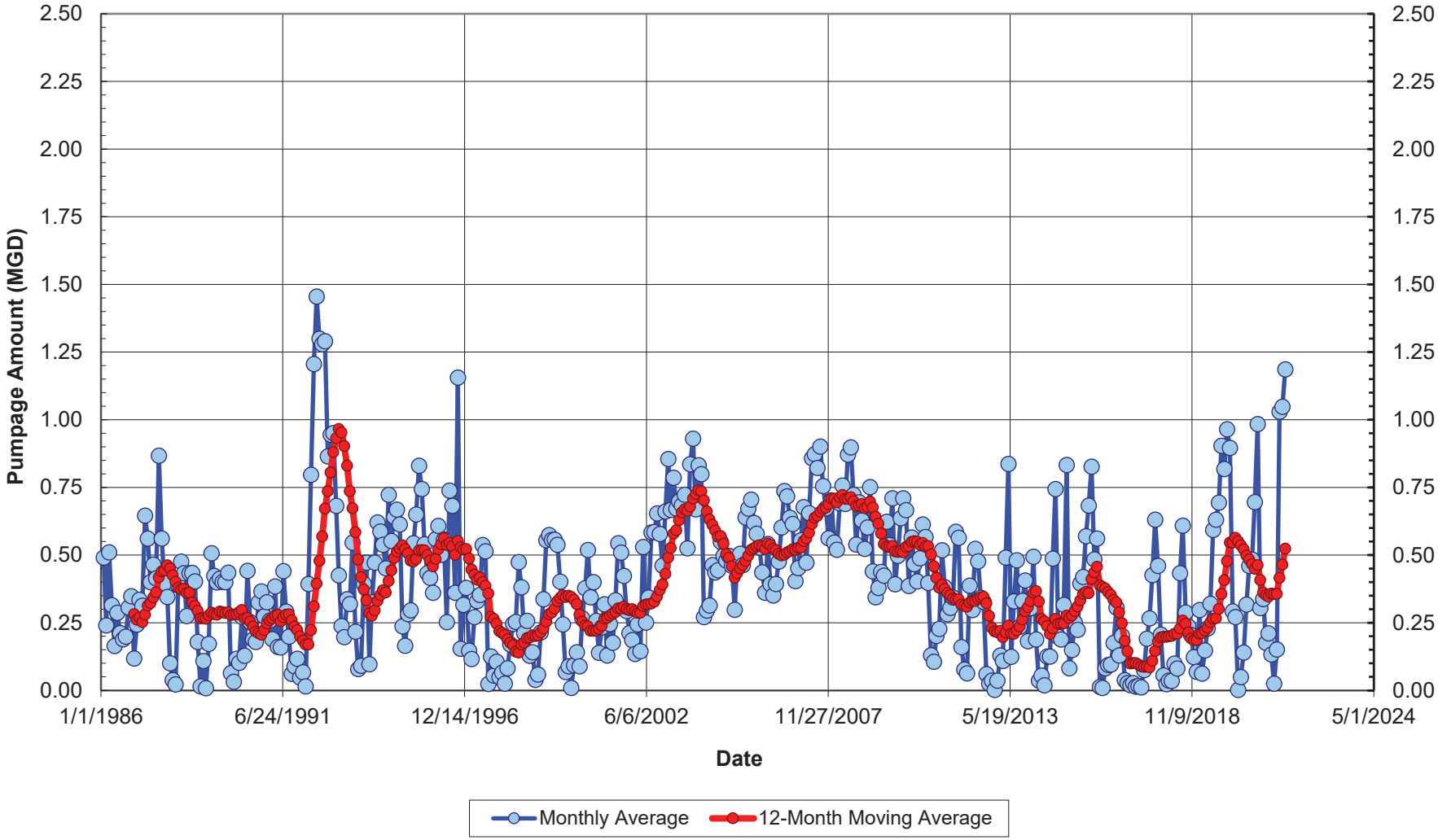


Figure 3
Total Pumpage of the Private Launiupoko Potable and Irrigation Company Wells Since January 2010

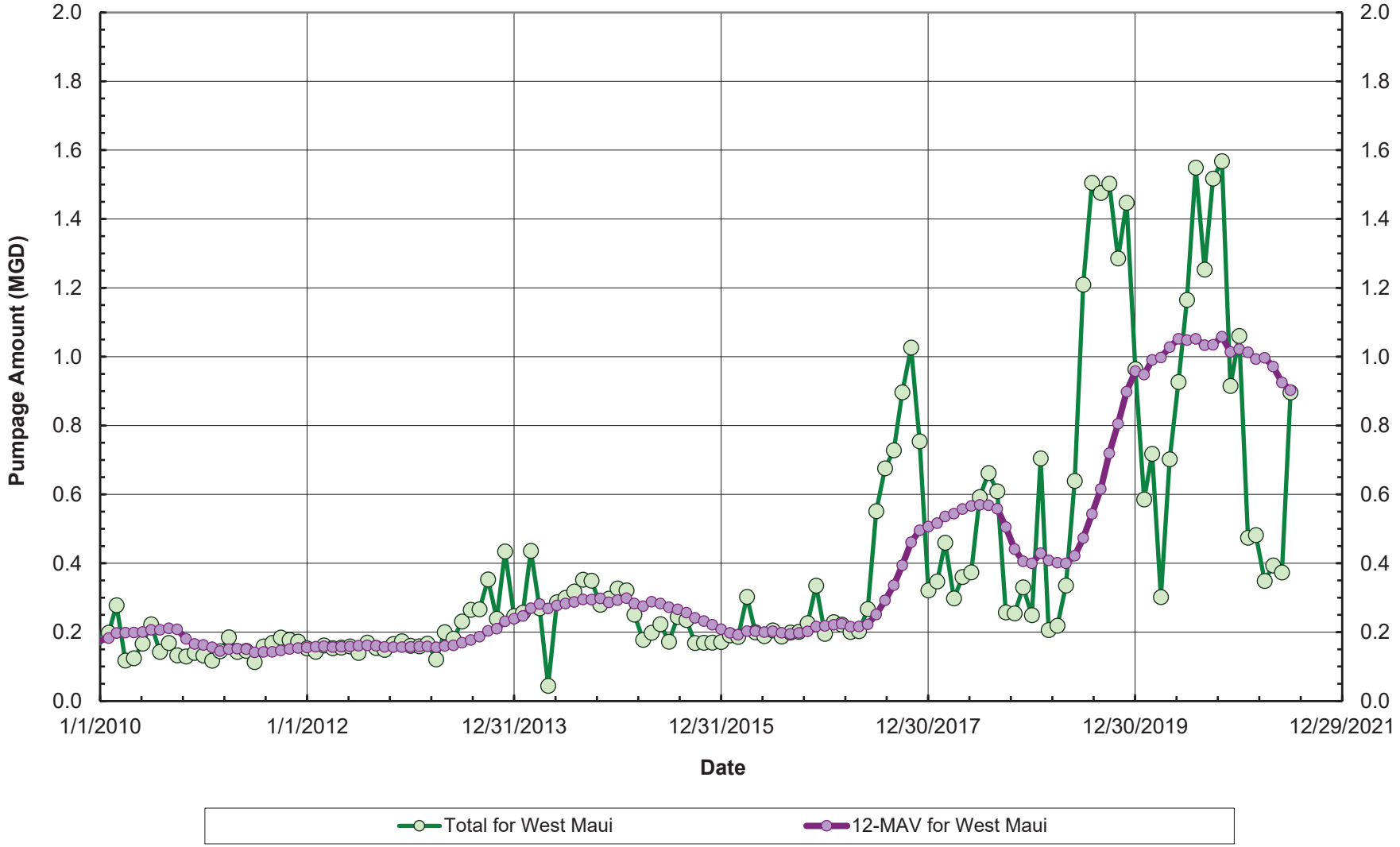
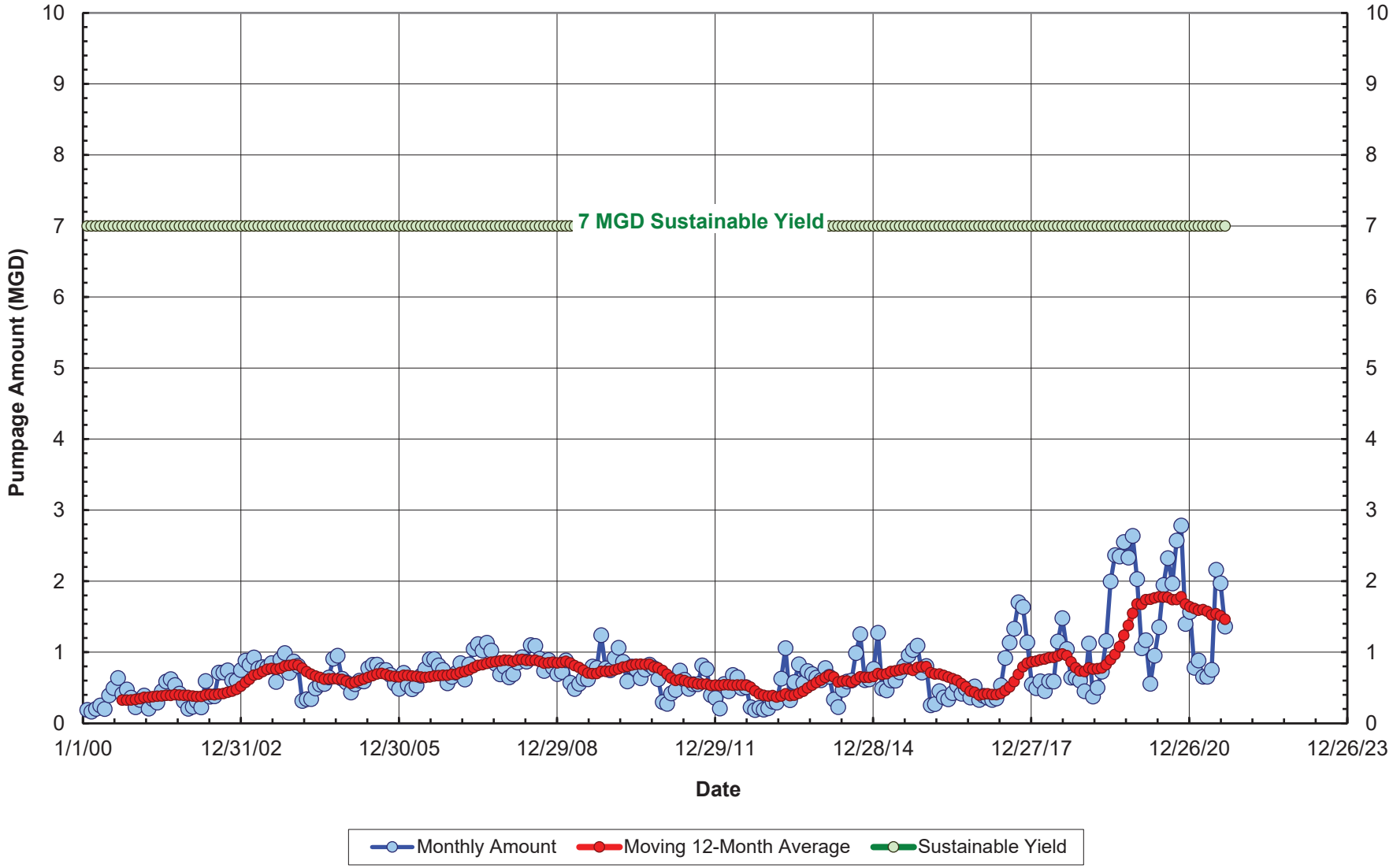


Figure 4
Total Pumpage in the Launiupoko Aquifer System in the Post-Plantation Period Since January 2000



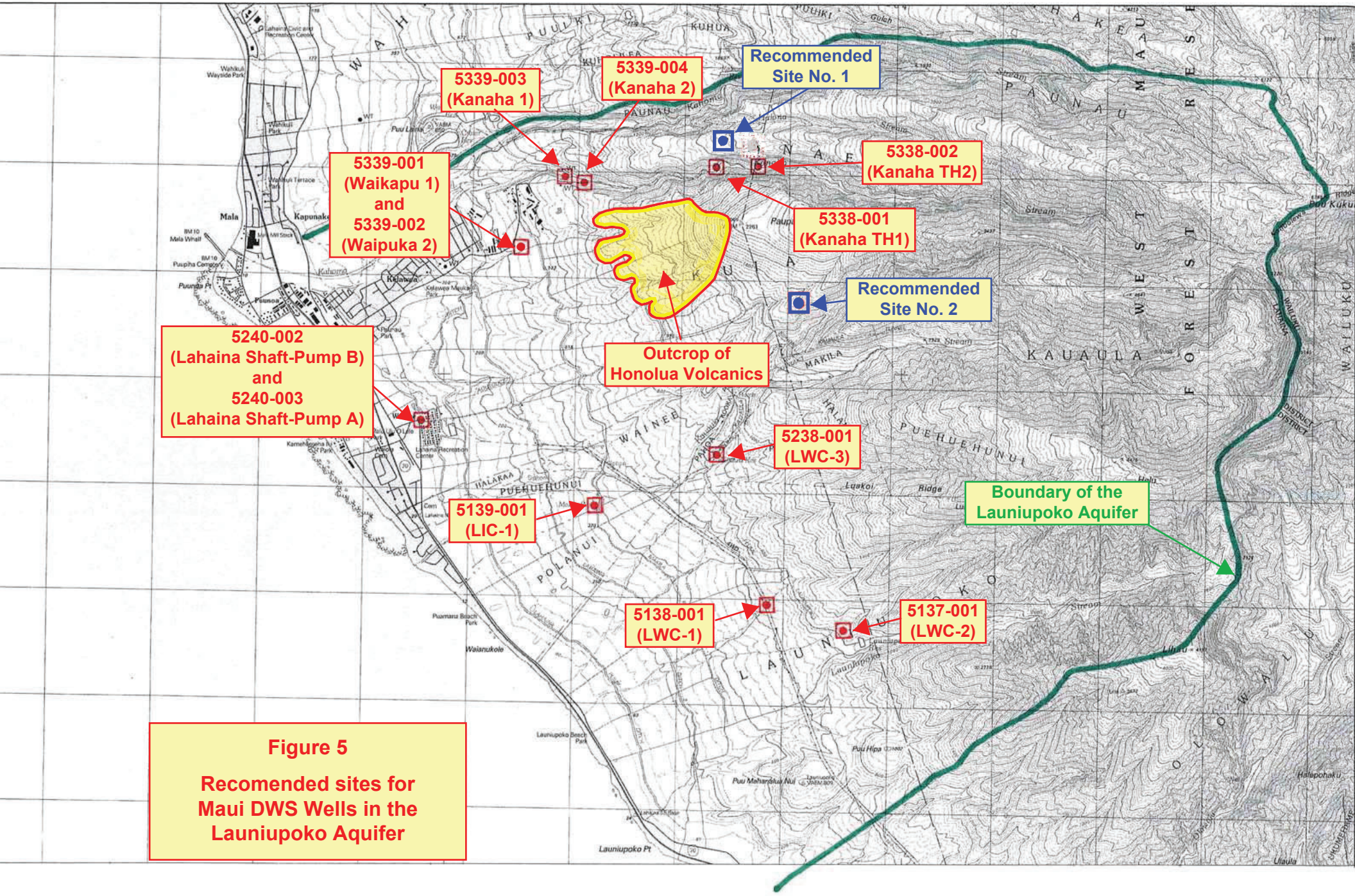


Figure 5

Recomended sites for Maui DWS Wells in the Launiupoko Aquifer

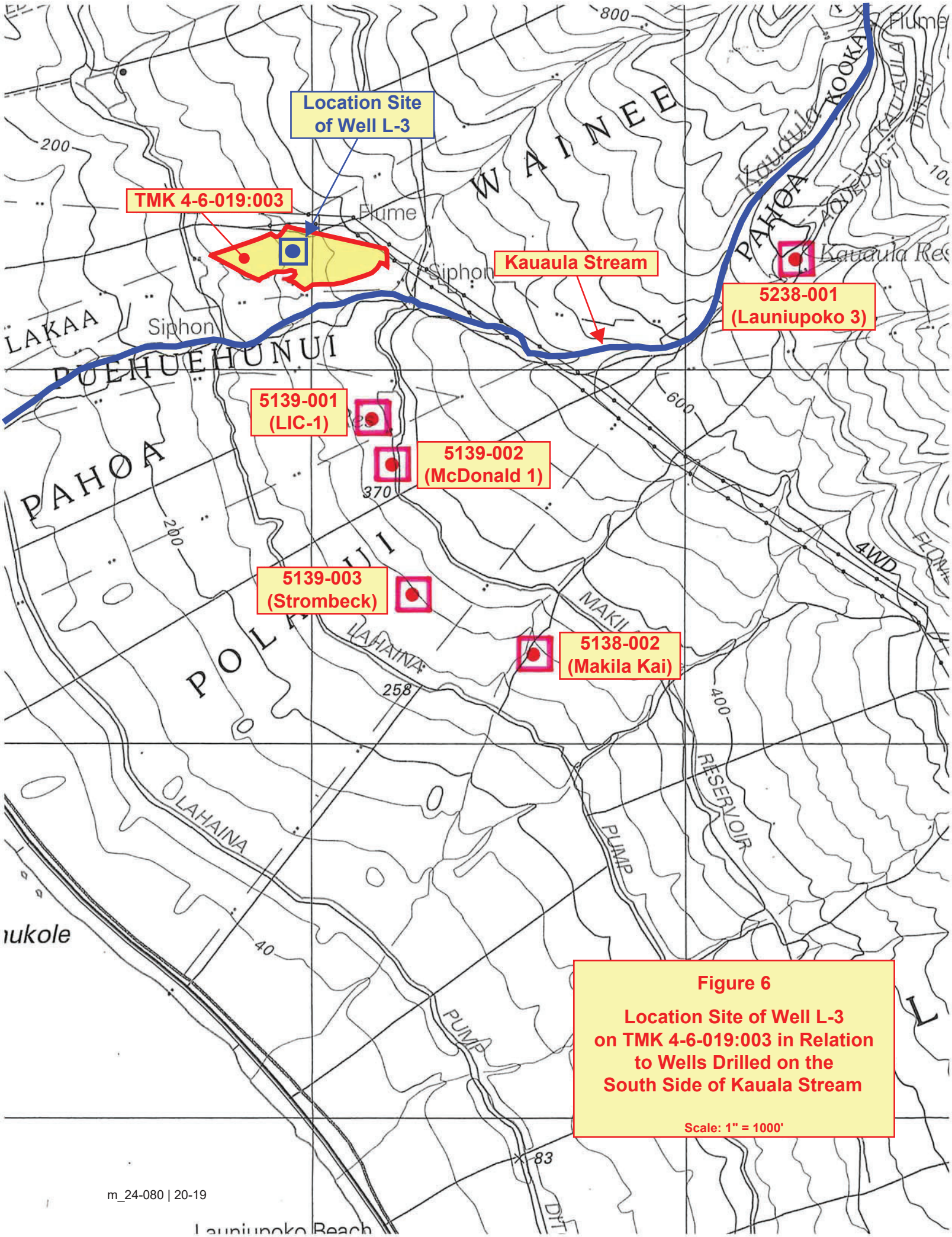


Figure 6

Location Site of Well L-3 on TMK 4-6-019:003 in Relation to Wells Drilled on the South Side of Kauala Stream

Scale: 1" = 1000'

m_24-080 | 20-19

Figure 7
Pumpage of the LIC- 1 Well and Available Conductivity Data Since May 2019

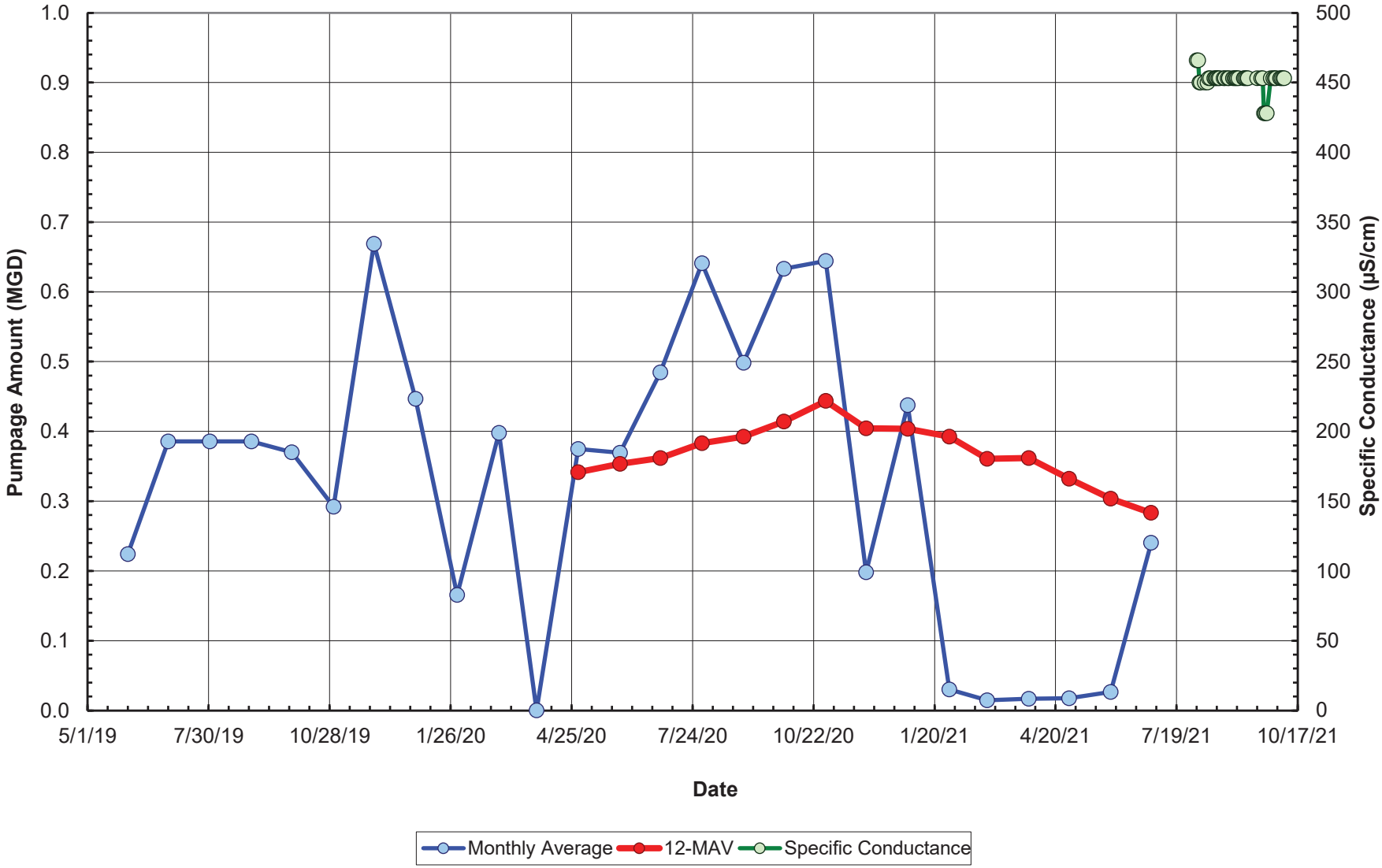
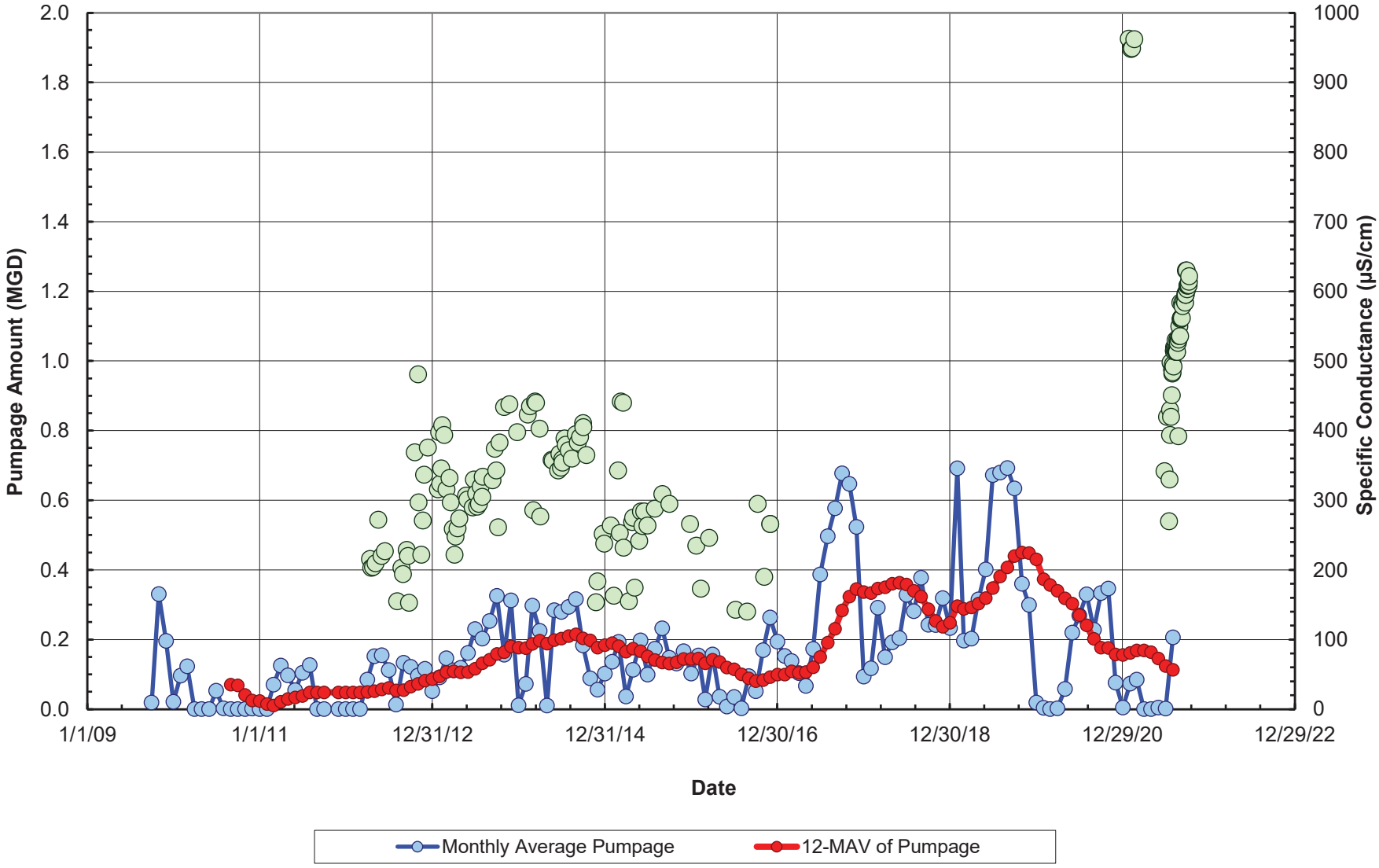


Figure 8
Reported Pumpage and and Available Specific Conductance Data of the LWC 3 Well Since Septemebr 2009



MEMORANDUM FOR REMAINING CAPACITY IN THE LAUNIUPOKO AQUIFER

APPENDIX

B

Tom Nance Water
Resource Engineering

No. of pages: 2
Email: ron@femaui.com
greg@tnwre.com

Electronic Submission Only

February 26, 2025
25-029 | 20-19

MEMORANDUM

To: Ronald Fukumoto – Fukumoto Engineering, Inc.

From: Tom Nance

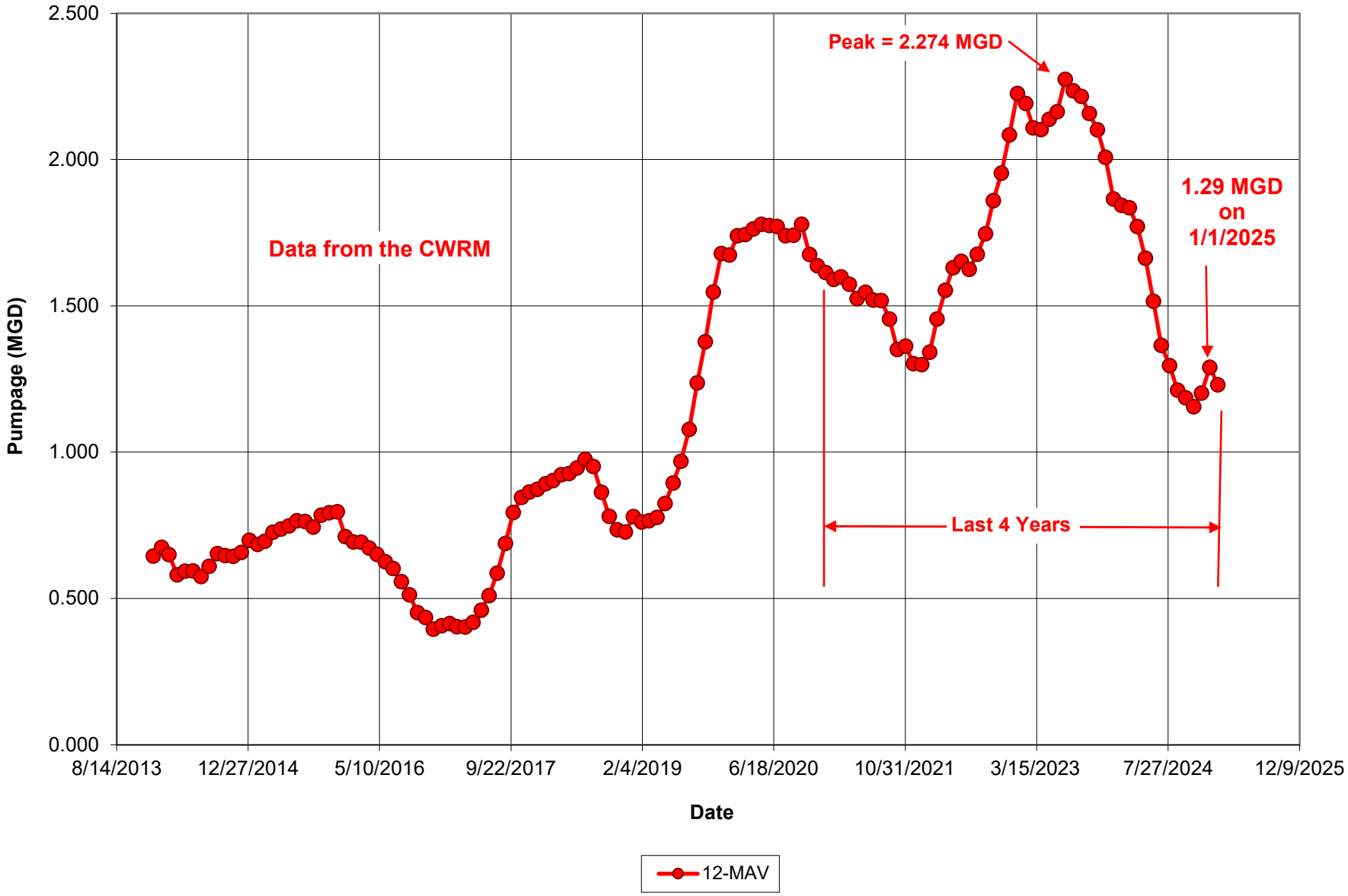
Subject: Remaining Capacity in the Launiupoko Aquifer

My personal version of the Launiupoko Aquifer's remaining supply would be calculated as the aquifer's sustainable yield of 7 million gallons per day (MGD) set by the Commission on Water Resource Management (CWRM) less the peak of the 12-month moving average (12-MAV) of pumpage over the previous 4 years, plus development tunnel discharge, and planned authorized use (AUP). Figure 1 depicts the 12-MAV of well pumpage since January 2014. The peak in the last four years was 2.274 MGD in July 2023. There is one development tunnel in the aquifer way in the back of Kauaula Valley. It is the Kauaula Tunnel (State Well No. 5236-001). Its only known flow rate measurement is 2.0 MGD (on page 213 of Bulletin 7 of the Hawaii Division of Hydrography). Since I do not have the necessary information to quantify AUP, I will adopt the CWRM's number of 1.036 MGD. That brings the total of existing and authorized use to (2.274 + 2.0 + 1.036) 5.31 MGD. Based on the 7 MGD sustainable yield, that leaves 1.69 MGD as the remaining uncommitted supply.

Attached: Figure 1

Email Copy: Greg Fukumitsu – TNWRE Inc.

Figure 1
12-MAV of the Launiupoko Aquifer Since January 2014



ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION REPORT

APPENDIX C

Proj 2456 LRFI 1.5

A Literature Review and Field Inspection for the Launiupoko Aquifer Well Development Project (DWS Job No. 20-01 / Contract WC1039) for Five Proposed Well Sites in ʻAlaeloa Ahupuaʻa, Kāʻanapali District and Panaʻewa, Mākila, and Waineʻe Ahupuaʻa, Lāhainā District, Island of Maui, Hawaiʻi

[TMK: (2) 4-3-001:001 por. (2) 4-6-018:007 por., (2) 4-6-025:002 por., and (2) 4-6-019:003 por.]

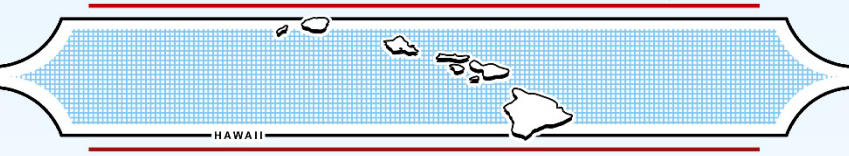
Prepared by:
Gloria C. A. Lee, B.A.
and
Michael F. Dega, Ph.D.

February 2023
Draft

Prepared for:
Fukumoto Engineering, Inc.
1721 Wili Pa Loop
Suite 203
Wailuku, HI 96793

On Behalf of:
Department of Water Supply
County of Maui
200 South High Street
Wailuku, HI 96793

SCIENTIFIC CONSULTANT SERVICES, Inc.



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INTRODUCTION

At the request of Fukumoto Engineering, Inc., representing the County of Maui Department of Water Supply (DWS), Scientific Consultant Services, Inc. (SCS), has prepared this literature review and field inspection report (LRFI) regarding the development of 1.55 million gallons per day of groundwater sources for Lāhainā in West Maui. Five sites have been considered as potential well sites. The DWS has selected L-1 and L-3 for construction of exploratory wells. Two exploratory wells will be constructed on L-1 and two exploratory wells will be constructed on L-3 to provide back-up capacity. Sites L-2, H-1, and H-2 will be assessed as potential alternative sites.

About one acre of land will be acquired for the proposed H-1 and H-2 well sites (Figures 1, 3, and 5). About two acres will be acquired for the proposed L-1, L-2, and L-3 well sites (Figures 2, 4, and 6) because of the area's mountainous, steep terrain. This land area allows for future construction of pumping stations consisting of pump pads and piping, a control building, a reservoir, paved service yards, drainage sumps, and emergency generators. Interim site improvements will include grading of the immediate work area to create a gently sloping pad and constructing a chain link security fence around the site.

The proposed Honolua Aquifer Site H-1 and Honolua Aquifer Site H-2 are both located in ʻAlaeloa Ahupuaʻa, Kāʻanapali District, Maui, on a 1,377.71-acre parcel [TMK: (2) 4-3-001:001] owned by the Maui Land and Pineapple Company, Inc. (MLP). The total depth of the Honolua Aquifer Sites H-1 and H-2 are 1,340 feet (ft) and 1,300 ft, respectively. A pedestrian survey of Sites H-1 and H-2 took place on April 19, 2022.

The proposed Launiupoko Aquifer Site L-1 [TMK: (2) 4-6-018:007] is on State owned land with a small portion on a private property. The latter consists of an 1,800-foot-long and 20-foot-wide easement. The well site is located on a 387.804-acre parcel in Panaʻewa Ahupuaʻa, Lāhainā District, Maui. The total depth of the proposed L-1 site is 1,700 ft. A pedestrian survey of Site L-1 took place on April 4, 2022.

The proposed Launiupoko Aquifer Site L-2 [TMK: (2) 4-6-025:002] and Launiupoko Aquifer Site L-3 [TMK: (2) 4-6-019:003] are both located on land owned by the State of Hawaii in Lāhainā District on Maui. The well sites are within a 2,012.5-acre parcel in Mākila Ahupuaʻa and a 16.6-acre parcel in Waineʻe Ahupuaʻa, respectively. A pedestrian survey of Site L-3 took place on February 25, 2022. Because of the steep slope leading to Site L-2, the project area was inaccessible by foot, and the property was thus surveyed via drone on December 14, 2022.

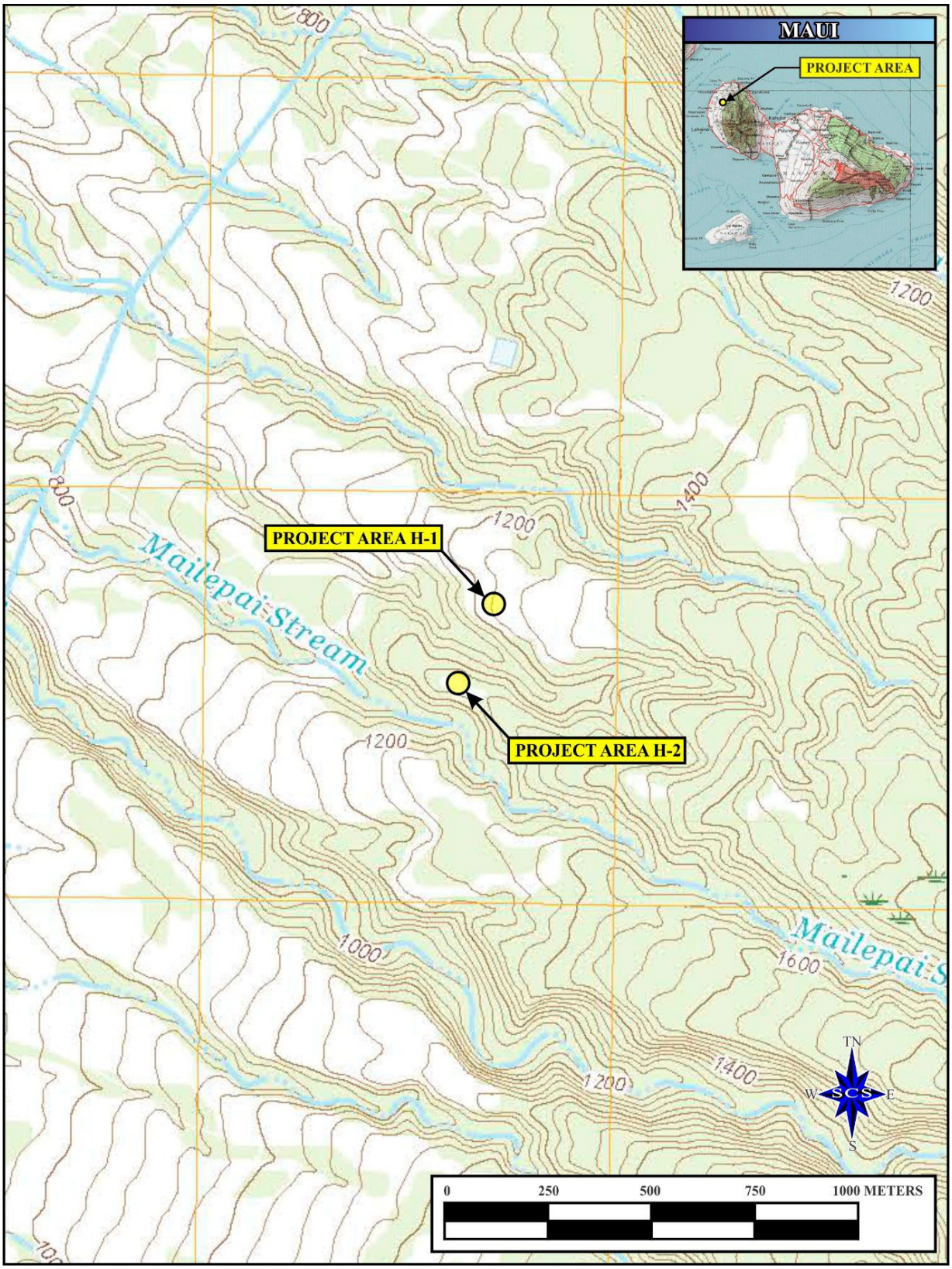

Figure 1: USGS topographic map showing project area locations for Honolua Aquifer Sites H-1 and H-2

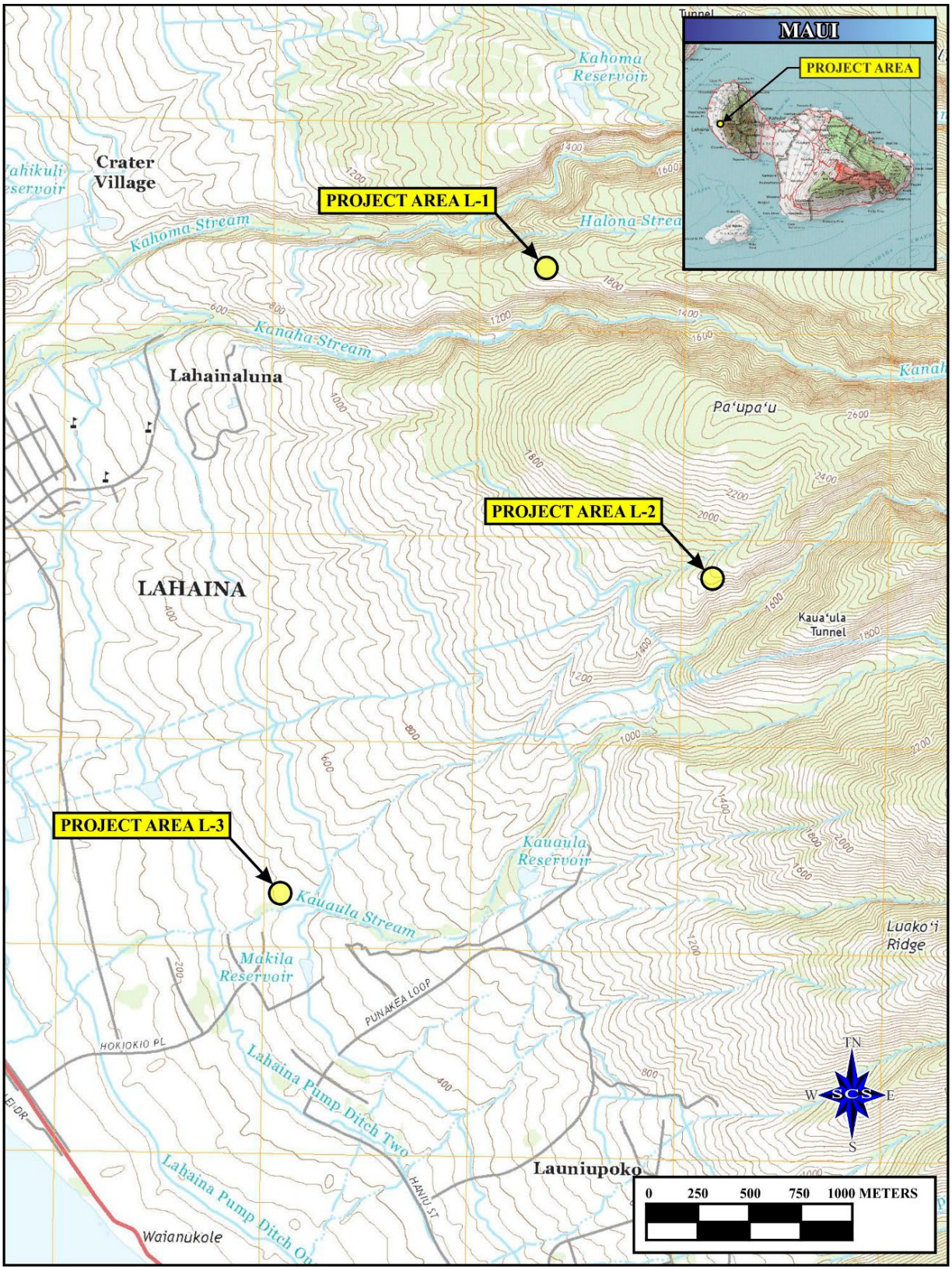

Figure 2: USGS topographic map showing project area locations for Launiupoko Aquifer Sites L-1, L-2, and L-3

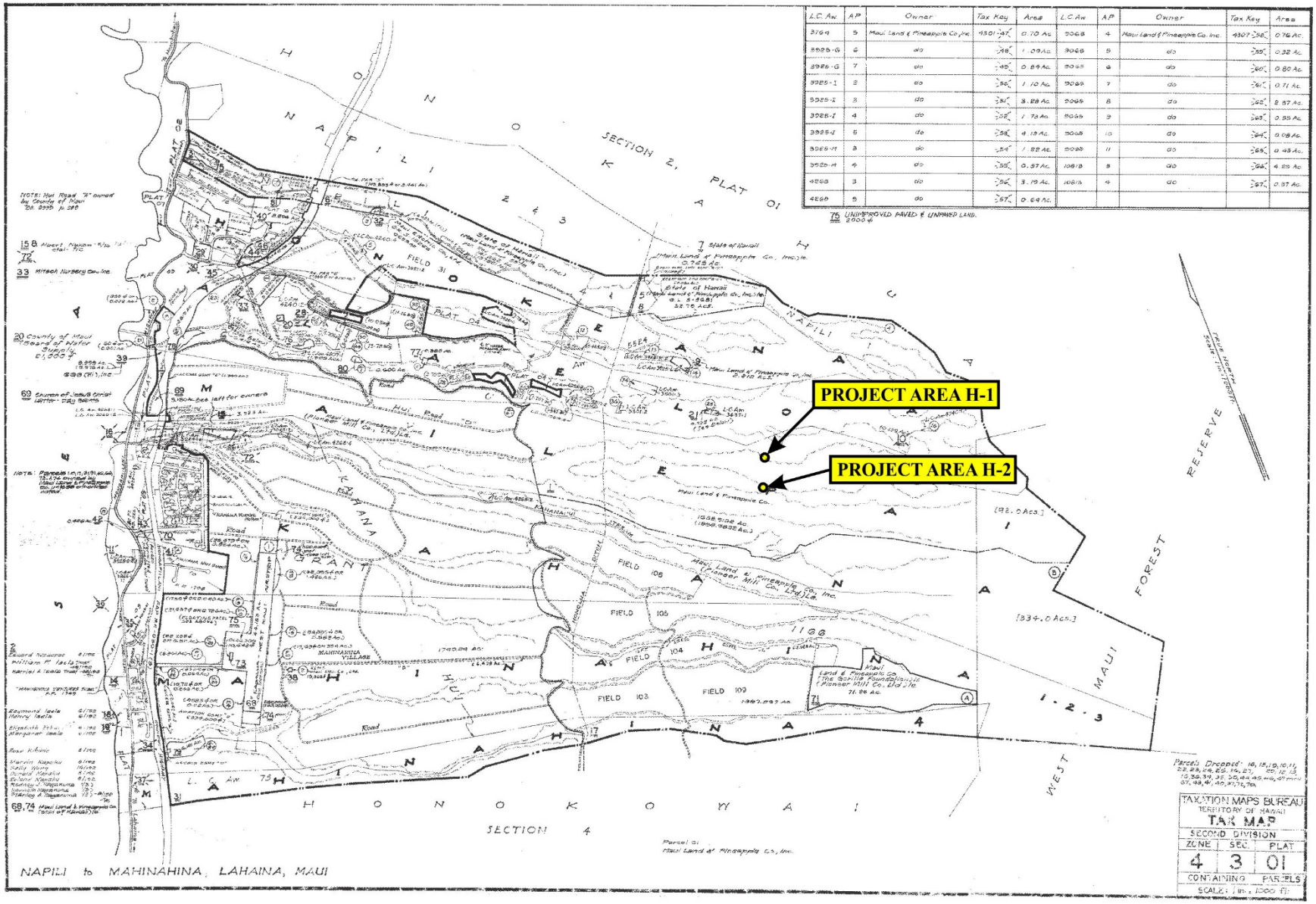

Figure 3: Tax Map Key [TMK: (2) 4-3-001:001] map showing project area locations for Honolua Aquifer Sites H-1 and H-2

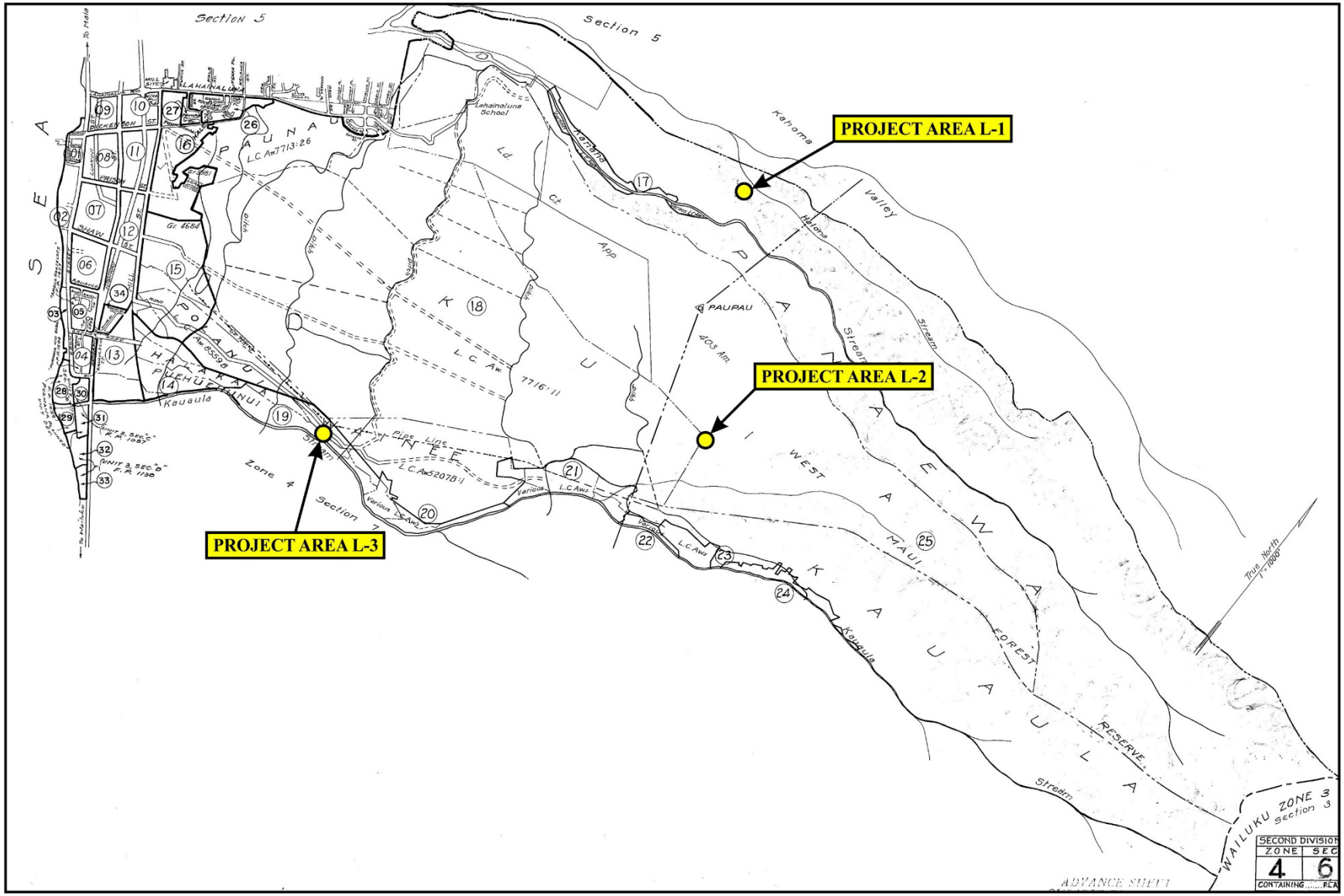

Figure 4: Tax Map Key (TMK Zone 4: Section 6) map showing project area locations for Launiupoko Aquifer Sites L-1, L-2, and L-3

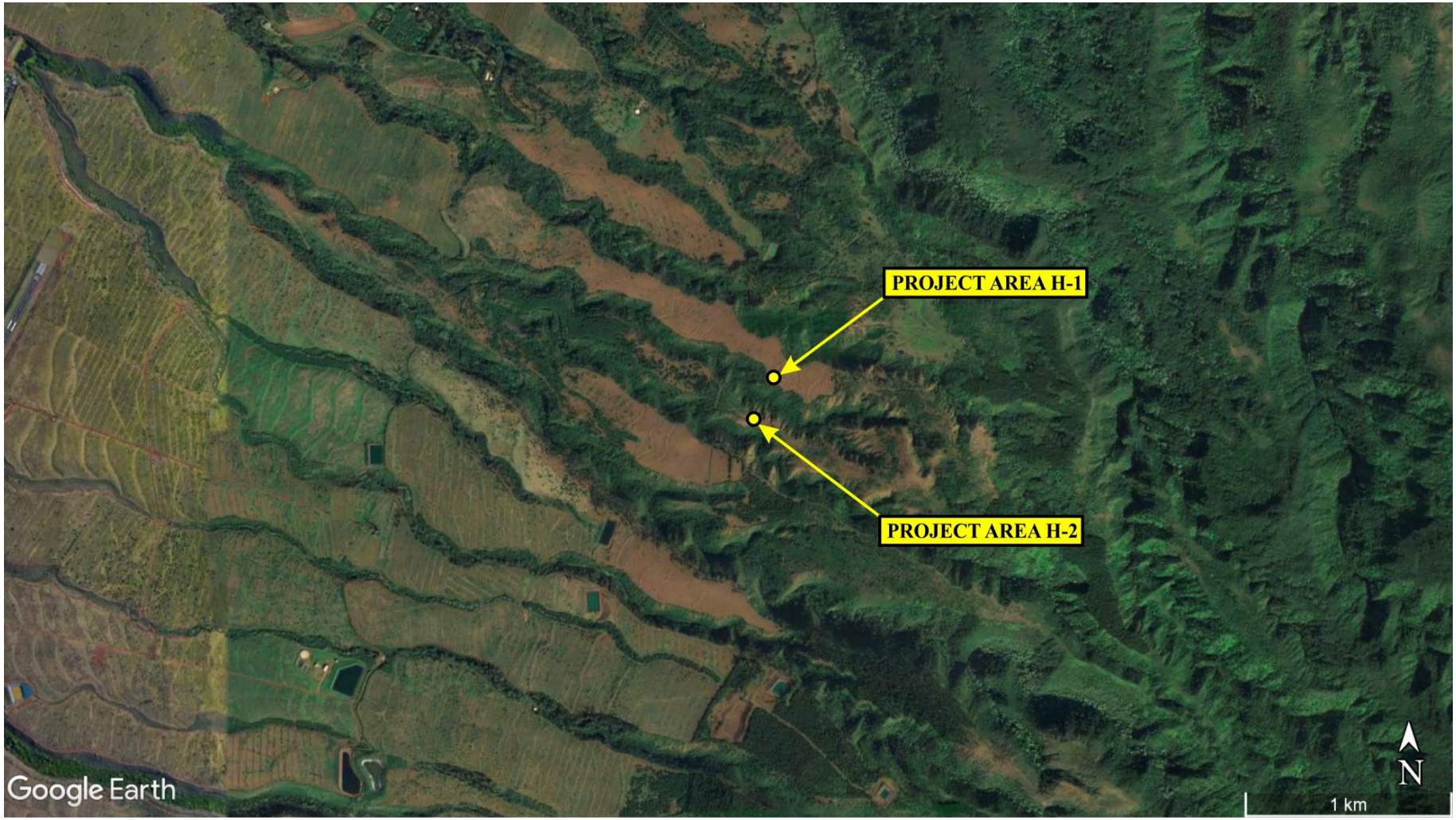

Figure 5: Google Earth aerial photograph showing project area locations for Honolua Aquifer Sites H-1 and H-2

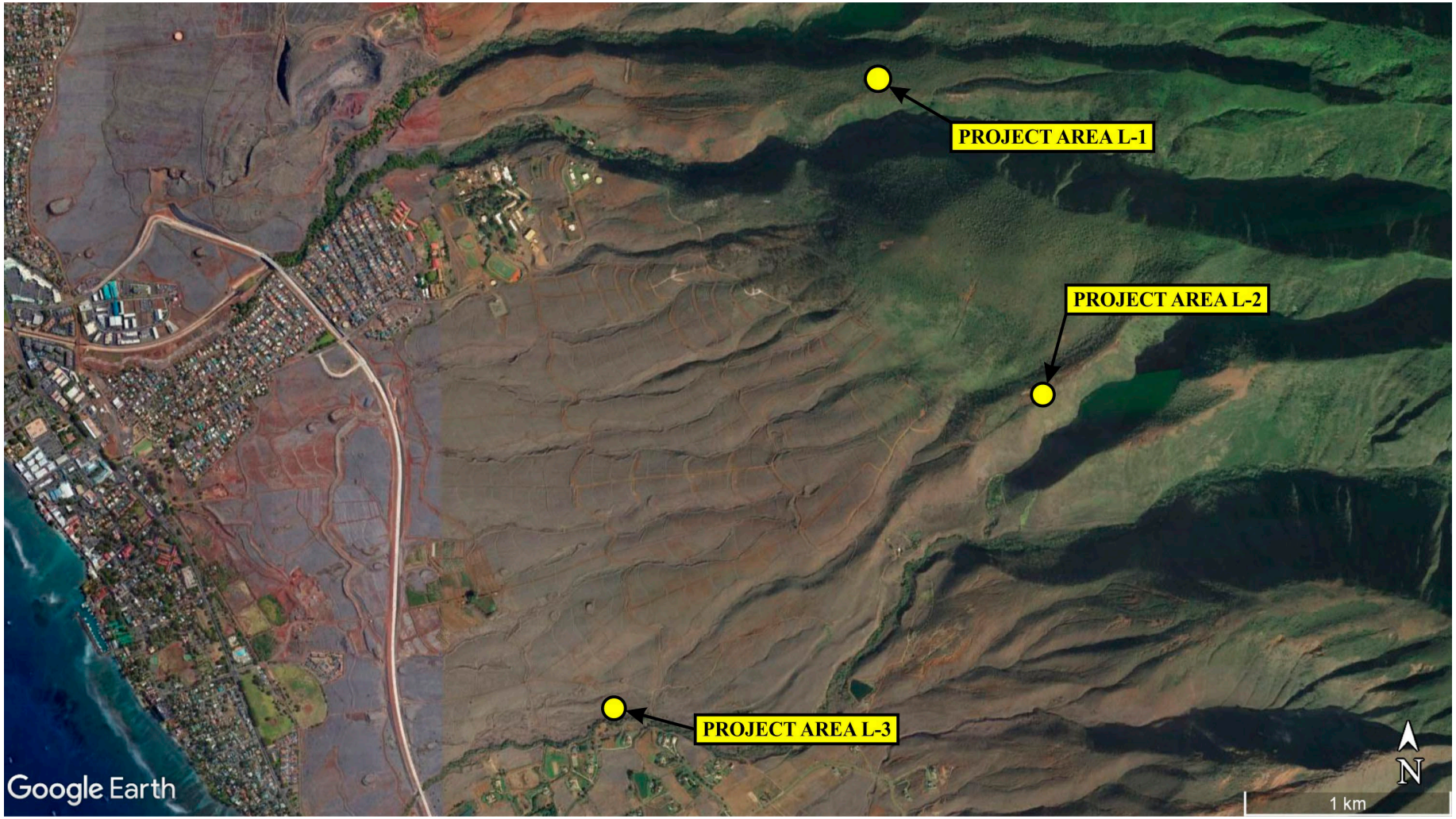

Figure 6: Google Earth aerial photograph showing project area locations for Launiupoko Aquifer Sites L-1, L-2, and L-3

All site inspections for the Launiupoko Aquifer Well Development project were conducted by SCS archaeologist Ian Bassford, B.A., under the supervision of principal investigator Michael F. Dega, Ph.D. The surveys were completed to assess the presence or absence of historic properties on the surface of the project area and determine the potential for subsurface cultural deposits.

This report presents the results of the archaeological field inspection of the project areas and an archival study of past land use and previous archaeological projects in the vicinity. It is not intended to meet the requirements of HAR §13-276 as an archaeological inventory survey (AIS). Through research of the archaeological, historical, and cultural background, this investigation is nonetheless intended to provide a cultural history of the project area and identify cultural resources that may be present in it and its vicinity.

ENVIRONMENTAL SETTING

Maui is the second largest island of the Hawaiian Archipelago. It was formed by two volcanoes, the younger and dormant Haleakalā in the east and the older and extinct Puʻu Kukui in the west, joined together by an isthmus of dry, open country. Haleakalā (from Hawaiian, "house of the Sun") is the larger of the two volcanoes, as it dominates the larger southeastern section of the island, soaring 3,055 meters (m; 10,023 ft) above mean sea level (amsl). The flanks of Haleakalā are distinguished by their gentle slopes toward the isthmus. Puʻu Kukui ("candlenut peak") in the west rises to 1,764 m (5,788 ft) amsl. The West Maui Mountains (Mauna Kahālāwai) are surrounded by large, heavily eroded, amphitheater shaped valleys that support permanent streams watering the fertile agricultural lands along the coasts. The deep valleys and coastal regions of West Maui, and the district of Lāhainā in particular, have been long contested and coveted lands remarkable for their productivity. Although the isthmus of Maui contains the population center Wailuki-Kahului, Lāhainā has been a historically important settlement in both Pre- and Post-Contact times.

PROJECT AREA LOCATIONS

The project area for each well site includes additional land to support pumping stations. The proposed well sites for Honolua Aquifer Sites H-1 and H-2 require about one acre of land, while the proposed well sites for Launiupoko Aquifer Sites L-1, L-2, and L-3 require about two acres. While the Honolua Aquifer System is located in lands used for pineapple cultivation that required irrigation and have been watered via the Honokōhau Ditch, Launiupoko Aquifer's former sugarcane lands contain substantial groundwater resources.

Honolua Aquifer Site H-1 and Honolua Aquifer Site H-2 are located about 2.8 miles from the ocean. The well sites are about 1,000 feet apart and within a 1,377-acre parcel owned by MLP [TMK: (2) 4-3-001:001]. These sites are located in the traditional district of Kāʻanapali, now Lāhainā.

Honolua Aquifer Site H-1 is situated at an elevation of about 1,280 ft amsl on a slope of about 16 percent. It is located primarily on privately owned land near the upper limits of an old pineapple field on the ridge between two streams. To the northeast of the site is Kaopala Gulch, and to the southwest is an unnamed tributary of Mailepai Stream.

Honolua Aquifer Site H-2 lies about 900 ft upslope of an old pineapple field on a ridge between two streams. An unnamed tributary of Mailepai Stream flows to the northeast, and Mailepai Stream is to the southwest. Situated on State owned land, Site H-2 is located at an elevation of about 1,240 ft amsl on a slope of about 12 percent.

Launiupoko Aquifer Site L-1 [TMK: (2) 4-6-018:007] is in Panaʻewa Ahupuaʻa. It is partially located on a 338-acre parcel owned by the State of Hawaii, although a small portion of it (an 1,800-ft long by 20-ft wide easement for a pipeline and access road) is privately owned. The site is about 2.8 miles from the ocean at an elevation of about 1,700 ft amsl on a slope of about 20 percent. Site L-1 is on a ridge between Kanahā Stream to the immediate south and Kahoma Stream to the north.

Launiupoko Aquifer Site L-2 [TMK: (2) 4-6-025:002] is in Mākila Ahupuaʻa, on a 2012.5-acre parcel owned by the West Maui Forest Reserve of the State of Hawaii. The site is on a narrow ridge about 2.7 miles from the ocean at an elevation of about 1,800 ft amsl and a slope of about 20 percent. Site L-2 lies between two unnamed gulches to the northwest and to the southeast. Located approximately 1,500 ft north of Kauaʻula Stream, the unnamed gulch to the southwest is a tributary of Kauaʻula Stream. Since Site L-2 is in a heavily vegetated and difficult to access area, it was deemed safest that it is surveyed from the air.

Launiupoko Aquifer Site L-3 [TMK: (2) 4-6-019:003] is at Hōkiokio Place in Waineʻe Ahupuaʻa, on a 16.6-acre parcel of land owned by the Department of Land and Natural Resources of the State of Hawaii. Situated on the north side of Kauaʻula Stream, the site is on an open, flat surface in an area once used for sugarcane production. The site sits less than 50 m *makai* (oceanward) of the old Kauaʻula Plantation Camp.

SOILS

According to Foote et al. (1972), the soil type at Honolua Aquifer Site H-1 and Site H-2 consists of Honolua silty clay (HwD), 15 to 25 percent slopes, as well as rough, broken, and stony land (rRS). The Honolua series consists of well-drained soils derived from basic igneous rock. The soil has a dark-brown surface layer about 12 inches thick and a dark reddish-brown and reddish-brown subsoil layer about 58 inches thick. The HwD soil type displays moderately rapid permeability, medium runoff, and moderate erosion hazard (Foote et al. 1972:42). Rough, broken, and stony land consists of very steep, stony gulches, where the local relief is generally between 25 and 500 ft with soil material general less than 20 inches deep over saprolite or bedrock (Foote et al. 1972:119).

The soil at Launiupoko Aquifer Site L-1 is Alaeloa silty clay (AeE), 15 to 35 percent slopes, and Lahaina silty clay (LaD), 15 to 25 percent slopes. Both the Alaeloa and Lahaina series consists of well-drained soils derived from decomposing volcanic rock found at high elevations. Characterized as having a dark reddish-brown surface layer about 10 inches thick, a dark-red and red subsoil layer about 48 inches thick, the AeE soil type exhibits moderately rapid permeability, medium runoff, and moderate erosion hazard (Foote et al. 1972:14). The LaD soil type displays medium runoff and moderate erosion hazard (Foote et al. 1972:79).

Foote et al. (1972:119) depicts the project area for Launiupoko Aquifer Site L-2 as straddling between rock outcrop (rRO) and rough broken land (rRR). While rRO soil type consists primarily of exposed bedrock, consisting mainly of basalt and andesite, the rRR soil type consists of very steep land broken by numerous intermittent drainage channels. Both land types are well-drained and are used for water supply and wildlife habitats. Rough broken land is characterized as having a variable composition with about 20 to over 60 inches over soft, weathered rock and active geologic erosion.

The soil at Launiupoko Aquifer Site L-3 is stony alluvial land (rSM). This land type consists of stones, boulders, and soil deposited along the bottoms of gulches and on alluvial fans by streams. This soil is generally considered difficult to improve because of its rockiness (Foote et al. 1972:120).

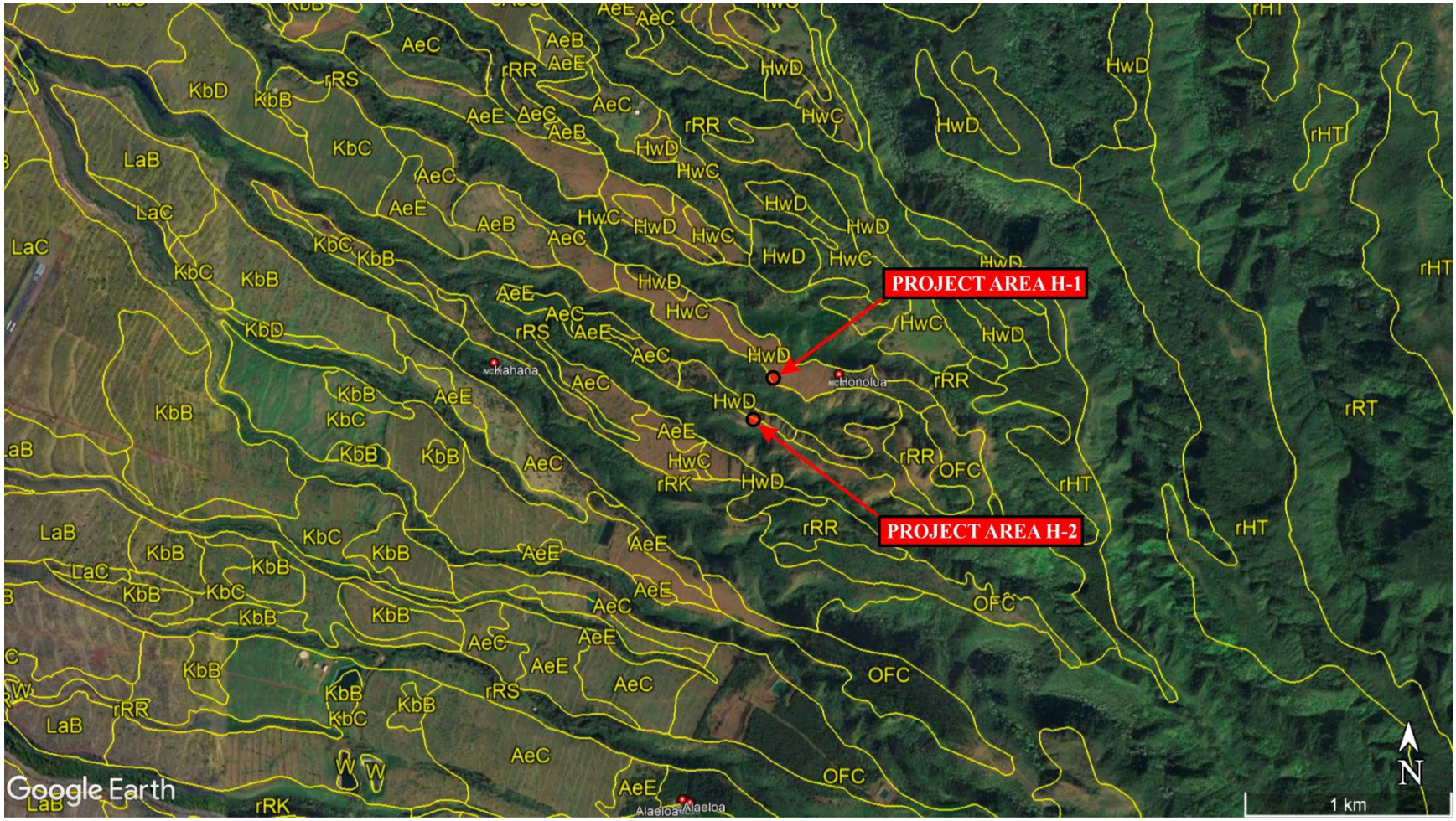

Figure 7: Google Earth aerial photograph showing soil series in the vicinity of project area locations for Honolua Aquifer Sites H-1 and H-2

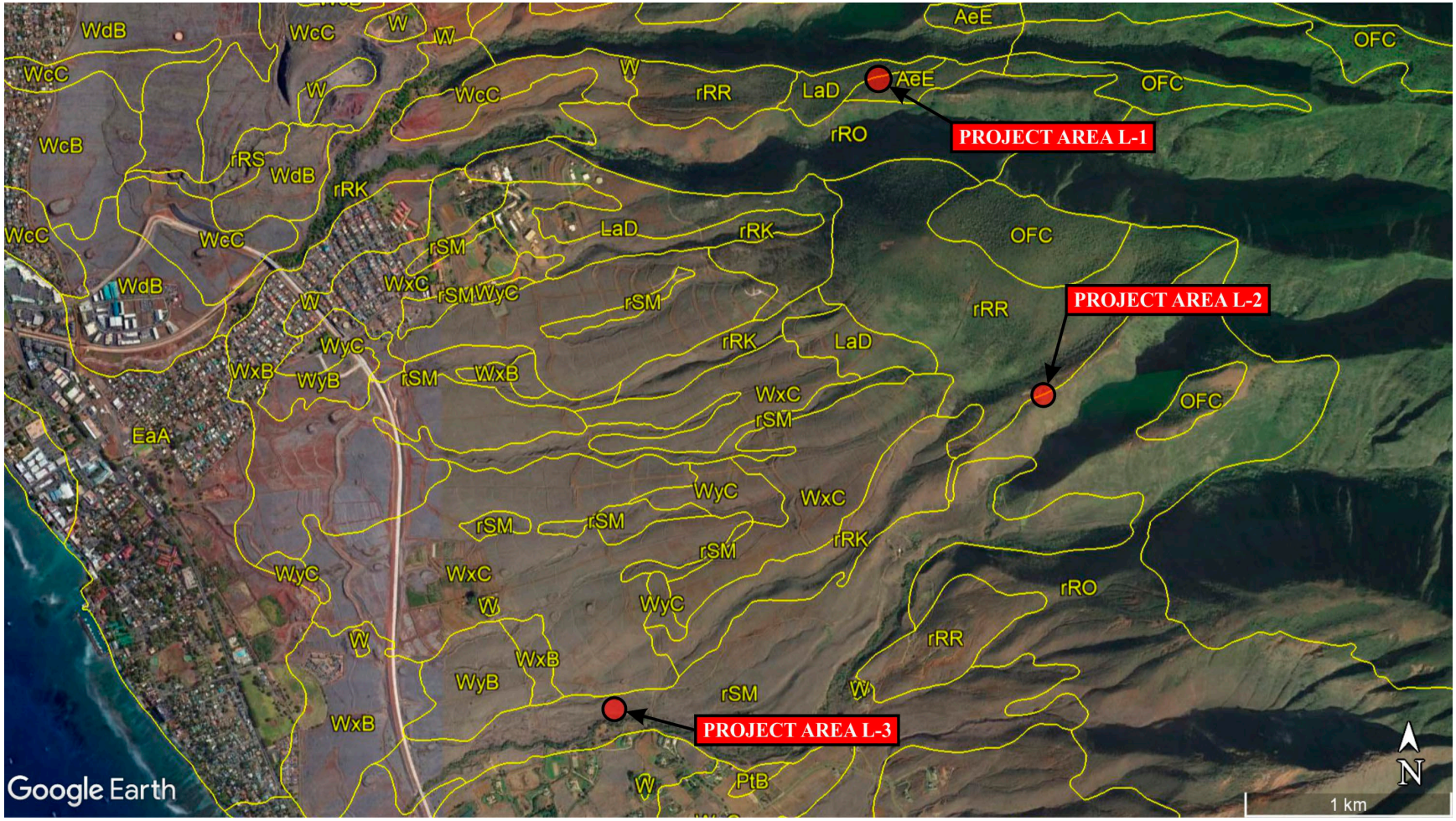

Figure 8: Google Earth aerial photograph showing soil series in the vicinity of project area locations for Launiupoko Aquifer Sites L-1, L-2, and L-3

CLIMATE AND HYDROLOGY

Because they are located on the leeward side of Mauna Kahālāwai, the aquifer well sites are in a rain shadow that impacts rainfall and air temperature. The typically moist trade winds bring precipitation to the northeastern slopes of this range, leaving the southwestern slopes relatively dry.

Honolua Aquifer Sites H-1 and H-2 receive an annual mean rainfall of 1,685 mm (66.3 in), with the lowest rainfall in September at 84.8 mm (3.34 in) and the highest in March at 216.2 mm (8.5 in). According to Giambelluca et al. (2013), the annual mean rainfall in the vicinity of the Launiupoko Aquifer Sites is 563.9 mm (22.2 in). The highest average rainfall of 96.5 mm (3.8 in) occurs in December. The area receives its lowest average rainfall in July at 16.6 mm (0.65 in).

The mean annual temperature at the Honolua Aquifer Sites H-1 and H-2 is 21.6 °C (70.9 °F). The lowest average temperature is 19.8 C (67.7 °F) in February, while the highest average is 23.4 C (74.1 °F) in August. For the Launiupoko Aquifer Sites, the mean annual temperature is 22.6 °C (72.7 °F), with the highest average temperature in August at 24.6 °C (76.3 °F). The lowest average temperature occurs in February at 20.6 °C (69.1 °F) (Giambelluca et al. 2014).

HISTORICAL CONTEXT

Archaeological data indicate that the initial settlement of the Hawaiian Islands by South Pacific Polynesians occurred on the windward shores around the 10th century, with populations extending into leeward areas at later periods (Kirch 2011:22). Most likely, human presence in the project area and its vicinity can be traced to the early period of agricultural development, which on Maui began circa 1200–1400 (Kirch 1985:142).

Traditionally, Maui's division into *moku* (districts) and *ahupua'a* (subdistricts) was established by a *kahuna* (priest) named Kalaiha'ōhia during the time of *ali'i* (chief) Kaka'alaneo (Beckwith 1970:383); Abraham Fornander places Kaka'alaneo at the end of the 15th or the beginning of the 16th century (Fornander 1916/1917, Vol. 4:248). The *ahupua'a* subdivisions were meant to incorporate natural resources relevant to traditional subsistence from the ocean to the mountain peaks (Lyons 1875:111). These ancient divisions are still commonly used to locate and refer to geographical features of the islands (Sterling 1998:3). The *'ili* were smaller land divisions administered by the chief who controlled the corresponding *ahupua'a* (Lyons 1875:33; Lucas 1995:40). Finally, the *mo'o* were narrow strips of land within an *'ili*. The land holding of a tenant (*hoa 'āina*) was called a *kuleana* (right, privilege) (Lucas 1995:61). Figure 9 shows the traditional and contemporary district boundaries on Maui.

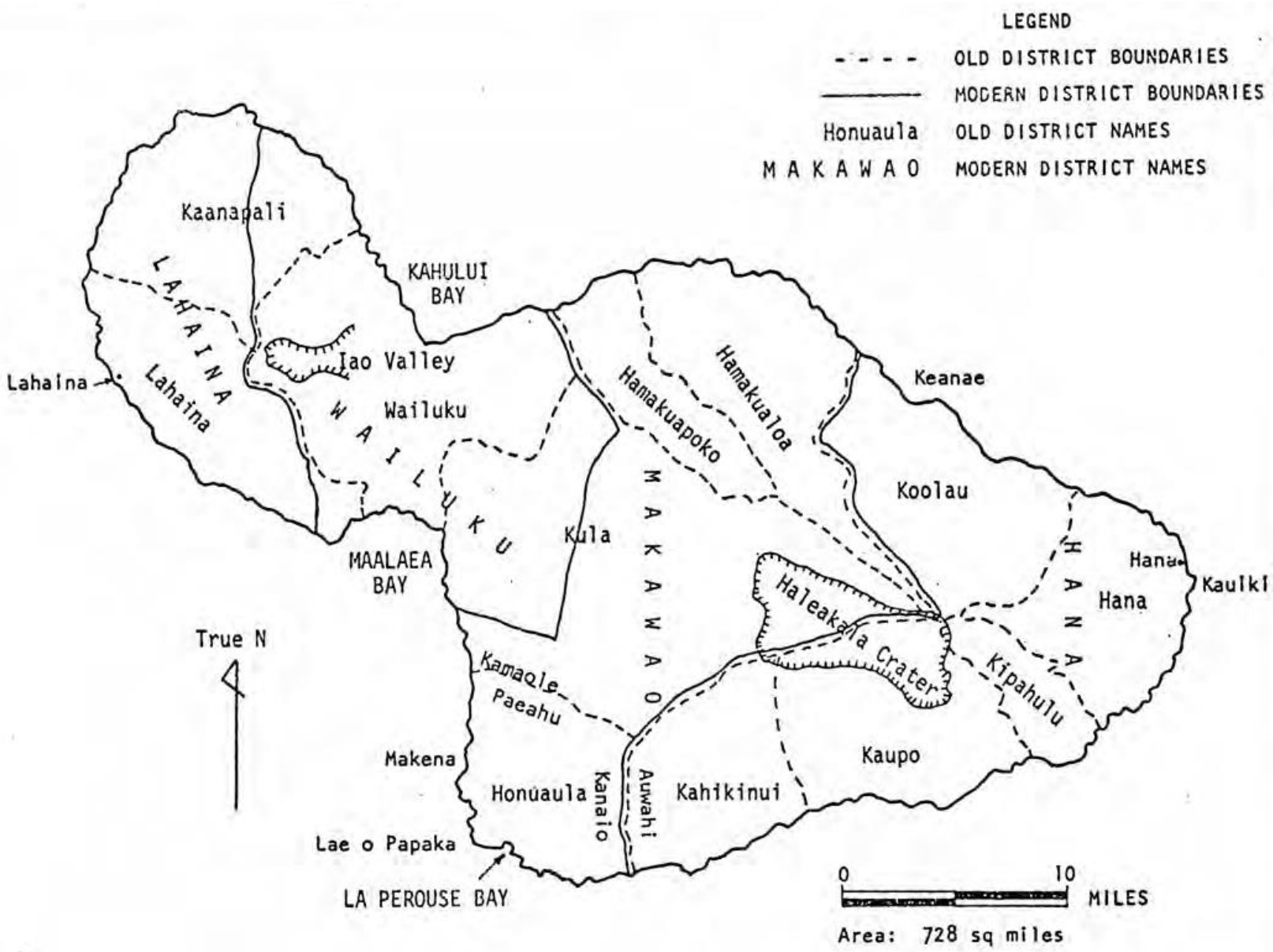

Figure 9: Traditional and modern districts of Maui (c. 1875; Barrère 1975:31)

PRE-CONTACT POLITICAL HISTORY

According to oral history, chief Haho (early 12th century) formally established his rulership and prestige with an archipelago-wide chiefly council (Fornander 1880, Vol. 2:28). By the 1400s, power on Maui was consolidated into two polities, western and eastern (Kolb et al. 1997:16), and that continued until the unification by Wailuku based *ali'i* Pi'ilani in the late 1500s. Along with consolidating power, he also raised Maui's political status by ruling judiciously and by using his connections with the reigning chiefly families of O'ahu and Hawai'i Island (Fornander 1916/1917, Vol. 4:87).

Pi'ilani's possessions were inherited by his firstborn son, Lono-a-pi'ilani. According to the oral tradition, after a rift between Lono-a-pi'ilani and his younger brother, Kiha-a-pi'ilani (born c. 1626), the latter took refuge in Kula District. Subsequently, he traveled to the island of Hawai'i, which was the kingdom of their brother-in-law, 'Umi-a-līloa, and convinced him to send an army to Maui in order to avenge Kiha-a-pi'ilani and dethrone Lono-a-pi'ilani (Fornander 1918/1919, Vol. 5:178–80). According to one version, Lono-a-pi'ilani was eventually captured and killed by 'Umi's troops in Waihe'e, on the other side of Mauna Kahālāwai. Contrarily, Samuel Kamakau (1961:31) recorded that the Wailuku chief died of terror before the invading army even reached his residence. In any case, after the invasion Kiha-a-pi'ilani became the sole ruler of Maui.

The 18th century was marked by the rivalry between Maui and Hawai'i Island. At the end of his reign, the ambitious but ruthless Ke-kau-like (c. 1700–1736) launched an expedition from to Kohala on Hawai'i Island. After returning to Kaupō in Southern Maui, he developed an acute and fatal case of what Kamakau (1961:69) describes as possible epilepsy ("*ka-maka-huki-lani*," or "eyes drawn heavenward"). Ke-kau-like's heir was Kamehameha-nui, son of a half-sister of Hawai'i Island chief Alapa'i-nui. When the Hawai'i chief arrived in Maui with a retaliatory force, he found out that Ke-kau-like was dying and that his nephew was about to inherit the island (Kamakau 1961:70).

Alapa'i came in defense of Kamehameha-nui when Ka-uhi-'aimoku-a-kama, an older brother of the Maui chief, rebelled. The king of Hawai'i established his headquarters at Lāhainā, while the rest of his army occupied the coast extending from Honokōwai to Ukumehame. With the pending arrival of Pele-'io-holani from O'ahu, who was to assist Ka'uhi, Alapa'ii destroyed the *kalo* (taro, *Colocasia esculenta*) patches and broke down *'auwai* (irrigation ditches) belonging to the followers of Ka'uhi in the vicinity of Lāhainā. Alapa'i's war tactics involved drying up the streams and barring Ka'uhi from accessing other streams in West Maui (Kamakau 1961:74). Eventually the forces met.

> The fortune of the battle swayed back and forth from Honokowai to near Lāhainā; and to this day heaps of human bones and skulls, half buried in various places in the sand, attest to the bitterness of the strife and carnage committed. [Fornander 1969, Vol. 2:140]

Thus, with the help of his uncle, Kamehameha-nui defeated Kaʻuhi in 1738, securing his rule over Maui once again.

The island enjoyed a period of relative peace and prosperity before conflict returned with wars between Kahekili II (c. 1737–1794), another of Ke-kau-like's sons, and Hawaiʻi chief Kalaniʻōpuʻu (c. 1729–1782). Shortly before Captain Cook's arrival, Kalaniʻōpuʻu's armies from Hawaiʻi landed and plundered Honuaʻula District in East Maui and moved to Māʻalaea Bay, from where the chief planned to invade Wailuku (Fornander 1916/1917, Vol. 4:147–57). After losing two battles, Kalaniʻōpuʻu welcomed a truce, concentrating his efforts on the east, protecting Hāna and Kīpahulu, which were spoils from a battle in 1759 (Fornander 1916/1917, Vol. 4:147).

TRADITIONAL SETTING OF KĀʻANAPALI

The traditional district of Kāʻanapali extends north and west from Kekaʻa Point to ʻIli O Kukuipuka, encompassing five major stream valleys (Honokōwai, Kahana, Honokahua, Honolua, and Honokōhau) draining the leeward slopes of West Maui (Sterling 1998:46; Handy and Handy 1972:494). "The valleys of Honokōhau, Honolua, and Honokōwai merge together at around 4,000 [amsl], below Lake Manowai where the headwaters begin" (Anderson 2016:113). During the Pre-Contact Period, these valleys were productive wet *kalo* lands with extensive *loʻi* systems, which were reportedly used into the early 20th century.

Jacques Arago (1823:119–20), a draftsman and artist, with Captain Louis Claude de Sauses de Freycinet, documents that the area surrounding the village of Lāhainā was "dry and barren" shortly after contact with Westerners. In contrast, David Thomas Fleming (cited in Handy 1940:106) visited the valleys of Northwestern Maui and reported:

> Honokowai, Honokohua and Honolua, as well as Kahana, there was considerable taro raised in olden times; as a matter of fact, a great deal was raised in Honokowai, where there must have been 30 or 40 acres under cultivation at one time. [Handy 1942:106]

In addition to watering the valleys, the streams of Lāhainā provide water for the six bays located on the western shores of Maui. These bays and coves, whose names begin with *Hono-*, include Honokahua, Honokeana, Honokōhau, Honokōwai, Honolua, and Hononana, which are collectively known as "Hono a Piʻilani," literally "the bays [acquired] by [Chief] Piʻilani" (Pukuʻi et al. 1974:48).

Handy and Handy describe the agricultural activities of Kāʻanapali:

> North of Lahaina are five valleys watered by streams draining the western slopes of the West Maui watershed: Honokawai, Kahana, Honokahua, Honolua, and Honokohau. The first four all had extensive loʻi lands in their valley bottoms, where terraces rose tier on tier in symmetrical stone-faced loʻi.… In 1931 a greater proportion of loʻi were still planted here than anywhere else on this side of Maui, but by 1934 commercial planting and exhaustion of the soil had brought in root-rot, and some of the large loʻi were abandoned, and some were planted in rice. [Handy and Handy 1972:494]

Traditionally, trails extended from the coast to the mountains, linking the two for both economic and social reasons. Kāʻanapali District is noted for Ala-loa (long trail) that reportedly encircled the entire island. Walker (cited in Sterling) wrote:

> The north end of Maui also is traversed by a paved trail. Sections of it can be seen from Honolua to Honokohau to Kahakuloa. It is paved with beach rocks and has a width of four to six feet.… This trail is also spoken of as the Kihapiilani Trail. [Sterling 1998:46]

TRADITIONAL SETTING OF LĀHAINĀ

Despite the comparatively dry conditions and paucity of perennial streams on the leeward side of Mauna Kahālāwai, Lāhainā District served as a chiefly center for centuries. The district was favored for its abundant resources from both land and sea, favorable climate, easy communication with other populated areas around West Maui, and proximity to the outer islands of Molokaʻi and Lānaʻi (Handy and Handy 1972:492).

Originally known as Lahaʻina, Lāhainā, which literally translates to "cruel sun," is said to be named for a time of terrible droughts (Pukuʻi et al. 1974:127). Launiupoko is known to be rocky and dry, as rainfall is scarce. In *The Hawaiian Planter* (1940), Handy states:

> Although there is a sizable stream bed and a deep valley here, there is no visible evidence of wet taro cultivation, and the Hawaiian planters at Olowalu say that loʻi never existed in Launiupoko. It is possible that there may have been a few terraces on the level land at the base of the valley, but this is wholly arid land now and covered with dense brush. [Handy 1940:103]

According to Handy and Handy (1972:272), Lahaina District is "flanked by excellent fishing grounds." Elspeth Sterling (1998:27) quotes A.D. Kahāʻulelio: "[t]he schools of *nehu* [anchovy, *Stolephorus purpureus*; bait fish used to catch tuna] were accustomed to coming in to Launiupoko and Keonepoko in the District of Lahaina, and sometimes at Mala."

Kahāʻulelio also wrote of shark fishing in the area:

> Hoomoemoe Fishing for Sharks—It was much practiced by old timers of this ahupuaʻa of Makila, and also by the people of the upland of Kauaula since we were children…. The kinds of sharks caught by the hoomoemoe method were lalakea and hammerheads…the place where hoomoemoe fishing was done was at Pahee, in Launiupoko, Lahaina. When you arrive at the little cape of Keahuiki and down the small incline, the first stretch you come to extending over to the rocky beach and adjoining with the sand on the left side, that is the place where the nets were laid. [Sterling 1998:27]

EARLY POST-CONTACT PERIOD

The Post-Contact Period in Maui begins on November 26, 1778, when British Explorer Captain James Cook passed by the island on his way back from the extreme Northern Pacific (Daws 1974:8). Unfortunately, the expedition left no written records of West Maui and its coast.

At the time of Cook's visit, the war between Kalaniʻōpuʻu and Kahekili II had not been over, and the latter was preparing for another attack (Speakman 1978:26). For a while the internal affairs on the island proceeded independently of significant Western influence. In fact, the height of Maui's political power was reached during the reign of the ambitious Kahekili II in 1783, just five years after the encounter with Captain Cook (Kolb et al. 1997:3). Yet, that moment of superiority proved ephemeral: by May 1790 the chief's soldiers were pushed back into ʻĪao Valley by Hawaiʻi's Kamehameha I (1758–1819), a young and ambitious chief who had enlisted the help of Western advisors Isaac Davis and John Young and the cannon Lopaka (Daws 1974:35). Some surviving *aliʻi* and warriors managed to escape over the trail to Olowalu from where they left the island (Kamakau 1961:149).

By the early 1800s, Kamehameha designated Lāhainā the capital of the Hawaiian Kingdom and constructed a brick palace named Mokuʻula, from which he collected the taxes. Lāhainā served as the capital of the Hawaiian Kingdom from that time until 1850 when Kamehameha moved it to Honolulu.

Early descriptions of Lāhainā village provided by Westerners paint a picture of idyllic tranquility and cooperation among the inhabitants. Archibald Menzies, a surgeon and naturalist aboard the *HMS Discovery* with Captain George Vancouver, stated that he "observed the rugged banks of a large rivulet that came out of a chasm cultivated and watered with great neatness and industry" (Handy and Handy 1972:493). Menzies (1920:112) describes a tour of the village as follows:

> I accompanied Captain Vancouver and a party of the officers, with the two Niihau women, to see the village of Lahaina, which we found scattered along shore on a low track of land that was neatly divided into little fields and laid out in the highest state of cultivation and improvement by being planted in the most regular manner with the different esculent roots and useful vegetables of the country, and watered at pleasure by aqueducts that ran here and there along the banks intersecting the fields, and in this manner branching through the greatest part of the plantation.
>
> …. In short, the whole plantation was cultivated with such studious care and artful industry as to occupy our minds and attention with a constant gaze of admiration. [Menzies 1920:112]

Little had changed 26 years later, when Arago visited Hawai‘i with Captain de Freycinet in 1819. Impressed by the verdant quality of Lāhainā and the skill the Hawaiians exhibited in farming, Arago writes:

> The environs of Lāhainā are like a garden. It would be difficult to find a soil more fertile, or a people who can turn it to a greater advantage; little pathways sufficiently raised and kept in excellent condition.… These are frequently divided by trenches, through which a fresh and limpid stream flows tranquilly, giving life to the plantation, the sole riches of the country. … Every cabin has its enclosure, and every enclosure is well taken care of; it seems to suffice for the wants of the family. [Arago 1823:119-120]

Freycinet was also impressed with the fertility of Lāhainā:

> Here were found vast orchards of the paper mulberry, whole fields of bananas and of sugar cane of fine appearance, fields of taro and other vegetables fit for human food, enormous breadfruit trees scattered here and there, finally the fertility and freshness of the soil everywhere maintained by frequent irrigation and well husbanded. [Kelly 1978:32]

In 1819, the first whaling ship *Bellina* arrived in what would later be known as Lāhainā Harbor. As Western influence grew, Lāhainā became the center of commercial whaling in the Pacific until the mid-1800s. During the golden age of whaling (1843–1860), the town underwent a building boom and became saturated with sailors, whalers, Western businessmen, and Christian missionaries. Lāhainā had been providing supplies, sailors, and recreation for voyagers participating in the trans-Pacific fur or sandalwood (*Santalum* sp.) trade since the beginning of the century, but by the 1830s the advantages of its harbor over that in Honolulu were apparent. At its peak in 1846, Lāhainā received 429 whale ships, compared to the 167 that visited Honolulu (Speakman 1978:98). After the decline of whaling, however, the importance of Lāhainā and its environs waned, and the district and its surroundings became a base for sugarcane plantations.

THE MĀHELE

In the 1840s, Kauikeaouli (Kamehameha III, r. 1825–1854) introduced private land ownership (Kuykendall 1938; Kelly 1983). The transition from communal to private land use is commonly called the "Māhele" (division). The name may also refer to a separation between the people and the *ʻāina* (land), as many Hawaiians lost control over and were dispossessed of their homeland (Daws 1974:128). Hawaiians, however, were not passive observers. Even though by 1900 "white men owned four acres of land for every one owned by a native" (Daws 1974:125), records show that Hawaiian commoners (*makaʻāinana*) were able to purchase an estimated 167,290 acres of land between 1850 and 1893 (Beamer and Tong 2016).

The Māhele set the stage for consequential changes to property possession in the islands as it introduced Western legal practices. As early as 1841, the legislature allowed island governors to lease lands to foreigners for up to 50 years. These leases were then to be registered "in writing so that there be no misunderstandings about terms and rents" (Daws 1974:125). The question of land reform was set aside in 1843 because of the five-month occupation of the islands by British naval officer George Paulet, but once the kingdom was stable again and Kauikeaouli felt secure at its helm it was brought back. By 1844, many chiefs were warming up to the proposal for a formal land division, and the Board of Commissioners to Quiet Land Titles (the Land Commission) was established in 1845 for "the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any land property" (Chinen 1958:8).

The Māhele of 1848 divided the lands between the king, the chiefs, and the government. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were made available, the *makaʻāinana* were able to claim the plots on which they had been living and cultivating through the Kuleana Act of 1850. These claims did not include any fallow lands, stream, or many other resources necessary for traditional survival strategies (Kameʻeleihiwa 1992:295). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take legal possession of the property (Chinen 1961:16). Foreigners could acquire land through the Alien Landownership Act of 1850. Commoners, however, would only make claims if they had first been made aware of foreign procedures such as the awarding of *kuleana* lands and LCAs.

According to the Office of Hawaiian Affairs Kipuka database (n.d.), a single grant overlaps with the TMK of Honolua Aquifer Sites H-1 and H-2. Grant 1166 was awarded to American Protestant missionary Dwight Baldwin in 1853. A portion of 2,675 acres were granted. There are 23 LCAs associated with the TMK as listed in Table 1. A number of unmapped Land Awards are also present in the parcel.

The portion of TMK: (2) 4-6-018:007 in which the Launiupoko Aquifer Site L-1 is situated includes 1.04 acres awarded to L.S. Ua with Grant #723 in 1852. In addition to many unmapped land awards, 20 LCAs are documented in the TMK: (Kipuka n.d.). The LCAs are listed in Table 2.

Kipuka (n.d.) notes a deed transfer in 1855 from Kamehameha III to Kalua regarding a portion of the TMK in which Launiupoko Aquifer Site L-2 lies. The deeded land was former Crown Land that was exchanged for Kehena in Puna on the island of Hawai‘i. Grant #3343, a portion of 24,000 acres awarded to Claus Spreckles in 1882, also includes part of TMK: (2) 4-6-025:002. Five LCAs associated with the project area are listed in Table 3. Kipuka references numerous unmapped Land Awards in the parcel as well.

The Launiupoko Aquifer Site L-3 lies within Waine‘e Ahupua‘a, which was designated Crown Land and Government Land in 1848. It was surrendered in lieu of commutation. According to Kipuka (n.d.), part of TMK: (2) 4-6-019:003, in which Launiupoko Aquifer Site L-3 lies, is located within Grant #725:4, which is a portion of 22.08 acres that was awarded to Namau‘u in 1852. Four LCAs associated with the project area are listed in Table 4. Kipuka notes many unmapped Land Awards in the Tax Map Key parcel as well.

Table 1: LCAs within TMK: (2) 4-3-001:001 (Honolua Aquifer Sites H-1 & H-2)

Award	Helu	Claimant	Patent Grant	Notes:
1855	8522 B:1	Kale Davis	2236	Claim Honokahua Ahupua‘a
1852	3925 L:4 & 6	Ili	729	Located in Honokeana Ahupua‘a
1859	4252:2	Kaaukea	4566	Located in ‘Alaeloa Ahupua‘a
1859	4245:1 & 2	Kaleiopu	4567	Located in ‘Alaeloa Ahupua‘a
1873	4240:1 & 2	Kau	6384	Located in Honokeana Ahupua‘a
1891	3925 O	Kekaa	7948	Located in Honokeana Ahupua‘a
1854	5524:1	L. Konia	1663	Claim Nāpili Ahupua‘a
1854	5524:2	L. Konia	1663	Claim Honokeana Ahupua‘a
1854	5524:3	L. Konia	1663	Claim ‘Alaeloa Ahupua‘a
1854	5524:4	L. Konia	1663	Claim Mailepai Ahupua‘a
1859	3801:2 & 3	Lupea	4569	Located in ‘Alaeloa Ahupua‘a
1859	3687:1	Ioba Malo	4570	Located in ‘Alaeloa Ahupua‘a
1859	4740:1 & 2	Manuwai	4699	Located in ‘Alaeloa Ahupua‘a
1859	4740:4	Manuwai	4699	Located in Honokeana Ahupua‘a
1859	3925 K:2	Miki	4568	Located in Honokeana Ahupua‘a
1859	4807:2 & 5	Nika	4697	Located in ‘Alaeloa Ahupua‘a
	10813:5	Palina		Located in ‘Alaeloa Ahupua‘a

Table 2: LCAs within TMK: (2) 4-6-018:007 (Launiupoko Aquifer Site L-1)

Award	Helu (Number)	Claimant	Patent	Notes:
	58:2.2	Mapu		Located in Kapunakea Ahupuaʻa
	3702:2.1	Davida Malo		Located in Moaliʻi Ahupuaʻa
1865	2320:2	Mere	5579	Located in Moaliʻi Ahupuaʻa
1852	486 C:3	Uluoa	1113	Located in Moaliʻi Ahupuaʻa
1853	6391:2	Kekualele	1177	Located in Aki Ahupuaʻa
1854	3422 B:1	Kekahuna	1678	
1854	6787:2	Hanaumua	1701	
1854	10968:2	Wahie	1752	
1855	4320:2	Kaua	1960	
1856	962:3	Joaquin Armas	2754	
1856	7587:2.3	T. Keaweiwi	2649	
1858	8452:4.3	A. Keohokalole	4388	
1861	7713:25	Victoria Kamāmalu	4475	Claim Aki Ahupuaʻa
1861	7713:26	Victoria Kamāmalu	4475	Claim Paunau Ahupuaʻa
1902	7716:11.1	Ruth Keelikolani	8146	Claim Kuʻia Ahupuaʻa
1911	3424 B:3	Kaleleiki	8251	
1854	3422 B:1	Kekahuna	1678	
	11216:15	Mataio Kekauonohi		Claim Panaʻewa Ahupuaʻa
1928	11216:15.2 & 3	Kekauonohi	8390	Claim Panaʻewa Ahupuaʻa

Table 3: LCAs within TMK: (2) 4-6-025:002 (Launiupoko Aquifer Site L-2)

Award	Helu (Number)	Claimant	Patent	Notes:
1861	7713:26	Victoria Kamāmalu	4475	Claim Paunau Ahupuaʻa
1855	6912:1	Kapili	1886	Located in Kuʻia Ahupuaʻa
1902	7716:11.1	Ruth Keʻelikōlani	8146	Claim Kuʻia Ahupuaʻa
1928	8525 B:6.2	Julia Alapai Kauwa	8403	Claim Mākila Ahupuaʻa
	11216:15	Mataio Kekauonohi		Claim Panaʻewa Ahupuaʻa

Table 4: LCAs within TMK: (2) 4-6-019:003 (Launiupoko Aquifer Site L-3)

Award	Helu (Number)	Claimant	Patent	Notes:
1858	4878 N:2	Kaekae	4377	Located in Waineʻe Ahupuaʻa
1871	5207 B:1	R. Kalaipaihala	5660	Located in Waineʻe Ahupuaʻa
1875	8520:3.1	Iosua Kaeo	6727	Claim Halakaʻa Ahupuaʻa
1928	8559 B:25	William C. Lunalilo	8395	Claim Polanui Ahupuaʻa

MID-19TH CENTURY TO PRESENT

Sugar Production

The whaling industry started to decline in the late 1850s (Speakman 1978:111). As a result, the economy of West Maui began to restructure itself. Sugar came to dominate Maui's economy for nearly a century starting in the 1860s. Commercial sugar production had taken place around Lāhainā as early as 1837. "The sugar & molasses of the higher chiefs are all made at the mills of the common natives," Baldwin wrote in his 1837 station report. He also noted that two of the three sugar mills in operation in Lāhainā were owned by Hawaiians (MacLennan 1995:40). In West Maui, commercial sugar was concentrated between Kāʻanapali and Lāhainā.

The Māhele made land easier to obtain, and vast areas were purchased for sugar cultivation. In 1861, James Campbell began a sugar plantation and eventually established a mill in Lāhainā. Founded by James Campbell, Henry Turton, and Benjamin Pitman in 1859, the Pioneer Mill Company became largest and most successful company, owning 900 acres and able to produce 2,000 tons of sugar in 1884. The Pioneer Mill Company increased its acreage of cultivated land throughout Lāhainā and Kāʻanapali. By 1883, the company owned railroad running from its mill in Lāhainā to Honokōwai (Condé and Best 1973:252–53).

Pioneer Mill Co. reorganized in 1900 at a time when its cane fields were located for 10 miles along the coast with some areas extending back as far as 2.5 miles inland. Sugar would be processed and bagged at the mill in Lāhainā and taken by train to a landing on the north side of Puʻu Kekaʻa. In addition, the company constructed oil and molasses tanks, as well as a pavilion and some beach cottages for use of its personnel. There was even a quarter-mile track for holiday horse racing on the tidal flats behind Hanakaʻōʻō (Clark 1989:61).

Pioneer Mill's railroad began operations in May 1882 when the Minister of the Interior of the Kingdom granted permission to Henry Turton, one of the originators of the Lahaina Sugar Plantation, to proceed with construction. By the following summer it was completed, running from its terminus at Honokōwai along the coast to the mill at Lāhainā (Condé 1973 and Best 1973:252–53). In 1919, the railroad was extended to Kahana and beyond, though the service was no longer utilized by 1953. The Kāʻanapali Landing was abandoned even before World War II.

With the increase in tourism in the 1950s, sugar plantations went into decline. By 1957, American Factors, owner of the Pioneer Mill Company, had plans for a multimillion-dollar resort to be built around Puʻu Kekaʻa, behind the beaches. Replacing the plantation's beach cottages, the company's first hotel in the complex, the Royal Lahaina, was opened in 1962, with the Sheraton Maui Hotel soon after in 1963 (Clark 1989:61). Tourism remains the major economic sector today.

Cattle Ranching & Pineapple Production

James Campbell established Honolua Ranch in the late 19th century when ranching came to Maui. Under later owner Henry Perrine Baldwin (1842–1911), a son of Dwight Baldwin, and his descendants, the ranch was successful and expanded to encompass the *ahupua'a* of Honolua, Honokōwai, Honokōhau, Kahana, Māhinahina, and Mailepai (Ashdown 1972). The manager of the venture after 1892 was Richard Cooper Searle, Sr., during whose time weekly interisland steamers stopped at Honolua Bay to pick up cattle hides and coffee produced by the ranch (Clark 1989:67). In 1904, Honolua Ranch built Honokōhau Ditch, an extensive irrigation system (Wilcox 1996:126). Baldwin died in 1911, but operations did not cease.

In 1912, Searle was succeeded by horticulturalist David T. Fleming, who had experience in growing pineapple from past work in Ha'ikū. Fleming shifted operations to focus on commercial pineapple production (Clark 1989:67). A pineapple cannery was constructed in Honolua in 1914 but moved to Honokahua in 1915. In 1920, the operation changed its name to "Baldwin Packers," reflecting that it not only grew but processed and canned pineapple. The plantation communities of Honokahua and Nāpili emerged and developed as operations grew. Lāhainā's population rose to supply workers and services for the booming industry, especially after canning was moved to the larger Lāhainā cannery close to the waterfront (Maui Land and Pineapple Company, Inc. n.d.).

Baldwin Packers merged with MLP in 1962. By the 1960s, commercial agriculture was declining in favor of tourism, with the development of golf courses, hotels, condominiums, and shops maintaining activity in the region. Soon after the merger, plans were made to establish a resort on previous agricultural lands. Much of the Honolua Ranch lands were converted for resort development, a process that continues to this day. Hotels, such as the Ritz-Carlton Kapalua and the Residences at Kapalua Bay, now occupy former pineapple fields of Honolua Ranch.

PREVIOUS ARCHAEOLOGY

The first archaeological work in the Lāhainā area was the island-wide inventory of religious structures compiled by Winslow Walker in 1929 and 1930 under the auspices of the Bernice Pauahi Bishop Museum (Walker 1931). He identified Apahua Heiau (Walker Site 8), built by Chief Hua-a-Pohukaina. Situated in Ku'ia Ahupua'a, Apahua Heiau is located at Waine'e in the sugarcane fields by the power house (Lahaina Pump) of Pioneer Mill Company (Ashdown 1962). It has been subsequently designated as State Inventory of Historic Places (SIHP) Site 50-50-03-00008. Most of the archaeological work near the project areas, however, is much more recent. Figures 10 and 11 depict the locations of studies in the vicinity of the proposed aquifier sites.

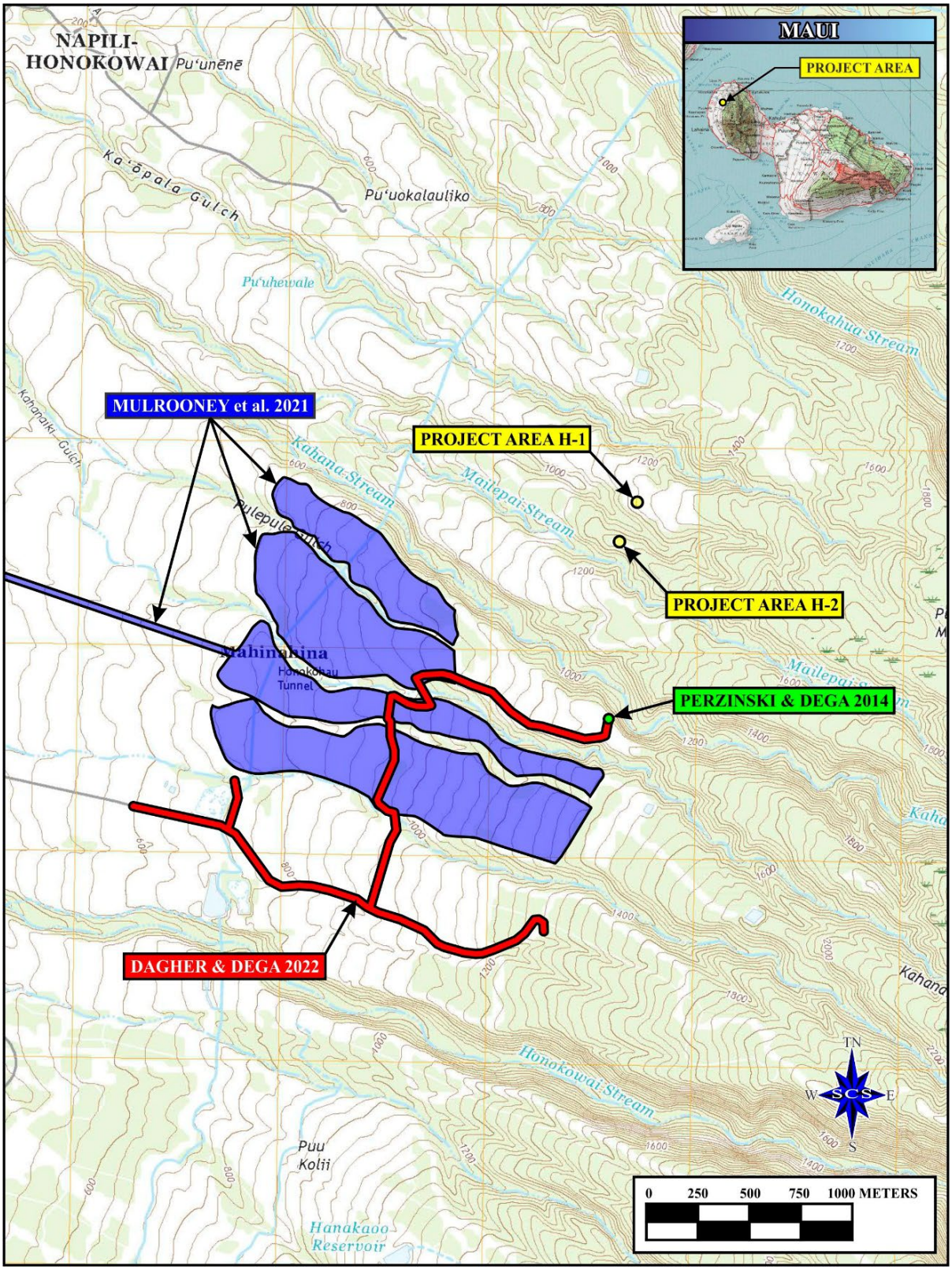

Figure 10: USGS topographic map showing previous archaeology in a roughly 1.0-mile radius around the locations of Honolua Aquifer Sites H-1 and H-2

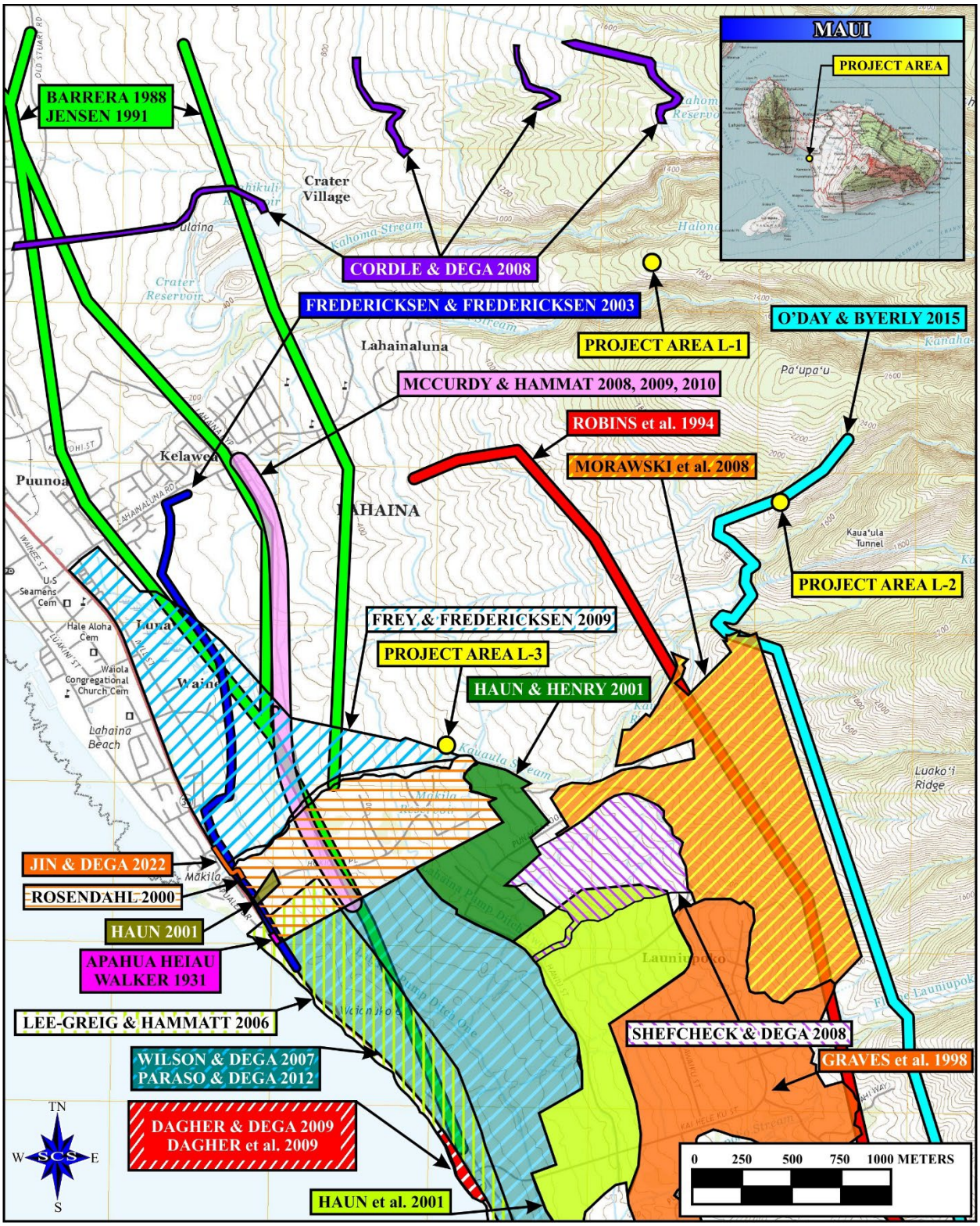

Figure 11: USGS topographic map showing previous archaeology in a roughly 1.0-mile radius around the locations of Launiupoko Aquifer Sites L-1, L-2, and L-3

HONOLUA AQUIFER SITES H-1 & H-2

Perzinski and Dega (2014) of SCS conducted an AIS for West Maui Well No. 2 on an approximately 1-acre land parcel in Kahana Ahupuaʻa, Lāhainā District [TMK: (2) 4-3-001:017]. No historic properties were identified. This absence of findings is presumed to be a result of wide-scale, industrial-level pineapple cultivation across the project area and beyond.

In 2020, Mulrooney et al. (2021 [in review]) of Pacific Legacy conducted an AIS of a 412-acre area for the Kahana Solar Project [TMK: (2) 4-3-001:017 por.; (2) 4-3-001:082 por.; (2) 4-3-001:084 por.]. A pedestrian survey, 20 backhoe trenches, and geotechnical testing documented 14 historic properties, comprised a total of 133 features, all of which were related to Post-Contact activities, primarily plantation agriculture (88 features) and water management (35 features). This includes 19 features associated with Honolua/Honokōhau Ditch, which were assigned as features of Honokahua Historic District, Site 50-50-01-01591. The other 13 archaeological sites were designated Sites 50-50-01-08851 through 50-50-01-08863.

SCS (Dagher and Dega 2022) also conducted an AIS for the West Maui Water Source Development Project. The locations of the proposed wells and associated infrastructure include multiple *ahupuaʻa*, extending into Honokōwai, Kahana, and Māhinahina 4 Ahupuaʻa, all within Lāhainā District (Kāʻanapali Moku). The project area consists of 11.5 acres situated within lands previously used for commercial sugar and pineapple cultivation. This includes lands currently owned by MLP. The study involved two full pedestrian surveys of the entire area, as well as subsurface testing via the excavation of 45 stratigraphic trenches. The second survey was performed to address concerns about transect spacing and attention paid to caves in gulches in the first survey. Three component features of the Site -01591, a segment of the Honolua/Honokōhau Ditch, a pump house associated with the ditch, and a bridge, were identified.

LAUNIUPOKO AQUIFER SITES L-1, L-2, & L-3

Chiniago, Inc. (Barrera 1988) and Paul H. Rosendahl, Inc., (PHRI; Jensen 1991) surveyed alternate highway corridors for the realignment of Honoapiʻilani Highway. The reconnaissance survey completed by Barrera (1988) investigated three alternate routes for Honoapiʻilani Highway, extending from Launiupoko to Honokōwai. The corridors passed through a number of sites, including the Lāhainā Historic District (Site 50-50-03-03001). An agricultural complex and a possible habitation terrace were recorded. During the archaeological inventory survey by Jensen (1991), four Pre-Contact sites containing 28 component features were identified. The historic properties were determined to be associated with agriculture, habitation, and burial interment and ceremony.

Cultural Surveys Hawai‘i, Inc. (CSH), conducted an AIS of a power transmission line from Mā‘alaea to Lāhainā (Robins et al. 1994). The survey resulted in the identification of 37 sites, consisting of temporary and permanent habitation sites, *heiau*, possible human burials, ranching walls, and a possible railroad bed. The traditional Hawaiian sites were clustered in the Ukumehame and Launiupoko valleys, with additional isolated Pre-Contact sites located near Kaua‘ula Stream.

From 1997 to 1998, PHRI (Graves et al. 1998) conducted an AIS of the approximately 430-acre Launiupoko Development parcel. Aerial and pedestrian survey with limited subsurface testing documented 47 sites (Sites 50-50-03-02639 through 50-50-03-02685) consisting of at least 67 component features. Features interpreted as associated with agriculture were the most numerous and included terraces, clearing piles, mounds, modified rock piles, ditches, retaining walls, and a flume. Features associated with permanent or temporary habitation included terraces, walls, rock alignments, enclosures, an L-shape, a C-shape, rock shelters, and a paved area. Features associated with ranching and animal husbandry included corrals and walls fences for containing animals. Other types of features recorded included cairns, upright boulders, a petroglyph panel, and a road. Eight of the sites identified were recommended for preservation and an additional six for data recovery if future work would affect them (Graves et al. 1998).

In 1999, PHRI (Rosendahl 2000) conducted an AIS on 230 acres of land in Polanui Ahupua‘a [TMK: (2) 4-7-002:004 and 007; 2-4-007-003:001]. The majority of the parcel was used for sugarcane cultivation. During the survey, two late Pre-Contact irrigated terraces (Site 50-50-03-04789) adjacent to Kaua‘ula Stream were identified as *lo‘i*, nine Post-Contact features associated with the sugar mill operation were collectively identified as Site 50-50-03-04787; and a late Pre-Contact wall segment (Site 50-50-03-04795) along Kaua‘ula Stream was determined to be part of a garden enclosure.

Haun and Associates (Haun 2001) completed a field inspection of a 3.8-acre parcel [TMK: (2) 4-7-002:005] surrounded on three sides by, but not included in, Rosendahl’s 2000 project area. No archaeological sites were identified. As a result of extensive mechanized ground disturbance due to commercial sugarcane cultivation, the presence of subsurface cultural deposits is unlikely.

Haun and Associates (Haun and Henry 2001) conducted an AIS on 124 acres in Launiupoko and Polanui Ahupua‘a [TMK: (2) 4-7-001:001 por. and TMK: (2) 4-7-004:004 por.]. Four sites consisting of six component features were identified. One of the sites (Site -04787) was recorded by Rosendahl (2000). The remaining sites include two linear rock piles (Site 50-50-03-05187), a series of low terraces associated with a concrete and mortared stone ditch (Site 50-50-03-05188), and a terrace interpreted as a *lo‘i.*

Haun and Associates (Haun et al. 2001) conducted an AIS on 300 acres within Launiupoko Ahupuaʻa [TMK: (2) 4-7-001:002]. Six sites consisting of seven component features were identified. Two of the sites had been recorded by Rosendahl (2000): a cattle wall (Site 50-50-03-02665) and irrigation ditches associated with Site -04787. Of the remaining four sites, two were cattle walls (Sites 50-50-03-05049 and 50-50-03-05050) from the ranching era, one was a historic roadbed (Site 50-50-03-05051) used to transport sugar, and the last consisted of linear rock mounds or terraces (Site 50-50-03-05052) found along an unnamed drainage. Similar to those documented by Rosendahl (2000), these features are interpreted to have resulted from manual sugarcane cultivation in the early 1900s, occurring where mechanized cultivation was not possible.

Xamanek Researches (Fredericksen and Fredericksen 2003) completed an AIS for the Lahaina Watershed Flood Control Project [TMK: (2) 4-6-012-016, 018 & TMK: 4-7-001, 002]. One Pre-Contact Native Hawaiian burial was located. Designated Site 50-50-03-05329, the human remains were found in what appeared to be the remnants of a coffin.

CSH (Lee-Greig and Hammatt 2006) conducted a LRFI over 823 acres for a proposed parkway [TMK: (2) 4-8-002, TMK: (2) 4-8-003, TMK: (2) 4-7-001]. Site -04787 was reidentified. It was noted that, while extensive sugarcane cultivation has likely truncated the surface record, there may still be significant subsurface cultural materials.

In 2006, SCS (Paraso and Dega 2012) conducted an AIS of 633 acres in Launiupoko and Polanui Ahupuaʻa [TMK: (2) 4-7-001:002 por.]. Ten Post-Contact sites were recorded, including one irrigation ditch previously documented by Rosendahl (2000) as Site -04787. Five of the sites (Sites 50-50-03-05950 through 50-50-03-05952, 50-50-03-05955, and 50-50-03-05957) are associated with the sugarcane plantation era, including large rock mounds, terraces, and irrigation ditches. Two sites are rock walls associated with the cattle ranching era, one of which had been previously recorded as Site -02665. The other rock wall was designated as Site 50-50-03-05954. Site 50-50-03-05953 is a scatter of slag fragments and cores interpreted as a Post-Contact work area. The final site (Site 50-50-03-05956) is an incohesive scatter of Post-Contact materials and midden. Paraso and Dega suggest that the lack of traditional sites in lower Launiupoko is due to a combination of Post-Contact disturbance and a "barren" or non-culturally-affected zone. Subsurface testing yielded negative results.

In 2006, SCS (Wilson and Dega 2007) conducted a field inspection of a corridor 2.5 miles (4 km) long and 160 ft (49 m) wide within the area surveyed by Paraso and Dega (2012) for a proposed extension of the Lāhainā Bypass [TMK: (2) 4-7-001:por]. Sites 50-50-03-05950, 50-50-03-05954, and 50-50-03-05955 were documented once again.

SCS (Shefcheck and Dega 2008) completed an AIS on 122.84 acres of undeveloped land in Launiupoko and Polanui Ahupuaʻa [TMK: (2) 4-7-001:029 por.]. Five Post-Contact sites were identified, of which four are extensive clusters of dryland terraces. The remaining site consisted of five ranch walls, which were designated under one site number because of their structural, geographic, and temporal similarity. No cultural materials were recovered.

SCS (Cordle and Dega 2008) conducted an AIS of four easement corridors on State of Hawaii Land in Wahikuli, Kuhua, and Puʻuiki Ahupuaʻa [TMK: (2) 4-5-021:003 por., 022 por., 023 por.; and (2) 4-5-022:002 por.]. The four easements are all arterial cane haul roads with existing dirt surfaces. Five Post-Contact features were identified as associated with the previously identified Site 50-50-03-04420. The features include two reservoirs, two earthen furrows along two of the existing dirt roads, and a single concrete lined *ʻauwai* (ditch).

SCS (Morawski et al. 2008) also conducted an AIS on 520 acres located within Launiupoko Ahupuaʻa [TMK: (2) 4-7-001:002 por.]. A total of 35 sites were identified, three of which were recorded by Robins et al. (1994). The previously recorded sites included a boulder wall (Site 50-50-03-03173), interpreted as an sugarcane plantation era irrigation ditch, a Pre-Contact agricultural complex (Site 50-50-03-03175) composed of mounds, retaining walls, and enclosures, and a wall segment (Site 50-50-03-03176). The 32 newly recorded sites (Sites 50-50-03-05880 through 50-50-03-05911) span the Pre-Contact through plantation eras. Several large agricultural complexes, both Pre- and Post-Contact in nature, and consisting of terraces, enclosures, and modified outcrops, were identified.

CSH (McCurdy and Hammatt 2008) conducted a LRFI for the Honoapiʻilani Highway Realignment (Lāhainā Bypass), Phase IB-l [TMK: (2) 4-6-014:001,002; (2) 4-6-018:002,003; (2) 4-7-001:002 and (2) 4-7-003:001]. The project area was a corridor running from the intersection of Lāhaināluna Road and ʻIkena Avenue in Paunau Ahupuaʻa, to just past (244 m south of) Hōkiokio Place in Polanui Ahupuaʻa. The project area includes land previously investigated by Jensen (1991). Two previously identified historic properties were re-recorded: a portion of an irrigation ditch that was feature D of Site -04787, documented by Rosendahl (2000), and the large mounds of Site -05950, documented by Paraso and Dega (2012). Five new potential archaeological sites were temporarily designated as CSH 1 through 5. CSH 1 consisted of remnants of a Post-Contact basalt wall, CSH 2 was a Pre-Contact agricultural complex, CSH 3 was an electrical transformer of indeterminate age but potentially historic (over 50 years old), and CSH 4 and CSH 5 were potentially historic irrigation pipes.

After the 2008 LRFI, CSH (McCurdy and Hammatt 2009) conducted AIS of the same Lāhainā Bypass corridor to further document the sites found in the LRFI. CSH 3 and CSH 5 were determined to be modern and not archaeologically significant, while CSH 1 was designated as Site 50-05-03-06631, CSH 2 was assigned Site 50-05-03-06632, and CSH 4 was determined to be Plantation Era in origin and assigned Site 50-05-03-06633. McCurdy and Hammatt (2009:40) also identified an additional ten "irregularly shaped push pile" features that were added to Site -05950, for a total of 27 features.

CSH (McCurdy and Hammatt 2010) completed an addendum AIS for the same Lāhainā Bypass corridor. The fieldwork consisted of mechanical testing of the push piles (mounds) features of Site -05950 that would be impacted by the construction. Six of the 27 features of Site -05950 occurred within the ROW and were subject to mechanical testing. No cultural features or artifacts were recovered, and the push piles were interpreted to be the result of field clearing activities from 1947 to 1951 associated with sugarcane agriculture.

From 2006 to 2007, Xamanek Researches (Frey and Fredericksen 2009) conducted an AIS on a 480-acre parcel in Lāhainā [TMK: (2) 4-6-013-016, 018, 025 and 4-6-001, 002]. A portion of the project area was previously studied by Fredericksen and Fredericksen (2003). The project area includes Maui's last sugarcane village, Waineʻe Village (Site 50-50-03-05042), demolished in 2000. A linear wall remnant (Site 50-50-03-06477) and a remnant of an old railroad bed associated with Pioneer Mill (Site 50-50-03-06478) were identified. Six subsurface site remnants were also identified. Sites 50-50-03-06472 and 50-50-03-06474 through 50-50-03-06476 consist of agricultural site remnants. Site 50-50-03-06471 is a Post-Contact refuse pit. One burial, contained in what appeared to be the remnants of a coffin, was designated as Site 50-50-03-06473.

In 2006 and 2007, SCS completed two concurrent archaeological projects within the same 5.697-acre parcel [TMK: (2) 4-7-001:017] at Launiupoko Beach Park. Monitoring was conducted for both a project to remove an existing cesspool and install two septic tanks (Dagher and Dega 2009) and a project to upgrade the park facilities to comply with the Americans with Disabilities Act (Dagher et al. 2009). The stratigraphy was documented to be uniform and consist of imported fill. During the cesspool project construction work, a single archaeological site, consisting of the human skeletal remains of at least two individuals, was inadvertently encountered (Site 50-05-03-06622). The two individuals were laid in the natural beach sand and interpreted as of Polynesian ancestry and likely dating to the Pre-Contact Period. Both of the archaeological monitoring reports (Dagher and Dega 2009; Dagher et al. 2009) documented this find.

Garcia and Associates (O'Day and Byerly 2015) completed an AIS of an ungulate enclosure fenceline corridor for the West Maui Forest Reserve [TMK: (2) 4-6-022; (2) 4-6-025:001, 002; 4-7-001:024; 4-8-001]. The survey identified 13 sites with 32 features. The historic properties included four Pre-, eight Post-Contact, and one indeterminate site. The Pre-Contact sites represent traditional irrigation and temporary habitation, and the Post-Contact sites were related to ranching, commercial sugarcane agriculture, and the establishment of the boundaries of the forest reserve. Due to the project area's location within undeveloped portions of West Maui, the sites are determined to not only be significant but have retained integrity of location, design, setting, materials, workmanship, feeling, and association.

In 2021, SCS (Jin and Dega 2022) completed an AIS of a project corridor for the Lauiniupoko Water System Line Extension to Waineʻe Project [TMK: (2) 4-6-013:022 por.; (2) 4-7-002:004 por.; (2) 4-7-003:031 por.]. As no historic properties were identified, the report was written as an archaeological assessment.

FIELD METHODOLOGY AND RESULTS

The archaeological field inspection of the Launiupoko Aquifer Well Development project was conducted in February 25, 2022, April 4, 2022, April 19, 2022, and December 14, 2022, by SCS archaeologist Ian Bassford, B.A., under the supervision of principal investigator Michael F. Dega, Ph.D. Field methods consisted of a 100% pedestrian survey of four of the five well sites and documentation via digital photographs taken at various locations. One site was not accessible by foot, and its inspection was completed via drone. Since no culturally significant artifacts were identified, laboratory work consisted of cataloging field notes and photographs. All field notes and digital photographs have been curated and are now stored at the SCS laboratory in Honolulu.

The full pedestrian survey of the Honolua Aquifer Sites H-1 and H-2 (Figures 12 through 16) and the Launiupoko Aquifer Site L-1 (Figures 17 through 21) identified no historic properties. Since Launiupoko Aquifer Site L-2 is located on a narrow ridge in the West Maui Forest Reserve, and its location is extremely difficult to access because of the rough terrain, abundant vegetation, and the 6-ft animal control fence, the site inspection was completed through an aerial investigation via a drone. One historic property, a concrete irrigation ditch, was observed (Figures 22 through 27). The ditch, identified as Paupau Ditch on a 1983 USGS Lahaina Quadrangle map, received irrigation water from the Kauaʻula siphon. The map shows the ditch extending about 4,000 feet to the northwest. The survey of the Launiupoko Aquifer Site L-3 revealed six historic properties, including two mounds or push piles and a single terrace, retaining wall, concrete irrigation ditch, and culvert (Table 5; Figures 28 through 38).

Table 5: Potentially historic properties observed at Launiupoko Aquifer Site L-3

Temporary Site #	Type of Site	GPS Points	Condition	Description
TS-1	Terrace	LAT 20°52'03.5039" North LONG 156°39'09.8651" West	Poor	3-4 course loosely stacked boulders, running in a general North to South orientation, parallel with existing slope 53 cm high × 5 m long
TS-2	Mound or Push pile	LAT 20°52'03.1256" North LONG 156°39'09.2762" West	Poor	amorphous shape, loosely heaped large cobbles and small boulders 75 cm high
TS-3	Mound or Push pile	LAT 20°52'01.4495" North LONG 156°39'08.1987" West	Poor	poorly constructed, loosely stacked small boulders 70 cm high
TS-4	Retaining wall	LAT 20°52'05.6388" North LONG 156°39'10.1601" West	Fair	Constructed of medium to large boulders stacked 5 to 7 course high 1.8 m high Acts as road buttress for main access road
TS-5	Concrete irrigation ditch	LAT 20°52'05.9221" North LONG 156°39'06.5401" West	Poor	60 cm deep × 8 m long
TS-6	Culvert	LAT 20°52'05.8212" North LONG 156°39'06.8188" West	Poor	constructed of concrete pipe 24 inches (60 cm) in diameter associated with the access road



Figure 12: Close-up photograph of the location for Site H-1 with the H-1 control pin (Latitude 20°57'43.1506" North Longitude 156°38'12.1173")



Figure 13: Close-up photograph of the location for Site H-2 (Latitude 20°57'35.3367" North Longitude 156°38'14.9443" West)



Figure 14: Photograph of H-2 control pin



Figure 15: Overview photograph of Sites H-1 and H-2 (view to Northwest)



Figure 16: Overview photograph of Sites H-1 and H-2 (view to North)



Figure 17: Photograph of L-1 control pin



Figure 18: Overview photograph of Site L-1 (view to South)



Figure 19: Overview photograph of Site L-1 with Lāhainā in background (view to West)



Figure 20: Overview photograph of Site L-1 (view to North)



Figure 21: Overview photograph of Site L-1 (view to East)



Figure 22: Photograph of concrete ditch identified near Site L-2 (view to Southwest)



Figure 23: Close up photograph of concrete ditch observed during survey of Site L-2 (view to Southwest)



Figure 24: Photograph of concrete ditch at Site L-2 with south end of the island of Molokaʻi in the background (view to West)



Figure 25: Photograph of siphon outlet for ditch at Site L-2 (view to South)



Figure 26: Photograph of control channels for sluice gates of ditch at Site L-2



Figure 27: Photograph of sluice gates for the ditch at Site L-2 (view to Southeast)



Figure 28: Close-up photograph of the location for Site L-3 (Latitude 20°52'03.5733" North Longitude 156°39'10.5226" West)



Figure 29: Overview photograph of Site L-3 (view to West)



Figure 30: Overview photograph of Site L-3 with Kauaʻula Valley in upper right (view to East)



Figure 31: Overview photograph of Site L-3 with partial view of TS-4 (view to North)



Figure 32: Overview photograph of Site L-3 with Kaua‘ula Stream in background (view to South)



Figure 33: Photograph of TS-1, terrace (view to South)



Figure 34: Photograph of TS-2, mound (view to West)



Figure 35: Photograph of TS-3, mound or push pile (view to North)



Figure 36: Photograph of TS-4, wall (view to North)



Figure 37: Photograph of TS-5, concrete ditch (view to South-West)



Figure 38: Photograph of TS-6, culvert, with TS-4 on the left (view to North)

DISCUSSION AND CONCLUSIONS

On behalf of the County of Maui Department of Water Supply and at the request of Fukumoto Engineering, Inc., Scientific Consultant Services, Inc. (SCS), conducted a literature review for the proposed Launiupoko Aquifer Well Development project. The field inspection identified seven historic properties. A single surface historic property was located at Launiupoko Aquifer Site L-2, and the remaining historic properties are near Launiupoko Aquifer Site L-3.

While Honolua and Launiupoko may not have supported a sizable Pre-Contact population, archaeological work in the vicinity of the current project areas provides evidence of habitation and agriculture. Findings suggest occupation of the area from the 10th century through the plantation era. Both areas, specifically Launiupoko, have experienced decades of activities associated with sugarcane cultivation and cattle ranching. Therefore, any Pre-Contact historic properties that may observed in the current project areas will be expected to be heavily disturbed, and any Post-Contact sites will likely be related to sugarcane cultivation or cattle ranching.

Based on the observance of multiple historic properties, it is recommended that an archaeological inventory survey be conducted of the project area known as Launiupoko Aquifer Site L-3. Since another historic property was observed (Launiupoko Aquifer Site L-2), archaeological monitoring is recommended for any ground disturbing activities in the remaining four project areas.

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BIOLOGICAL RESOURCES SURVEYS FOR WELL SITES L-1, L-2, L-3, H-1, AND H-2

APPENDIX D

Biological Resources Survey
Launiupoko Aquifer Well
Site L-1

BIOLOGICAL RESOURCES SURVEY
DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-1
PANA'EWA, LAHAINA, MAUI

by

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Prepared for:
County of Maui
Department of Water Supply

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-1

INTRODUCTION

The Launiupoko Aquifer Well Site L-1 is located on State Lahainaluna School lands situated above the town of Lahaina in Pana`ewa, TMK (2) 4-6-018:007 por. (see Figure 1). This biological assessment was initiated by the County of Maui Department of Water Supply in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The L-1 Well Site is located on a remote ridge top at an elevation of 1,700 feet between Hālona Gulch and Kanahā Gulch. The vegetation consists of deep grasses and shrubs with scattered trees. Soils are characterized as Rough Mountainous Land with shallow topsoil on often steep terrain (Foote et al, 1972). Rainfall averages between 30 and 40 inches per year with most occurring during the winter months.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Launiupoko Aquifer Well Site L-1 that was conducted in April 2022. 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.

FLORA SURVEY REPORT

SURVEY METHODS

A walk-through flora survey method was used following routes that would ensure complete coverage of the well site. Areas most likely to harbor native or rare plants 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 in the project area was composed predominantly of non-native species that have spread into this mountainous environment. A total of thirty-four plant species were found during the survey. One species was abundant in the area, Guinea grass (*Megathyrsus maximus*), that created a deep grassland. Three other species were common, silk oak (*Grevillea robusta*), koa haole (*Leucaena leucocephala*) and `a`ali`i (*Dodonaea viscosa*). Eight species were uncommon and twenty-two species were rare.

Eleven native plant species were identified in the project area including five that are endemic to Hawaii: kīlau (*Pteridium aquilinum* subsp. *decompositum*), Hawaiian moon flower (*Ipomoea tuboides*), `ena`ena (*Pseudognaphalium sandwicensium*), `iliahalo`e (*Santalum elipticum*) and `akia (*Wikstroemia oahuensis*). An additional six species are indigenous to Hawaii as well as to other Pacific Islands: manienie`ula (*Chrysopogon aciculatus*), `ilima (*Sida fallax*), `uhaloa (*Waltheria indica*), `ūlei (*Osteomeles anthyllidifolia*), pūkiawe (*Leptecophylla tameiameiae*) and `a`ali`i. These eleven native plant species are all hardy lowland species that are widespread throughout Hawaii.

DISCUSSION AND RECOMMENDATIONS

The vegetation on the two-acre L-1 Well Site project area was made up of a variety of native and non-native species. The non-native species were numerically more abundant and included those that most dominated the site. The native species were more scattered and mostly uncommon or rare in occurrence. These native species, however, are all relatively common in Hawaii and are all found in drier habitats on several islands. None of them are on the federal Endangered species list or are candidates for such status. No special habitats or plant communities were identified in the area.

The proposed water system development of the L-1 Well Site is not expected to result in any significant negative impacts to botanical resources in this part of West Maui.

FLORA SPECIES LIST

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

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 introduction = plants introduced to Hawai'i in the course of Polynesian migrations and prior to western contact.

   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
FERNS			
DENNSTAEDTIACEAE (Bracken Family)			
Pteridium aquilinum (L.) Kuhn subsp. *decompositum*(Gaudich.) Lam.	kīlau	endemic	rare
PTERIDACEAE (Brake Fern Family)			
Cheilanthes viridis (Forssk.) Sw.	green cliff brake	non-native	rare
MONOCOTS			
POACEAE (Grass Family)			
Andropogon virginicus L.	broomsedge	non-native	uncommon
Chrysopogon aciculatus (Retz.) Trin.	mānienie `ula	indigenous	rare
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	non-native	rare
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	abundant
Melinis minutiflora P. Beauv.	molasses grass	non-native	rare
Melinis repens (Willd.) Zizka	Natal redtop	non-native	uncommon
DICOTS			
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	rare
ASTERACEAE (Sunflower Family)			
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	rare
Emilia fosbergii Nicolson	red pualele	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
Pseudognaphalium sandwicensium (Gaud.) A. Anderb.	`ena`ena	endemic	rare
Sonchus oleraceus L.	pualele	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Ipomoea tubiflora Degener & Oostr.	Hawaiian moon flower	endemic	rare
ERICACEAE (Heath Family)			
Leptecophylla tameiameiae (Cham. & Schlectend.) Weiller	pūkiawe	indigenous	rare
FABACEAE (Pea Family)			
Desmodium incanum DC.	Spanish clover	non-native	uncommon
Indigofera suffruticosa	inikō	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	common
MALVACEAE (Mallow Family)			
Sida fallax Walp.	`ilima	indigenous	rare
Sida spinosa L.	prickly sida	non-native	rare
Waltheria indica L.	`uhaloa	indigenous	uncommon
MYRTACEAE (Myrtle Family)			
Psidium cattleianum Sabine	strawberry guava	non-native	rare
Psidium guajava L.	common guava	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Syzygium cumini (L.) Skeels	Java plum	non-native	uncommon
POLYGALACEAE (Milkwort Family)			
Polygala paniculata L.	root beer plant	non-native	rare
PROTEACEAE (Protea Family)			
Grevillea robusta A. Cunn. Ex R. Br.	silk oak	non-native	common
ROSACEAE (Rose Family)			
Osteomeles anthyllidifolia (Sm.) Lindl.	`ūlei	indigenous	uncommon
SANTALACEAE (Sandalwood Family)			
Santalum elipticum Gaud.	`iliahi alo`e	endemic	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	`a`ali'i	indigenous	common
THYMELEACEAE (Akia Family)			
Wikstroemia oahuensis (A. Gray) Rock	`akia	endemic	uncommon
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	rare
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain	non-native	uncommon

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey in the two-acre L-1 Well Site project area. 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.

RESULTS

MAMMALS

No mammals or any signs of their presence were found in this small project area. Dense grass and shrub vegetation made observations difficult. Even in the few openings, no trails, tracks, scat or other signs were found. Non-native mammals that could occur here include feral pigs (*Sus scrofa*), mongoose (*Herpestes auropunctatus*), rats (*Rattus* spp.) mice (*Mus domesticus*), feral cats (*Felis catus*) and axis deer (*Axis axis*). Taxonomy and nomenclature follow Tomich (1986).

While it was not practicable to do an evening survey at this remote site to observe any presence of the `ōpe`ape`a or Hawaiian bat (*Lasiurus cinereus semotus*), these bats will be addressed in the Discussion and Recommendations.

BIRDS

Birdlife was rather sparse in and around the project area. Seven species were recorded in small numbers. Taxonomy and nomenclature follow American Ornithological Society (2022). One species was uncommon, the zebra dove (*Geopelia striata*), and five other species were of rare occurrence, the cattle egret (*Bubulcus ibis*), the northern cardinal (*Cardinalis cardinalis*), the spotted dove (*Streptopelia chinensis*), the Japanese white-eye (*Zosterops japonicus*), the common myna (*Acridotheres tristis*) and the indigenous native white-tailed tropicbird (*Phaethon lepturus dorotheae*) which was seen soaring over the adjacent Kahoma canyon.

INSECTS

Insects were also sparsely represented, with only six species recorded in the project area. Taxonomy and nomenclature follow Nishida et al (1992). One species was common, the honeybee (*Apis mellifera*), which was seen in numbers taking pollen from male `a`ali`i flowers. Another species was uncommon, the indigenous native globe skimmer dragonfly (*Pantala flavescens*). Four other insect species were rare, the big-headed ant (*Pheidole megacephala*), the long-tailed blue butterfly (*Lampides boeticus*), the monarch butterfly (*Danaus plexippus*) and the narrow-winged mantis (*Tenodera angustipennis*).

DISCUSSION AND RECOMMENDATIONS

The Launiupoko Aquifer L-1 Well Site lies on a remote ridge top that has never been used for agricultural cultivation, but the environment has been encroached upon by a variety of non-native plant species that have now developed a dense growth of vegetation that is not suitable for supporting a diversity of native wildlife. Just one native bird and one native insect were recorded.

The indigenous white-tailed tropicbird was seen flying over the nearby Kahoma Canyon. These seabirds' nest on inaccessible ledges on cliffs in such places. They would never utilize the habitat in the L-1 Well Site project area.

The indigenous globe skimmer dragonfly found in the project area is very common in Hawaii as well as in many other places worldwide. It is of no conservation concern.

While no evening survey was conducted in the project area, there is a likelihood that the Endangered Hawaiian bat would occasionally pass through this area searching for nocturnal flying insects on which they feed. They are strong fliers and wide-ranging in a variety of habitats from sea level to over 8,000 feet elevation depending on seasonal spikes in insect activities. These bats also utilize trees where they place their young pups from April through mid-September. During this period the pups are vulnerable. As a precautionary measure it is recommended that no tree fifteen feet or more in height be removed during the breeding season to prevent any possible injury or death to these federally protected bats.

Three native seabirds, the Endangered ′ua′u or Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), and `akē`akē or band-rumped storm-petrel (*Oceanodroma castro*) and the Threatened `a`o or Newell's shearwater (*Puffinus newelli*), were also of concern during the survey. These seabirds, which nest high in the mountains between April and November, fly in from the ocean to their burrows during the evenings and then fly out to sea again at dawn each day to feed. In West Maui these seabirds when returning to their burrows call out to their mates which will return the calls. These calls are loud and can be heard at great distances. Also, these seabirds are sometimes distracted by bright lights which can cause them to crash and be injured and sometimes killed by cats, dogs, or mongoose. Young inexperienced birds, taking their first flights out to sea are particularly vulnerable. It is recommended that any significant outdoor lighting on structures at facilities be hooded to direct the light downward to minimize distractions and dangers to these birds.

Some other Endangered birds that were not seen are addressed here. The nēnē or Hawaiian goose (*Branta sandvicensis*) is widespread on Maui in a variety of habitats. The densely vegetated project area, however, is not suitable for them. Two waterbirds, the ae`o or black-necked stilt (*Himantopus mexicanus knudseni)* and alae ke`oke`o or Hawaiian coot (*Fulica alai*), are obligates to wetland habitats. No such habitat occurs on or near this dry ridgetop.

With observance of the above recommendations, it is felt that the development of the Launiupoko Aquifer L-1 Well Site project area will not have any significant negative impacts on the fauna resources in this part of West Maui.

FAUNA SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Fauna 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			
BIRDS			
ARDEIDAE (Heron Family)			
Bubulcus ibis L.	cattle egret	non-native	rare
CARDINALIDAE (Cardinal Family)			
Cardinalis cardinalis L.	northern cardinal	non-native	rare
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	uncommon
Streptopelia chinensis Scopoli	spotted dove	non-native	rare
PHAETHONTIDAE (Tropicbird Family)			
Phaethon lepturus dorotheae	koa`e kea, white tailed tropicbird	indigenous	rare
STURNIDAE (Starling Family)			
Acridotheres tristis L.	common myna	non-native	rare
ZOSTEROPIDAE (White-eye Family)			
Zosterops japonicus	Japanese white-eye	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
INSECTS			
Order - HYMENOPTERA - bees, wasps, ants			
APIDAE (Honeybee Family)			
Apis mellifera L.	honeybee	non-native	common
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	rare
Order - LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
Lampides boeticus L.	long-tailed blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
Danaus plexippus L.	monarch butterfly	non-native	rare
Order - MANTODEA - mantises			
MANTIDAE (Mantis Family)			
Tenodera angustipennis Saussure	narrow-winged mantis	non-native	rare
Order - ODONATA - dragonflies, damselflies			
LIBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer dragonfly	indigenous	uncommon

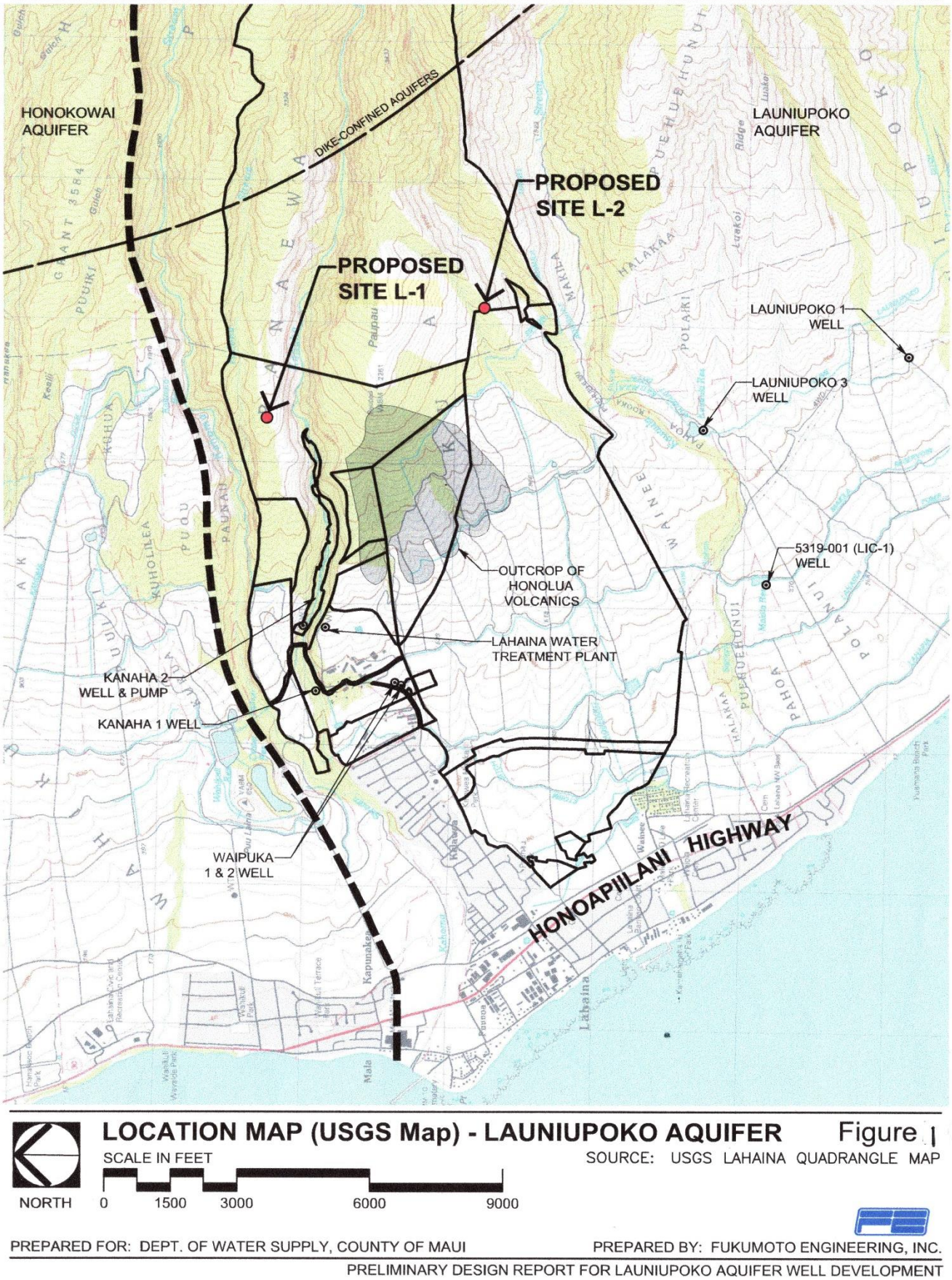

Figure 1. Launiupoko Aquifer Well Site L-1

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Biological Resources Survey
Launiupoko Aquifer Well
Site L-2

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-2
KU`IA, LAHAINA, MAUI

by

Robert W. Hobdy
Environmental Consultant
Kokomo, Maui
December 2022

Prepared for:
County of Maui
Department of Water Supply

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-2

INTRODUCTION

The Launiupoko Aquifer Well Site L-2 Project lies on a 2-acre portion of State owned land in upper Ku'ia above Lahaina town, TMK (2) 4-6-025:002 (portion) (see Figure 1). This survey and assessment of the flora and fauna resources was initiated by the County of Maui Department of Water Supply in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The project area is located on a ridgetop on the north side of Manowai`ōpae Gulch at an elevation of around 1,820 feet. Annual rainfall averages 30 inches with most occurring during the winter months (Armstrong, 1983). Soils in this remote mountain area are given a reconnaissance characterization as Rough Broken land with shallow, rocky soil on steep terrain (Foote et al, 1972). The vegetation was largely decimated by a massive wildland fire that had swept through this area about a month prior to the survey. The flora and fauna inventories were greatly compromised and limited to what could be identified in the charred remains and in small spots that escaped incineration.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Launiupoko Aquifer Well Site L-2 that was conducted in December 2022. 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.

FLORA SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes that would ensure complete coverage of the project area. Notes were made on plant species, distribution, and abundance as well as on terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation was largely decimated by the recent fire. Remnant plant species were identified in three ways: 1) Plants that had escaped incineration. 2) Charred remains that were recognizable. 3) Plants that were starting to sprout from roots or stumps that were recognizable. The plant inventory, however, was significantly reduced from what it would have been prior to the fire.

A total of only nine plant species were recorded during the survey. Two species were common, Guinea grass (*Megathyrsus maximus*) and a`ali`i (*Dodonaea viscosa*). Two other species were uncommon, forest red gum (*Eucalyptus tereticornis*) and silk oak (*Grevillea robusta*). Five other species were rare.

Four of the nine species were native Hawaiian plants, the a`ali`i, the `iliahi alo`e (*Santalum ellipticum*), the `ūlei (*Osteomeles anthyllidifolia*) and the `uhaloa (*Waltheria indica*).

The vegetation here prior to the fire was a dry-mesic shrubland with a few scattered trees. It had a mixture of native species and a number of non-native species that are becoming invasive in this habitat.

DISCUSSION AND RECOMMENDATIONS

Of the four native species, the `iliahi alo`e is endemic to Hawaii while the a`ali`i, the `ūlei and the `uhaloa are indigenous species that also occur on other Pacific islands. All of these species occur on all of the major islands in Hawaii.

None of the native plants found are of any heightened environmental concern. No endangered or threatened plant species are known to occur on or around the project areas, nor were there any species that are candidates for such status found. No special native plant habitats were observed.

The proposed development of this Launiupoko Aquifer Well Site L-2 is not expected to result in any significant negative impacts to the botanical resources in this part of West Maui.

FLORA 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 flowering plants are in accordance with Wagner et al. (1999).

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 introduction = plants introduced to Hawai'i during Polynesian migrations and prior to western contact.

   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			
POACEAE (Grass Family)			
Andropogon virginicus L.	broomsedge	non-native	rare
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	common
DICOTS			
FABACEAE (Pea Family)			
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	rare
MALVACEAE (Mallow Family)			
Waltheria indica L.	`uhaloa	indigenous	rare
MYRTACEAE (Myrtle Family)			
Eucalyptus tereticornis Sm.	forest red gum	non-native	uncommon
PROTEACEAE (Protea Family)			
Grevillea robusta A. Cunn. ex R. Brown	silk oak	non-native	uncommon
ROSACEAE (Rose Family)			
Osteomeles anthyllidifolia (Sm.) Lindl.	`ūlei	indigenous	rare
SANTALACEAE (Sandalwood Family)			
Santalum ellipticum Gaud.	`iliahialo`e	indigenous	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	a`ali`i	indigenous	common

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of this two-acre project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activity, and location as well as observation of trails, tracks, scat, and signs of feeding. Survey results were greatly reduced by the recent fire which had destroyed the habitat.

RESULTS

MAMMALS

None.

BIRDS

Birdlife was quite sparse in the project area. Just two species were recorded. Taxonomy and nomenclature follow American Onithological Society (2022). A non-native zebra dove (*Geopelia striata*) and gray francolin (*Francolinus pondicerianus*) were heard calling.

INSECTS

Insect species were also sparse in this burned habitat. Just two species were recorded. Taxomony and nomenclature follow Nishida et al (1992). One species was uncommon: the indigenous native globe skimmer dragonfly (*Pantala flavescens*). The other species, the big-headed ant (*Pheidole megacephala*), was rare.

DISCUSSION AND RECOMMENDATIONS

The habitat in the Launiupoko Aquifer Well Site L-2 project area and all surrounding lands over a two-thousand-acre area were completely burned and destroyed about a month prior to this survey. As a result, fauna species were almost non-existent in this broad landscape. Just one common indigenous native dragonfly, the globe skimmer (*Pantala flavescens*), was seen in flight in the project area. No other native mammals, birds or insects were seen, and no suitable habitat or host plants were present.

No Endangered or Threatened fauna species were recorded in or around the project area and no special wildlife habitats were found either.

The development of the Launiupoko Aquifer Well Site L-2 Project is not expected to have any significant negative impacts on the fauna resources in this part of West Maui.

FAUNA SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Fauna species are arranged 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 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:

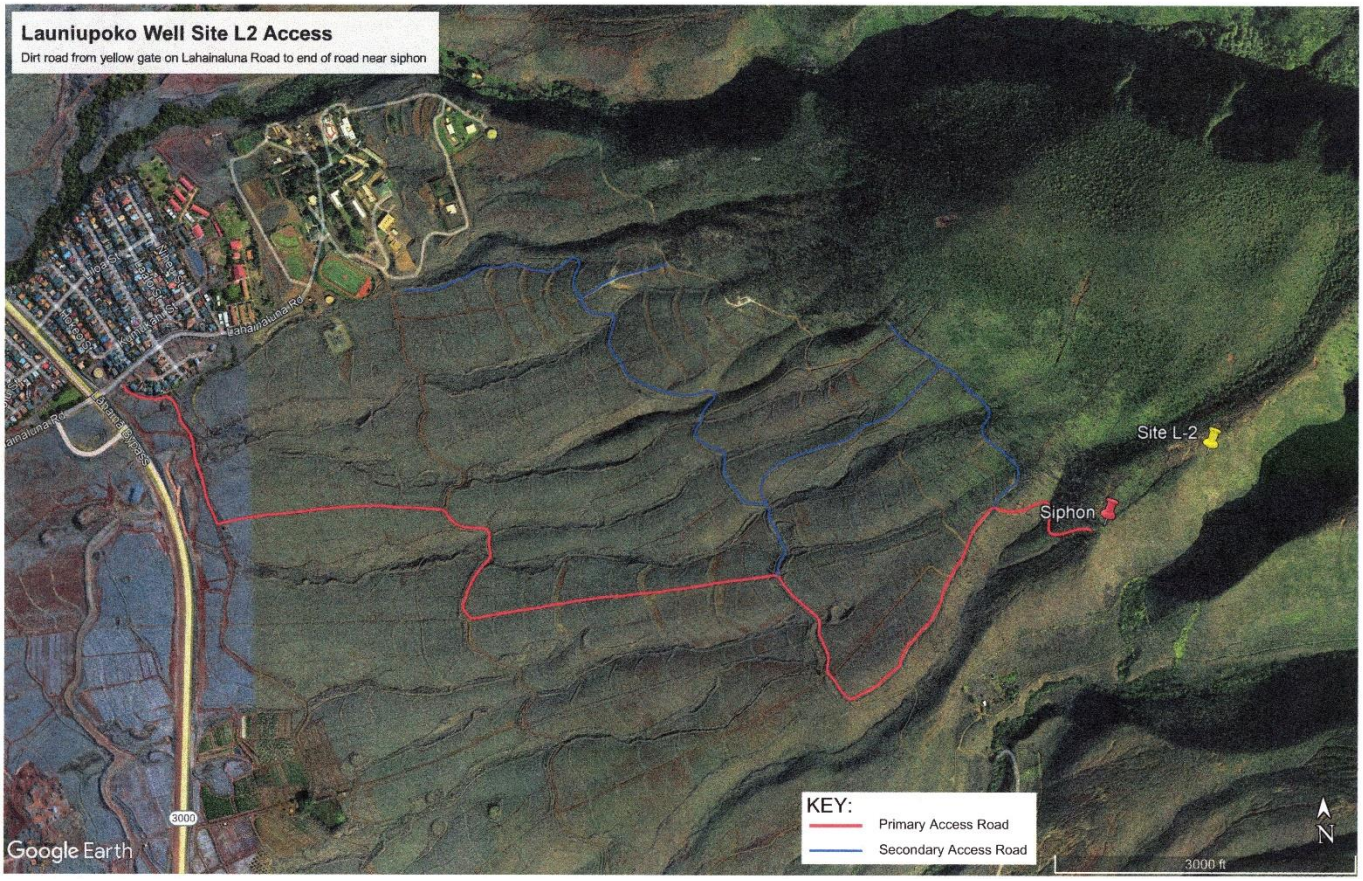
   abundant = many flocks or individuals seen throughout the area at all times of day.

   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			
BIRDS			
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	rare
PHASIANIDAE (Pheasant Family)			
Francolinus pondicerianus Gmelin	gray francolin	non-native	rare
INSECTS			
Order HYMENOPTERA - bees, wasps, ants			
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	rare
Order ODONTIDAE - dragonflies, damselfies			
LIBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer	indigenous	rare



Project Map – DWS Launiupoko Aquifer Well L-2 Ku`ia, Lahaina, Maui.

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Biological Resources Survey
Launiupoko Aquifer Well
Site L-3

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-3
WAINE'E, LAHAINA, MAUI

by

Robert W. Hobdy
Environmental Consultant
Kokomo, Maui
April 2022

Prepared for:
County of Maui
Department of Water Supply

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
LAUNIUPOKO AQUIFER WELL SITE L-3

INTRODUCTION

The Launiupoko Aquifer Well Site L-3 Project lies within a 2 acre portion of a State owned parcel of land in lower Kaua'ula valley and Lahaina town TMK (2) 4-6-019:003 (see Figure 1). This survey and assessment of the flora and fauna resources was initiated by the County of Maui, Department of Water Supply in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The project area is located on the north side of Kaua'ula Stream at an elevation of 280 feet. The soil is characterized as Stony Alluvial Land (Foote et al, 1972) which occurs near lower stream valley bottoms with an abundance of boulders and alluvial deposits. Rainfall averages about 15 inches per year with most occurring during the winter months. The vegetation consists mostly of dry land grasses and scattered shrubs.

This project area and 1,500 surrounding acres burned completely in the summer of 2018.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Launiupoko Aquifer Well Site L-3 that was conducted in April 2022. 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 that would ensure complete coverage of the project area. Notes were made on plant species, distribution, and abundance as well as on terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation within this project area was dominated by three plant species. Buffelgrass (*Cenchrus ciliaris*) was the most abundant throughout the area. Common species included koa haole (*Leucaena leucocephala*) and koali kuahulu (*Merremia aegyptia*). A total of nineteen species were recorded during the survey. Three common indigenous native species were found, the above koali kuahulu, ʻuhaloa (*Waltheria indica*) and ʻilima (*Sida fallax*). The remaining sixteen species were non-native grasses and shrubs.

DISCUSSION AND RECOMMENDATIONS

The vegetation within this project is dominated by non-native plants that have taken over on these abandoned agricultural lands. A total of three native species were recorded during two visits to the project area. These native species are indigenous in Hawaii and also occur in other tropical areas around the Pacific. All are quite widespread and common in Hawaii.

None of the native plants found in the project are of any heightened environmental concern. No endangered or threatened plant species are known to occur on or around the project areas, nor were there any species that are candidates for such status found. No special native plant habitats were observed.

The proposed development of this Launiupoko Well Site L-3 project is not expected to result in any significant negative impacts to the botanical resources in this part of West Maui.

FLORA 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 flowering plants are in accordance with Wagner et al. (1999).

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 introduction = plants introduced to Hawai'i in the course of Polynesian migrations and prior to western contact.

   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			
POACEAE (Grass Family)			
Cenchrus ciliaris L.	buffelgrass	non-native	abundant
Chloris virgata Sw.	feather fingergrass	non-native	uncommon
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	non-native	rare
Tragus berteronianus Schult.	bur grass	non-native	rare
DICOTS			
AMARANTHACEAE (Amaranth Family)			
Atriplex suberecta Verd.	saltbush	non-native	rare
ASTERACEAE (Sunflower Family)			
Sonchus oleraceus L.	pualele	non-native	rare
CONVOLVULACEAE (Morning Glory Family)			
Merremia aegyptia (L.) Urb.	koali kuahulu	indigenous	common
FABACEAE (Pea Family)			
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Crotalaria pumila Ort.	low rattlebox	non-native	rare
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	common
Vachellia farnesiana (L.) Wight & Arnott	klu	non-native	uncommon
LAMIACEAE (Mint Family)			
Leonotis nepetifolia (L.) R. Br.	lion's ear	non-native	uncommon
MALVACEAE (Mallow Family)			
Abutilon incanum (Link) Sweet	hoary abutilon	non-native	rare
Malva parvifolia L.	cheese weed	non-native	rare
Sida fallax Walp.	'ilima	indigenous	rare
Waltheria indica L.	'uhaloa	indigenous	uncommon
NYCTAGINACEAE (Four-o'clock Family)			
Boerhavia coccinea Mill.	scarlet spiderling	non-native	rare
SOLANACEAE (Nightshade Family)			
Nicandra physalodes (L.) Gaertn.	apple-of-Peru	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of this two acre project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activity and location as well as observation 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*), the Hawaiian petrel (*Pterodroma sanwichensis*), the Newells' shearwater (*Puffinus newelli*) or the banded rumped storm petrel (*Oceanodroma castro*) in the area.

RESULTS

MAMMALS

No mammals were observed in this small project area during two site visits. The evening survey was conducted with the use of a bat detector (Batbox III) set to the frequency of 27,000 Hertz that these bats are known to emit when echo-locating for nocturnal flying insects upon which they prey. No bats were detected with the use of this device.

A special effort was made to look for the Endangered ʻōpeʻapeʻa or Hawaiian hoary bat by conducting an evening surveys utilizing a bat detector (Batbox IIID) set to the frequency of 27,000 Hertz that these bats are known to emit when echo-locating for nocturnal flying insect prey. No bats were detected with the use of this device.

BIRDS

Birdlife was quite sparse in the project area during two site visits. Just one species was recorded. Taxonomy and nomenclature follow American Onithological Society (2022). A few non-native zebra doves (*Geopelia striata*) were seen and heard calling.

INSECTS

Insect species were also sparse in this hot, dry habitat. Seven non-native species were recorded during two site visits. Taxomony and nomenclature follow Nishida et al (1992). Three species were uncommon: the beet webworm moth (*Spoladea recurvalis*), the sleepy orange butterfly (*Eurema niccipe*) and the large sulphur butterfly (*Phoebis agarithe*). Four other species were rare. No native insects were seen.

DISCUSSION AND RECOMMENDATIONS

The habitat in the Launiupoko Well Site L-3 area has been altered by over a century of agricultural activity and is now overwhelmingly dominated by non-native organisms. The project area is surrounded by similar habitat. No native mammal, bird or insect fauna species were recorded during the survey.

The endemic and Endangered nēnē goose was not seen in the project area. It is known to frequent the margins of reservoirs and ditches where they feed and rest. There is none of this habitat in or around the project area. However, should they show up, they need space to be free from harassment or injury.

While not detected during the survey, the Endangered ʻōpeʻapeʻa or Hawaiian hoary bat was looked for during an evening survey with the use of a bat detector (Batbox IIID) set to the frequency of 27,000 Hertz which these bats are known to emit when hunting for flying nocturnal insect prey. These wide-ranging bats are highly mobile as they follow spikes in insect prey but were not detected in the project area during the survey. If ʻōpeʻapeʻa show up the U.S. Fish and Wildlife Service should be consulted on how to proceed with project activities so that these bats will not be adversely affected.

Three native seabirds, the Endangered ʻuaʻu or Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), the band-rumped storm petrel (*Oceanodroma castro*) as well as the Threatened ʻaʻo or Newell's shearwater (*Puffinus newelli*), were also looked for during the evening surveys. These seabirds, which nest high in the mountains between April and November, fly in from the ocean over the lowlands to their burrows during the evenings and then fly out to sea again at dawn each day to feed. In West Maui these seabirds when returning to their burrows call out to their mates which will return the calls. These calls are loud and can be heard at great distances. None of these calls were heard. Also, these seabirds are sometimes distracted by bright lights which can cause them to crash and be injured and sometimes killed by cats, dogs or mongoose. Young inexperienced birds, taking their first flights out to sea are particularly vulnerable. It is recommended that any significant outdoor lighting on structures at facilities be hooded to direct the light downward to minimize distractions and dangers to these birds.

The Endangered blackburn's sphinx moth (*Manduca blackburni*) was looked for but not found during the survey. None of its obligate host plants in the Nighshade family occurred on the project area so their presence is unlikely.

With observance of the above recommendations, it is felt that the development of the Launiupoko Well Site L-3 project will not have any significant negative impacts on the fauna resources in this part of West Maui.

FAUNA SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Fauna species are arranged 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			
BIRDS			
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	uncommon
INSECTS			
Order DIPTERA - flies			
CALLIPHORIDAE (Blowfly Family)			
Calliphora vomitoria L.	blowfly	non-native	rare
Order LEPIDOPTERA - butterflies, moths			
CRAMBIDAE (Grass Moth Family)			
Spoladia recurvalis Fabricius	beet webworm moth	non-native	uncommon
PIERIDAE (White & Sulphur Butterfly Family)			
Euremia niccipe Cramer	sleepy orange butterfly	non-native	uncommon
Phoebis agarithe Boisduval	large sulphur butterfly	non-native	uncommon
Pieris rapae L.	cabbage butterfly	non-native	rare
Order ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oedaleus abruptus Thunberg	short-horned grasshopper	non-native	rare
Schistocerca nitens Thunberg	graybird grasshopper	non-native	rare



Launiupoko Aquifer Well Site L-3 Figure 1.

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Biological Resources Survey
Honolua Aquifer Well
Site H-1

BIOLOGICAL RESOURCES SURVEY
DEPARTMENT OF WATER SUPPLY
HONOLUA AQUIFER WELL SITE H-1
MAILEPAI, LAHAINA, MAUI

by

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April 2022

Prepared for:
County of Maui
Department of Water Supply

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
HONOLUA AQUIFER WELL SITE H-1

INTRODUCTION

The Honolua Aquifer Well Site H-1 is located on two acres in Mailepai, West Maui TMK (2) 4-3-001:001 portion (see Figure 1). It is proposed to be an exploratory well to assess its potential for water resource development. This biological assessment was initiated by the County of Maui Department of Water Supply in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The H-1 Well Site is located on a ridge top between Mailepai Gulch and Kaopala Gulch at an elevation of 1,240 feet. It lies on land formerly used to grow pineapples but has now lain fallow for over 20 years. The area is now overgrown with a dense, deep grassland with a few widely scattered shrubs and small trees. The soil is characterized as Honolua Silty Clay, 15 to 25% slopes (HwD) a moderately sloping, well-drained soil (Foote et al, 1972). Rainfall averages 50 inches per year (Armstrong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Honolua Aquifer Well Site H-1 that was conducted in April 2022. 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.

FLORA SURVEY REPORT

SURVEY METHODS

A walk-through flora survey method was used following routes that would ensure complete coverage of the well site. Areas most likely to harbor native or rare plants were more intensively examined. Notes were made on plant species, distribution, and abundance as well as on terrain and substrate.

DESCRIPTION OF THE VEGETATION

When the pineapple operation closed the field was abandoned and was soon overgrown with a dense growth of molasses grass (*Melinis minutiflora*) which has dominated the entire project area and is rated as abundant. No other plant species was common. Four species were uncommon: the gold-backed fern (*Pityrogramma austroamericana*), the broomsedge (*Andropogon virginicus*), the Formosa koa (*Acacia confusa*) and a number of remnant pineapple plants (*Ananas comosus*). Twenty-one species were of rare occurrence, mostly growing along an old field road.

Three common indigenous native species were found in small numbers: ni`ani`au (*Nephrolepis exaltata*), mau`u laiki *(Paspalum scrobiculatum*) and `a`ali`i (*Dodonaea viscosa*).

DISCUSSION AND RECOMMENDATIONS

The vegetation in this project area is nearly entirely non-native in character and is dominated by one aggressive grass species. The three native species that were found in small numbers are all common in Hawaii as well as in other countries and are of no conservation concern. No federally protected Endangered or threatened plant species occur here and no special native plant habitats or communities were found.

The proposed water system development at the small H-1 Well Site project area is not expected to result in any significant negative impacts to the botanical resources in this part of West Maui.

FLORA SPECIES LIST

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

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 introduction = plants introduced to Hawai'i during the course of Polynesian migrations and prior to western contact.

   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
FERNS			
NEPHROLEPIDACEAE (Sword Fern Family)			
Nephrolepis exaltata (L.) Schott	ni'ani'au	indigenous	rare
PTERIDACEAE (Brake Fern Family)			
Pityrogramma austroamericana Domin	gold-backed fern	non-native	uncommon
THELYPTERIDACEAE (Marsh Fern Family)			
Cyclosorus parasiticus (L.) Farw.	parasitic maiden fern	non-native	rare
MONOCOTS			
BROMELIACEAE (Bromeliad Family)			
Ananas comosus (L.) Merr.	pineapple	non-native	uncommon
ORCHIDACEAE (Orchid Family)			
Spathoglottis plicata Blume	Phillipine ground orchid	non-native	rare
POACEAE (Grass Family)			
Andropogon virginicus L.	broomsedge	non-native	uncommon
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	rare
Melinis minutiflora P. Beauv.	molasses grass	non-native	abundant
Paspalum scrobiculatum L.	mau'u laiki	indigenous	rare
DICOTS			
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	rare
APOCYNACEAE (Dogbane Family)			
Asclepias physocarpa (E.Mey.) Schlecter	balloon plant	non-native	rare
ASTERACEAE (Sunflower Family)			
Ageratina adenophora (Spreng.) R. King & H. Robinson	Maui pāmakani	non-native	rare
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	rare
Emilia sonchifolia (L.) DC.	flora's paintbrush	non-native	rare
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	rare
FABACEAE (Pea Family)			
Acacia confusa Merr.	Formosa koa	non-native	rare
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Desmodium incanum DC.	Spanish clover	non-native	uncommon
MELASTOMATACEAE (Melastoma Family)			
Tibouchina herbacea (DC.) Cogn.	cane tibouchina	non-native	rare
Szyzgium cumini (L.) Skeels	Java plum	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
POLYGALACEAE (Milkwort Family)			
Polygala paniculata L.	root beer plant	non-native	rare
PROTEACEAE (Protea Family)			
Grevillea robusta A. Cunn. Ex R. Br.	silk oak	non-native	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	'a'ali'i	indigenous	rare
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	rare
Stachytarpheta cayennensis (Rich) Vahl	nettle-leaved vervain	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the flora survey in the Honolua Aquifer Well Site H-1 project area. 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.

RESULTS

MAMMALS

Sign of just one non-native mammal was observed, the mongoose (*Herpestes auropunctatus*) whose droppings were noted. Other non-native mammals that could occur here include feral pigs (*Sus scrofa*), axis deer (*Axis axis*), feral cats (*Felis catus*), rats (*Rattus* spp.) and mice (*Mus domesticus*). Taxonomy and nomenclature follow Tomich (1986).

While it was impracticable to do an evening survey at this remote location to observe any presence of the `ōpe`ape`a or Hawaiian bat (*Lasiurus cinereus semotus*), these bats will be addressed in the Discussion and Recommendations.

BIRDS

Birdlife was sparse in and around this small project area. Just four non-native bird species were recorded, and all were of rare occurrence in this rather sterile habitat. Taxonomy and nomenclature follow American Ornithological Society (2022). Species included Japanese bush warbler (*Cettia diphone*), zebra dove (*Geopelia striata*), house finch (*Haemorhous mexicanus*) and the myna bird (*Acridotheres tristis*). No native forest birds were seen.

INSECTS

Insects were also sparsely represented. Only four non-native species were recorded, and all were of rare occurrence. Taxonomy and nomenclature follow Nishida et al (1992). Species included big-headed ant (*Pheidole megacephala*), long-tailed blue butterfly (*Lampides boeticus*), monarch butterfly (*Danaus plexippus*) and short-horned grasshopper (*Oedaleus abruptus*). No native insects were seen.

DISCUSSION AND RECOMMENDATIONS

The Honolua Aquifer Well Site H-1 project area had very little in the way of mammals, birds or insects recorded, and all of these were both non-native and of rare occurrence. No endangered or threatened species were found and there were no special fauna habitats identified. Though not recorded during the survey there are a few species for which there are concerns that are addressed here.

While no evening survey was conducted in the project area, there is a likelihood that the Endangered Hawaiian bat would occasionally pass through this area searching for nocturnal flying insects on which they feed. They are strong fliers and wide-ranging in a variety of habitats from sea level to over 8,000 feet elevation depending on seasonal spikes in insect activities. These bats also utilize trees where they place their young pups from April through mid-September. During this period the pups are vulnerable. As a precautionary measure it is recommended that no tree fifteen feet or more in height be removed during the breeding season to prevent any possible injury or death to these federally protected bats.

Three native seabirds, the Endangered ′ua′u or Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), the `akē`akē or band-rumped storm-petrel (*Oceanodroma castro*) and the Threatened ′a′o or Newell's shearwater (*Puffinus newelli*), were also of concern during the survey. These seabirds, which nest high in the mountains between April and November, fly in from the ocean to their burrows during the evenings and then fly out to sea again at dawn each day to feed. In West Maui these seabirds when returning to their burrows call out to their mates which will return the calls. These calls are loud and can be heard at great distances. Also, these seabirds are sometimes distracted by bright lights which can cause them to crash and be injured and sometimes killed by cats, dogs, or mongooses. Young inexperienced birds, taking their first flights out to sea are particularly vulnerable. It is recommended that any significant outdoor lighting on structures at facilities be hooded to direct the light downward to minimize distractions and dangers to these birds.

Some other Endangered birds that were not seen are addressed here. The nēnē or Hawaiian goose (*Branta sandvicensis*) is widespread on Maui in a variety of habitats. The densely vegetated project area, however, is not suitable for them. Two waterbirds, the ae`o or black-necked stilt (*Himantopus mexicanus knudseni)* and alae ke`oke`o or Hawaiian coot (*Fulica alai*), are obligates to wetland habitats. No such habitat occurs on or near this dry ridgetop.

With observance of the above recommendations, it is felt that the development of Honolua Aquifer H-1 Mailepai Well Site project area will not have any significant negative impacts on the fauna resources in this part of West Maui.

FAUNA SPECIES LIST

Following is a checklist of the fauna species inventoried during the field work. Fauna 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:

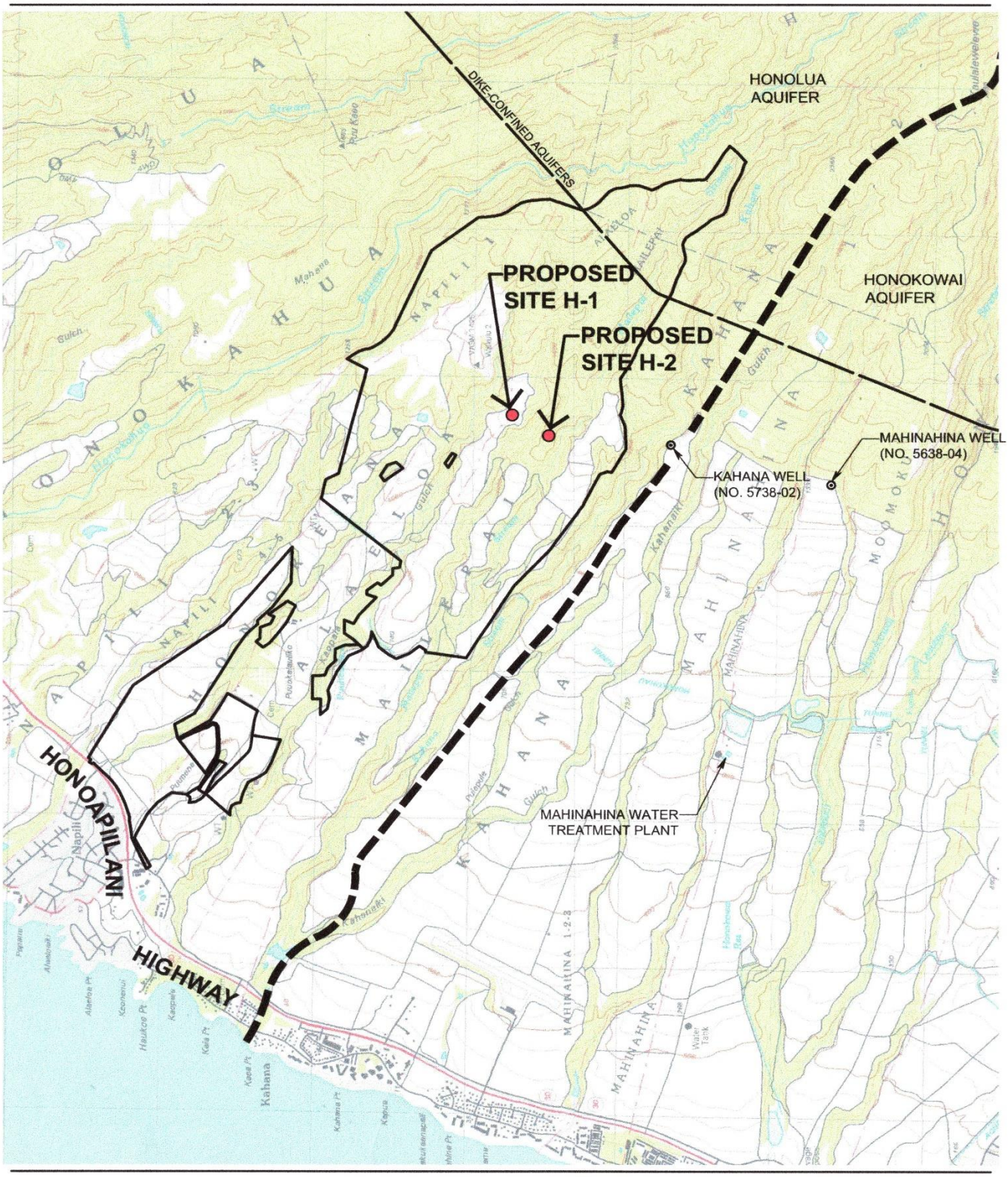
   abundant = many flocks or individuals seen throughout the area at all times of day.

   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			
VIVERRIDAE (Mongoose Family)			
Herpestes auropunctatus Hodgson	mongoose	non-native	rare
BIRDS			
CETTIIDAE (Bush Warbler Family)			
Cettia diphone Kittlitz	Japanese bush warbler	non-native	rare
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	rare
FRINGILLIDAE (Fringillid Finch Family)			
Haemorhous mexicanus Muller	house finch	non-native	rare
STURNIDAE (Starling Family)			
Acridotheres tristis L.	myna	non-native	uncommon
INSECTS			
Order - HYMENOPTERA - bees, wasps, ants			
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	rare
Order - LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
Lampides boeticus L.	long-tailed blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
Danaus plexippus L.	monarch butterfly	non-native	rare
Order - ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oedaleus abruptus Thunberg	short-horned grasshopper	non-native	rare



LOCATION MAP (USGS Map) - HONOLUA AQUIFER Figure 1

SCALE IN FEET

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE MAP

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

PRELIMINARY DESIGN REPORT FOR LAUNIUPOKO AQUIFER WELL DEVELOPMENT

Honolua Aquifer Well Site H-1 Project Map

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Biological Resources Survey
Honolua Aquifer Well
Site H-2

BIOLOGICAL RESOURCES SURVEY
DEPARTMENT OF WATER SUPPLY
HONOLUA AQUIFER WELL SITE H-2
MAILEPAI, LAHAINA, MAUI

by

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April 2022

Prepared for:
County of Maui
Department of Water Supply

BIOLOGICAL RESOURCES SURVEY
MAUI COUNTY DEPARTMENT OF WATER SUPPLY
HONOLUA AQUIFER WELL SITE H-2

INTRODUCTION

The Honolua Aquifer Well Site H-2 is located in Mailepai, West Maui TMK (2) 4-3-001:001 (see Figure 1). It is proposed to be an exploratory well to assess its potential for water resource development. This biological assessment was initiated by the County of Maui Department of Water Supply in compliance with environmental requirements of the planning process.

SITE DESCRIPTION

The project site is located in upper Mailepai on a ridge top at an elevation of 1,260 feet. The vegetation consists mostly of low scrub and scattered small trees. The soil is characterized as Honolua Silty Clay, 16-25 % slopes (HwD) which is a well-drained soil (Foote et al, 1972). Rainfall averages 50 inches per year (Armstrtong, 1983).

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the Honolua Aquifer Well Site H-2 that was conducted in April 2022. 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.

FLORA SURVEY REPORT

SURVEY METHODS

A walk-through flora survey method was used following routes that would ensure complete coverage of the well site. Areas most likely to harbor native or rare plants 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 project area was never used for agriculture and thus was relatively undisturbed. The vegetation consisted of a mixture of native and non-native species. A total of 42 plant species were recorded during the survey. One species was abundant throughout the project area, the `a`ali`i (*Dodonea viscosa*), a native shrub or small tree. Two grass species were common, the broomsedge (*Andropogon virginicus*) and the molasses grass (*Melinis minutiflora*). Fifteen species were uncommon and twenty-four species were of rare occurrence. Thirteen native species were recorded including three that are endemic to Hawaii:

kīlau (*Pteridium equilinum* subsp. *decompositum*)
`ākia (*Wikstroemia oahuensis*)
`ōhi`a (*Metrosideros polymorpha* var. *glaberrima*)

and ten species that are indigenous in Hawaii as well as to other Pacific Islands:

pala`ā (*Odontosoria chinensis*)
ni`ani`au (*Nephrolepis exaltata*)
uluhe (*Dicranopteris linearis*)
`uki (*Machaerina mariscoides* subsp. *meyenii*)
mau`u laiki (*Paspalum scrobiculatum*)
`u`ulei (*Osteomeles anthyllidifolia*)
alahe`e (*Psydrax odorata*)
pōpolo (*Solanum americanum*)
`a`ali`i (*Dodonaea viscosa*)

All of these thirteen species are widespread and common throughout Hawaii.

DISCUSSION AND RECOMMENDATIONS

The vegetation on this two-acre Honolua Aquifer Well Site H-2 project area is a mixture of native and non-native species. The non-native species were more numerous than natives, but the one species that was abundant was the native `a`ali`i. The thirteen native species are all widespread on all the major islands and none of them are rare. No endangered or threatened plant species were found nor were any that are candidate for such status seen. No species habitats or plant communities were identified in the area.

The proposed water system development at the small H-2 well site project area is not expected to result in any significant negative impacts to the botanical resources in this part of West Maui.

FLORA SPECIES LIST

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

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 introduction = plants introduced to Hawai'i during the course of Polynesian migrations and prior to western contact.

   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
FERNS			
DENNSTAEDTIACEAE (Bracken Family)			
Pteridium aquilinum (L.) Kuhn subsp. *decompositum* (Gaudich.) Lamoureux	kīlau	endemic	rare
GLEICHENIACEAE (False Stagthorn Fern Family)			
Dicranopteris linearis (Burm.f.) Underw.	uluhe	indigenous	uncommon
LINDSAEACEAE (Lindsaea Fern Family)			
Odontosoria chinensis (L.) J. Sm.	pala'ā	indigenous	uncommon
NEPHROLEPIDACEAE (Sword Fern Family)			
Nephrolepis exaltata (L.) Schott	ni'ani'au	indigenous	uncommon
THELYPTERIDACEAE (Marsh Fern Family)			
Cyclosorus parasiticus (L.) Farw.	parasitic maiden fern	non-native	rare
MONOCOTS			
ASPARAGACEAE (Asparagus Family)			
Cordyline fruticosa (L.) A. Chev.	kī laʻī	Polynesian	rare
CYPERACEAE (Sedge Family)			
Machaerina mariscoides (Gaud.) J. Kern *subsp. meyenii* (Kunth) T. Koyama	'ahaniu, uki	indigenous	uncommon
Rhynchospora caduca Elliott	anglestem beak-rush	non-native	rare
ORCHIDACEAE (Orchid Family)			
Phaius tankarvilleae (Banks & L'Her.) Blume	nuns-hood orchid	non-native	uncommon
Spathoglottis plicata Blume	Phillipine ground orchid	non-native	uncommon
POACEAE (Grass Family)			
Andropogon virginicus L.	broomsedge	non-native	common
Megathyrsus maximus (Jacq.) Simon & Jacobs	Guinea grass	non-native	rare
Melinis minutiflora P. Beauv.	molasses grass	non-native	common
Paspalum scrobiculatum L.	mau'u laiki	indigenous	uncommon
Paspalum urvillei Steud.	Vasey grass	non-native	rare
DICOTS			
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	uncommon
APOCYNACEAE (Dogbane Family)			
Asclepias physocarpa (E. Mey.) Schlechter	baloon plant	non-native	rare
ASTERACEAE (Sunflower Family)			
Ageratina adenophora (Spreng.) R. King & H. Robinson	Maui pāmakani	non-native	uncommon
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	rare
Crassocephalum crepidioides (Benth.) S. Moore	redflower ragleaf	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Elephantopus mollis Kunth	elephant foot weed	non-native	rare
Emilia sonchifolia (L.) DC.	flora's paintbrush	non-native	rare
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
CUCURBITACEAE (Gourd Family)			
Momordica charantia L.	bitter melon	non-native	rare
ERICACEAE (Heath Family)			
Leptecophylla tameiameiae (Cham. & Schlect.) Weiller	pūkiawe	indigenous	rare
EUPHORBIACEAE (Spurge Family)			
Euphorbia hypericifolia L.	graceful spurge	non-native	
FABACEAE (Pea Family)			
Acacia confusa Merr.	Formosa koa	non-native	uncommon
Chamaecrista nictitans (L.) Moench	partridge pea	non-native	rare
Desmodium incanum DC.	Spanish clover	non-native	uncommon
Indigofera suffruticosa	inikō	non-native	rare
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	rare
MELASTOMATACEAE (Melastoma Family)			
Tibouchina herbacea (DC.) Cogn.	cane tibouchina	non-native	rare
MYRTACEAE (Myrtle Family)			
Metrosideros polymorpha Gaud. var. *glaberrima* (H.Lev.) St.John	'ōhi'a lehua	endemic	uncommon
Psidium cattleianum Sabine	strawberry guava	non-native	rare
Psidium guajava L.	common guava	non-native	rare
POLYGALACEAE (Milkwort Family)			
Polygala paniculata L.	root beer plant	non-native	uncommon
PROTEACEAE (Protea Family)			
Grevillea robusta A. Cunn. Ex R. Br.	silk oak	non-native	uncommon
ROSACEAE (Rose Family)			
Osteomeles anthyllidifolia (Sm.) Lindl.	ūlei	indigenous	uncommon
RUBIACEAE (Coffee Family)			
Psydrax odorata (G. Forster) A.C. Smith & S.P. Darwin	alahe'e	indigenous	rare
SAPINDACEAE (Soapberry Family)			
Dodonaea viscosa Jacq.	'a'ali'i	indigenous	abundant
SOLANACEAE (Nightshade Family)			
Solanum americanum Mill.	pōpolo	indigenous	rare
THYMELAEACEAE ('Akia Family)			
Wikstroemia oahuensis (A.Gray) Rock	'ākia	endemic	rare
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	rare
Stachytarpheta cayennensis (Rich) Vahl	nettle-leaved vervain	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the flora survey in the H-2 Well Site Mailepai project area. 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.

RESULTS

MAMMALS

Just signs of one non-native mammal species was observed in the project area. Droppings of the small Indian mongoose (*Herpestes auropunctatus*) were noted. Other non-native mammals that could occur here include feral pigs (*Sus scrofa*), axis deer (*Axis axis*), rats (*Rattus* spp.), mice (*Mus domesticus*) and feral cats (*Felis catus*).

While it was impracticable to conduct an evening survey in this remote location to observe any presence of the `ōpe`ape`a or Hawaiian bat (*Lasiurus cinereus semotus*), these bats will be addressed in the Discussion and Recommendations.

BIRDS

Birdlife was sparse in and around this small ridge top project area. Just five non-native species were recorded during the survey. Taxonomy and nomenclature follow American Ornithological Society (2022). Two species were uncommon, the zebra dove (*Geopelia striata*) and the common myna (*Acridotheres tristis*). Three other species were rare, the Japanese bush warbler (*Cettia diphone*), the hwamei (*Leucodioptron canorum*) and the house finch (*Haemorhous mexicanus*). No native birds were seen.

INSECTS

The diversity of insect species in this small project area was found to be low and no species was found to be common. Just five insect species were recorded. Taxonomy and nomenclature follow Nishida et al (1992). Two non-native species were uncommon, the big-headed ant (*Pheidole megacephala*) and the monarch butterfly (*Danaus plexippus*). Of rare occurrence were the long-tailed blue butterfly (*Lampides boeticus*), the short-horned grasshopper (*Oedaleus abruptus*) and the globe skimmer dragonfly (*Pantala flavescens*). The globe skimmer is a common indigenous native species.

DISCUSSION AND RECOMMENDATIONS

The Honolua Aquifer Well Site H-2 project area had very little in the way of native fauna. The globe skimmer dragonfly was the only native species recorded. This native dragonfly is common throughout Hawaii and it also occurs in many other tropical countries. It is of no conservation concern.

While no evening survey was conducted in the project area, there is a likelihood that the Endangered Hawaiian bat would occasionally pass through this area searching for nocturnal flying insects on which they feed. They are strong fliers and wide-ranging in a variety of habitats from sea level to over 8,000 feet elevation depending on seasonal spikes in insect activities. These bats also utilize trees where they place their young pups from April through mid-September. During this period the pups are vulnerable. As a precautionary measure it is recommended that no tree fifteen feet or more in height be removed during the breeding season to prevent any possible injury or death to these federally protected bats.

Three native seabirds, the Endangered ʻuaʻu or Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), and `akē`akē or band-rumped storm-petrel (*Oceanodroma castro*) and the Threatened ʻaʻo or Newell's shearwater (*Puffinus newelli*), were also of concern during the survey. These seabirds, which nest high in the mountains between April and November, fly in from the ocean to their burrows during the evenings and then fly out to sea again at dawn each day to feed. In West Maui these seabirds when returning to their burrows call out to their mates which will return the calls. These calls are loud and can be heard at great distances. Also, these seabirds are sometimes distracted by bright lights which can cause them to crash and be injured and sometimes killed by cats, dogs, or mongooses. Young inexperienced birds, taking their first flights out to sea are particularly vulnerable. It is recommended that any significant outdoor lighting on structures at facilities be hooded to direct the light downward to minimize distractions and dangers to these birds.

Some other Endangered birds that were not seen are addressed here. The nēnē or Hawaiian goose (*Branta sandvicensis*) is widespread on Maui in a variety of habitats. The densely vegetated project area, however, is not suitable for them. Two waterbirds, the ae`o or black-necked stilt (*Himantopus mexicanus knudseni)* and alae ke`oke`o or Hawaiian coot (*Fulica alai*), are obligates to wetland habitats. No such habitat occurs on or near this dry ridgetop.

With observance of the above recommendations, it is felt that the development of Honolua Aquifer H-2 Mailepai Well Site project area will not have any significant negative impacts on the fauna resources in this part of West Maui.

FAUNA SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Fauna 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:

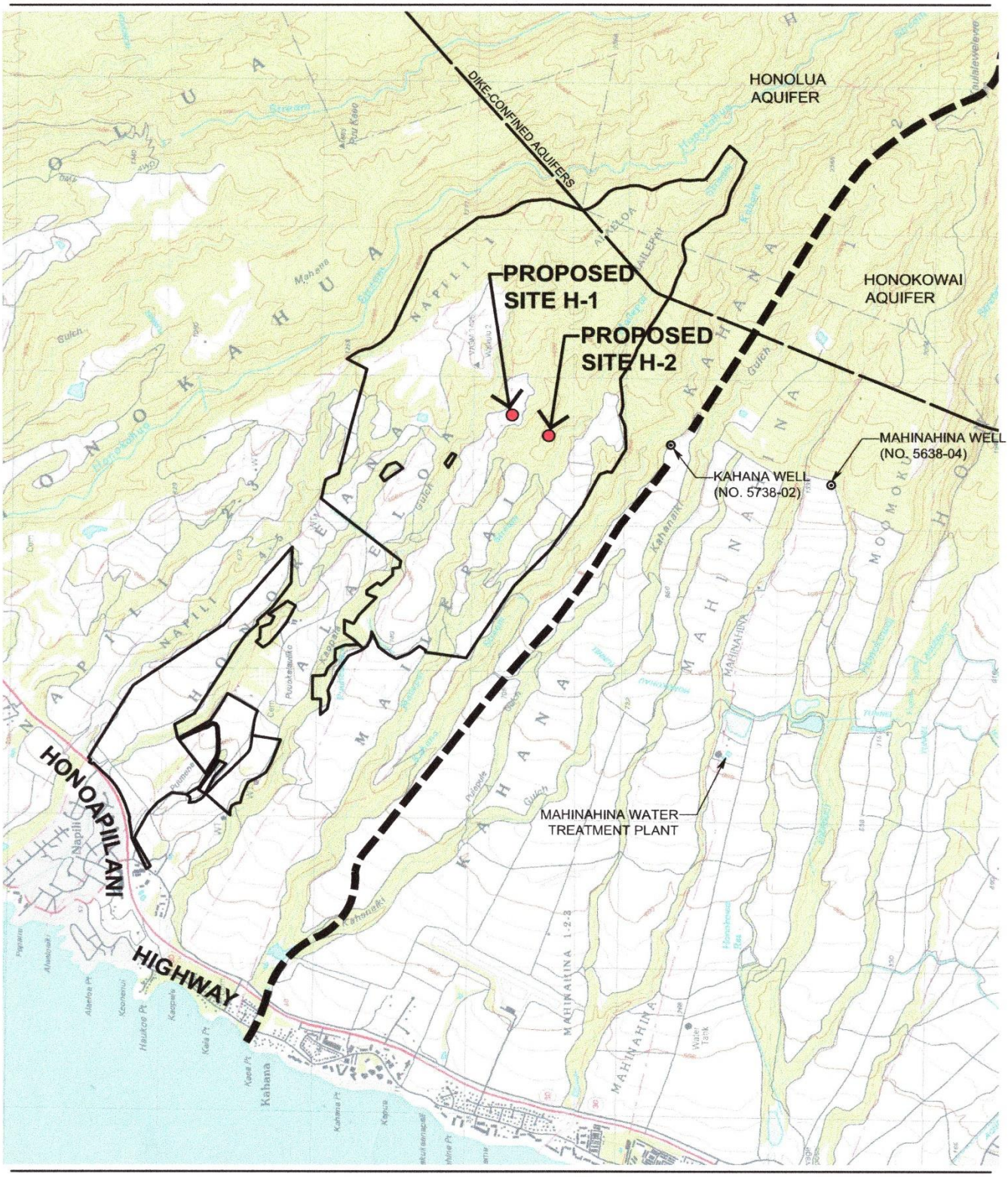
   abundant = many flocks or individuals seen throughout the area at all times of day.

   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			
VIVERRIDAE (Mongoose Family)			
Herpestes auropunctatus Hodgson	mongoose	non-native	uncommon
BIRDS			
CETTIIDAE (Bush Warbler Family)			
Cettia diphone Kittlitz	Japanese bush warbler	non-native	rare
COLUMBIDAE (Dove Family)			
Geopelia striata L.	zebra dove	non-native	uncommon
FRINGILLIDAE (Fringillid Finch Family)			
Haemorhous mexicanus Muller	house finch	non-native	rare
LEIOTHRICHIDAE (Leiothrix Family)			
Leucodioptron canorum L.	hwamei	non-native	rare
STURNIDAE (Starling Family)			
Acridotheres tristis L.	myna	non-native	uncommon
INSECTS			
Order - HYMENOPTERA - bees, wasps, ants			
FORMICIDAE (Ant Family)			
Pheidole megacephala Fabricius	big-headed ant	non-native	uncommon
Order - LEPIDOPTERA - butterflies, moths			
LYCAENIDAE (Gossamer-winged Butterfly Family)			
Lampides boeticus L.	long-tailed blue butterfly	non-native	rare
NYMPHALIDAE (Brush-footed Butterfly Family)			
Danaus plexippus L.	monarch butterfly	non-native	uncommon
Order - ODONATA - dragonflies, damselflies			
LIBELLULIDAE (Skimmer Dragonfly Family)			
Pantala flavescens Fabricius	globe skimmer dragonfly	indigenous	rare
Order - ORTHOPTERA - grasshoppers, crickets			
ACRIDIDAE (Grasshopper Family)			
Oedaleus abruptus Thunberg	short-horned grasshopper	non-native	rare



LOCATION MAP (USGS Map) - HONOLUA AQUIFER Figure 1

SCALE IN FEET

SOURCE: USGS LAHAINA & NAPILI QUADRANGLE MAP

PREPARED FOR: DEPT. OF WATER SUPPLY, COUNTY OF MAUI

PREPARED BY: FUKUMOTO ENGINEERING, INC.

PRELIMINARY DESIGN REPORT FOR LAUNIUPOKO AQUIFER WELL DEVELOPMENT

Honolua Aquifer Well Site H-2 Mailepai

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ARCHAEOLOGICAL FIELD INSPECTION FOR WELL SITE L-3

APPENDIX

E

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AN ARCHAEOLOGICAL FIELD INSPECTION FOR WELL SITE L-3 FOR THE LAUNIUPOKO AQUIFER WELL DEVELOPMENT PROJECT (DWS JOB NO. 20-01 / CONTRACT WC1039) IN WAINE‘E AHUPUA‘A, LĀHAINĀ DISTRICT, ISLAND OF MAUI, HAWAI‘I

[TMK: (2) 4-6-019:003 POR.]

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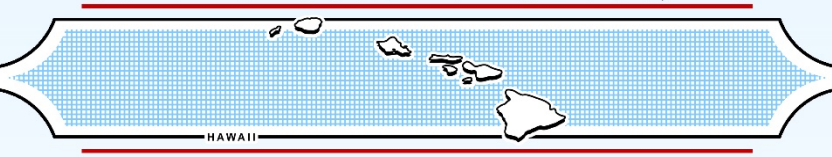

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INTRODUCTION

At the request of Fukumoto Engineering, Inc., representing the County of Maui Department of Water Supply (DWS), Scientific Consultant Services, Inc. (SCS), has prepared this field inspection report regarding the development of 1.55 million gallons per day of groundwater sources for Lāhainā in West Maui. The DWS has specified Well Site L-3 in Waineʻe Ahupuaʻa, Lāhainā District, Island of Maui, [TMK: (2) 4-6-019:003 por.] for the construction of exploratory wells (Figures 1, 2, and 3).

The project area includes land to allow for future construction of pumping stations, consisting of pump pads and piping, a control building, a reservoir, paved service yards, drainage sumps, and emergency generators. Interim site improvements will include grading of the immediate work area to create a gently sloping pad and constructing a chain link security fence around the site.

The proposed Launiupoko Aquifer Site L-3 is located on land owned by the State of Hawaii. The field inspection of Well Site L-3 for the Launiupoko Aquifer Well Development project was conducted on October 23, 2024, by SCS archaeologists David Stielow, B.A. and Derel Butler, B.A., under the supervision of principal investigator Michael F. Dega, Ph.D. The survey was completed to assess the presence or absence of historic properties on the surface of the project area and determine the potential for subsurface cultural deposits.

This report presents the results of the archaeological field inspection of the project area and previous archaeological projects in the vicinity. It is not intended to meet the requirements of Hawaiʻi Administrative Rules (HAR) §13-276 as an archaeological inventory survey. This investigation is intended to provide a cultural history of the project area and identify cultural resources that may be present in it and its vicinity.

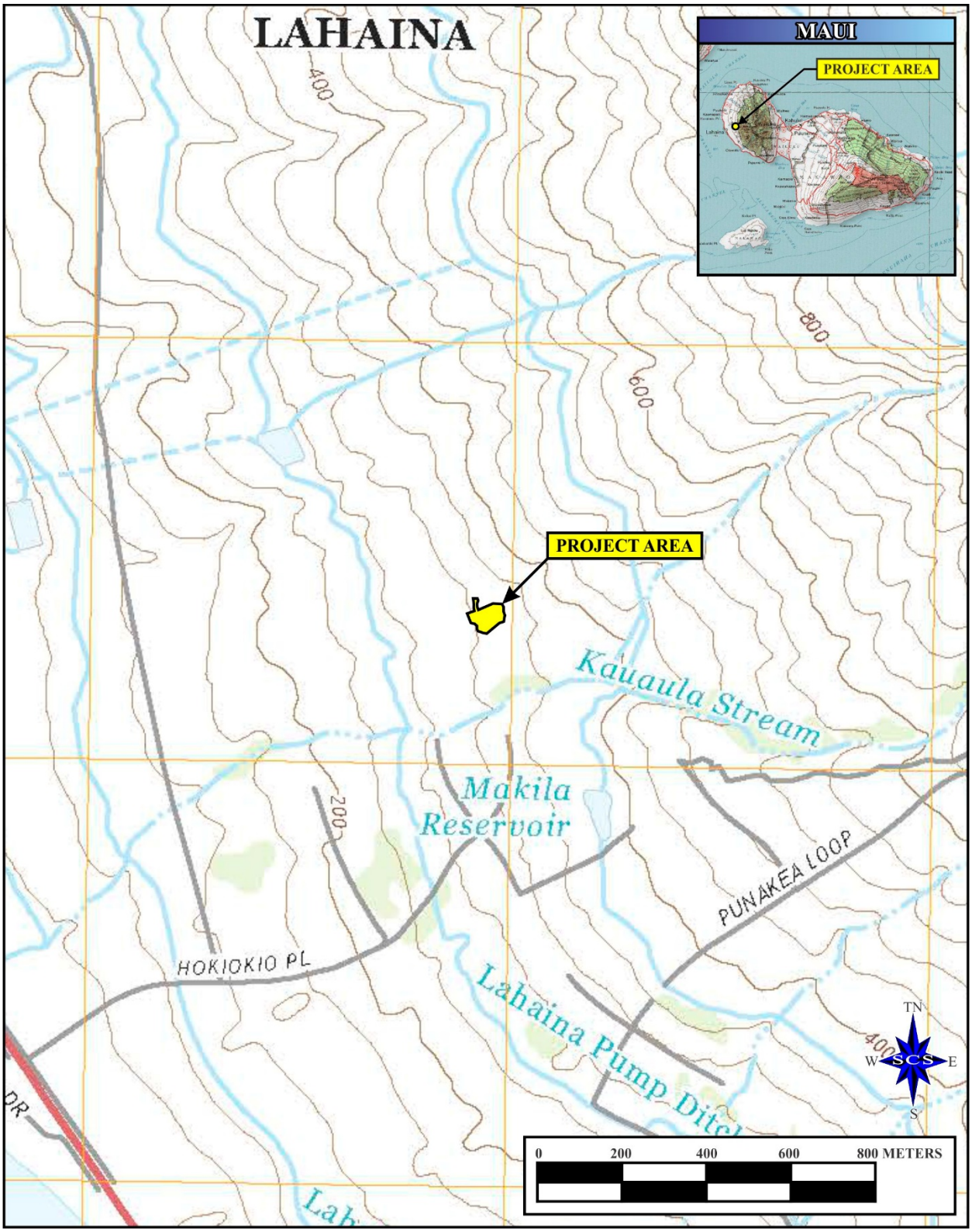

Figure 1: USGS topographic map showing project area location for Launiupoko Aquifer Site L-3

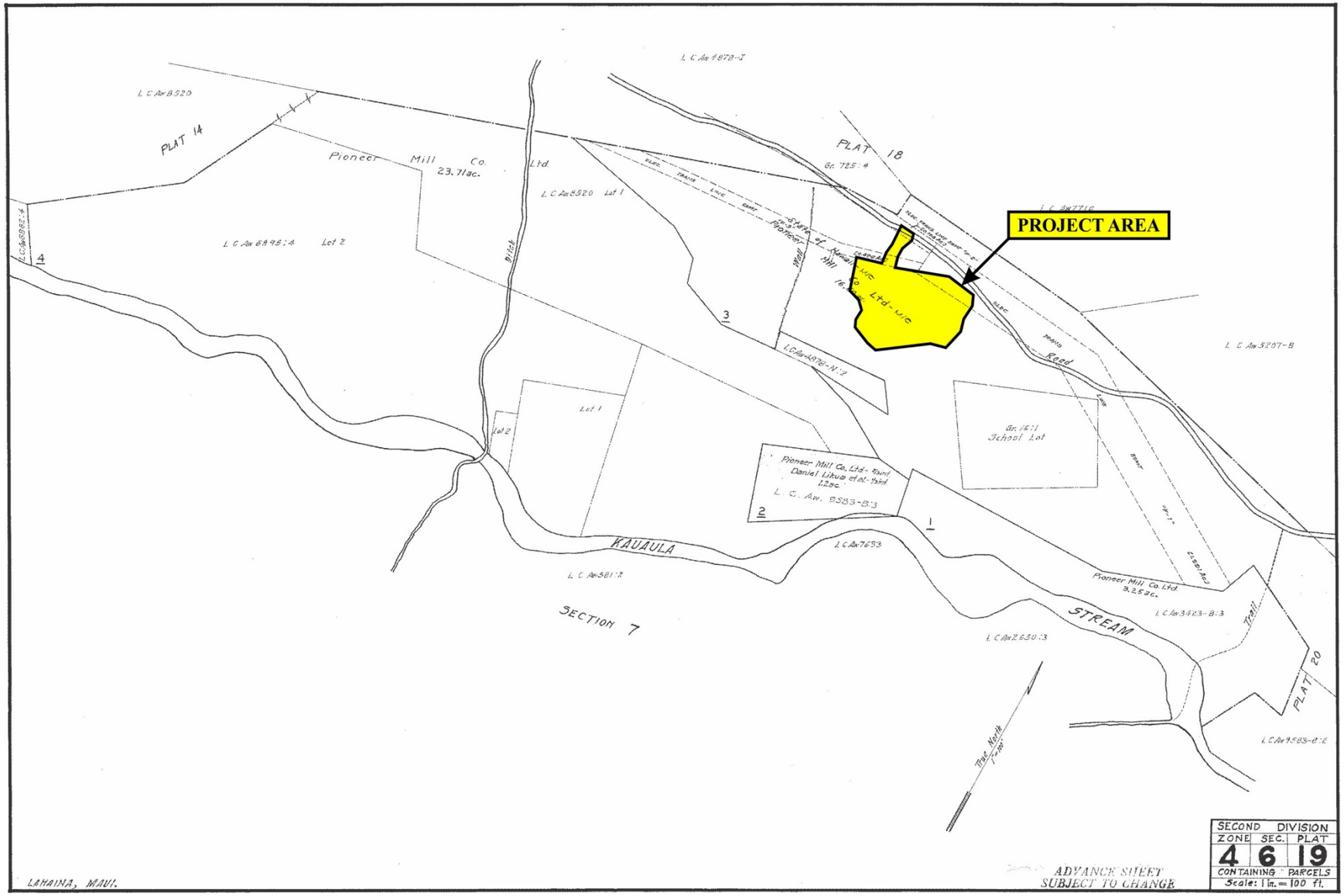

Figure 2: Tax Map Key [TMK: (2) 4-6-019] map showing project area location for Launiupoko Aquifer Site L-3

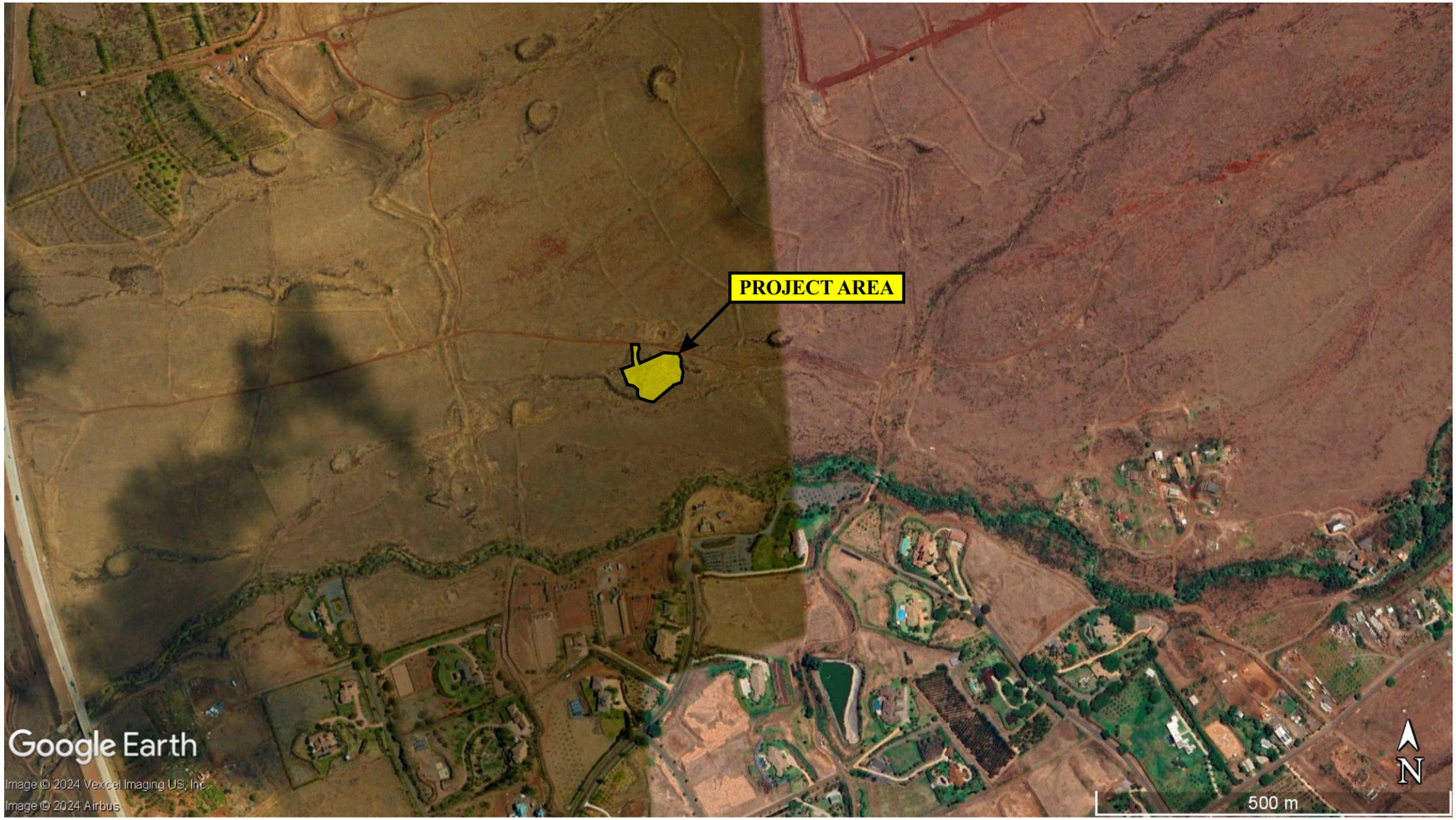

Figure 3: Google Earth aerial photograph showing project area location for Launiupoko Aquifer Site L-3

ENVIRONMENTAL SETTING

Maui is the second largest island of the Hawaiian Archipelago. It was formed by two volcanoes, the younger and dormant Haleakalā in the east and the older and extinct Puʻu Kukui in the west, joined together by an isthmus of dry, open country. Haleakalā (from Hawaiian, "house of the Sun") is the larger of the two volcanoes, as it dominates the larger southeastern section of the island, soaring 3,055 meters (m; 10,023 ft) above mean sea level (amsl). The flanks of Haleakalā are distinguished by their gentle slopes toward the isthmus. Puʻu Kukui ("candlenut peak") in the west rises to 1,764 m (5,788 ft) amsl. The West Maui Mountains (Mauna Kahālāwai) are surrounded by large, heavily eroded, amphitheater shaped valleys that support permanent streams watering the fertile agricultural lands along the coasts. The deep valleys and coastal regions of West Maui, and the district of Lāhainā in particular, have been long contested and coveted lands remarkable for their productivity.

PROJECT AREA LOCATION

The project area includes additional land to support pumping stations. The Launiupoko Aquifer's former sugarcane lands contain substantial groundwater resources. Launiupoko Aquifer Site L-3 [TMK: (2) 4-6-019:003 por.] is in Waineʻe Ahupuaʻa, on a parcel of land owned by the Department of Land and Natural Resources of the State of Hawaii.

CLIMATE AND HYDROLOGY

Because they are located on the leeward side of Mauna Kahālāwai, the aquifer well site is in a rain shadow that impacts rainfall and air temperature. The typically moist trade winds bring precipitation to the northeastern slopes of this range, leaving the southwestern slopes relatively dry. According to Giambelluca et al. (2013), the annual mean rainfall in the vicinity of the Launiupoko Aquifer Site is 563.9 mm (22.2 in). The highest average rainfall of 96.5 mm (3.8 in) occurs in December. The area receives its lowest average rainfall in July at 16.6 mm (0.65 in). The mean annual temperature is 22.6 °C (72.7 °F), with the highest average temperature in August at 24.6 °C (76.3 °F). The lowest average temperature occurs in February at 20.6 °C (69.1 °F) (Giambelluca et al. 2014).

SOILS

The soil at Launiupoko Aquifer Site L-3 is partially situated in Stony Alluvial Lands (rSM) and Wainee very stony silty clay (WxC). Stony Alluvial Lands consist of stones, boulders, and soil deposited along the bottoms of gulches and on alluvial fans by streams. This soil is generally considered difficult to improve because of its rockiness (Foote et al. 1972:120). Wainee very stony silty clay is a well-drained soil on alluvial fans (Foote et al. 1972:134).

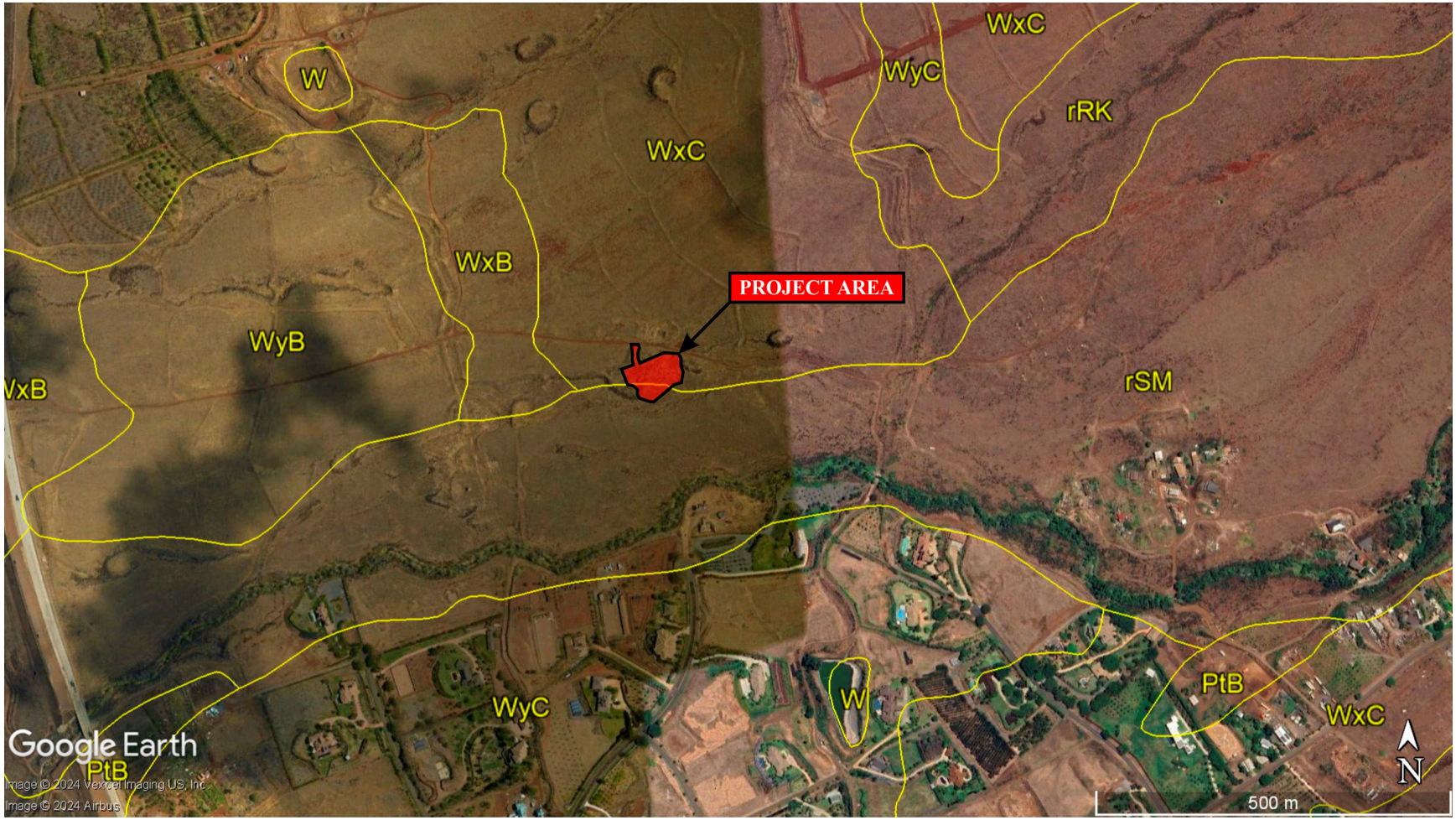

Figure 4: Google Earth aerial photograph showing soil series in the vicinity of project area locations for Launiupoko Aquifer Site L-3

PREVIOUS ARCHAEOLOGY

The first archaeological work in Lāhainā was the island-wide inventory of religious structures compiled by Winslow Walker in 1929 and 1930 under the auspices of the Bernice Pauahi Bishop Museum (Walker 1931). He identified Apahua Heiau (Walker Site 8), built by Chief Hua-a-Pohukaina. Situated in Kuʻia Ahupuaʻa, Apahua Heiau is located at Waineʻe in the sugarcane fields by the power house (Lahaina Pump) of Pioneer Mill Company (Ashdown 1962). It has been subsequently designated as State Inventory of Historic Places (SIHP) Site 50-50-03-00008.

Most of the archaeological work near the project area, however, is much more recent, following changes in hisoric protection legislation and practices in the 1980s. These studies have been summarized below, and their project areas are depicted on Figure 5

HONOAPIʻILANI HIGHWAY

Chiniago, Inc. (Barrera 1988) and Paul H. Rosendahl, Inc., (PHRI; Jensen 1991) surveyed alternate highway corridors for the realignment of Honoapiʻilani Highway. The reconnaissance survey completed by Barrera (1988) investigated three alternate routes for Honoapiʻilani Highway, extending from Launiupoko to Honokōwai. The corridors passed through a number of sites, including the Lāhainā Historic District (SIHP Site 50-50-03-03001). An agricultural complex and a possible habitation terrace were recorded. During the archaeological inventory survey by Jensen (1991), four Pre-Contact sites containing 28 component features were identified. The historic properties were associated with agriculture, habitation, and burial interment and ceremony.

CSH (McCurdy and Hammatt 2008) conducted a literature review and field inspection for the Honoapiʻilani Highway Realignment (Lāhainā Bypass), Phase IB-l [TMK: (2) 4-6-014:001, 002, (2) 4-6-018:002, 003; (2) 4-7-001:002, (2) 4-7-003:001]. The project area was a corridor running from the intersection of Lāhaināluna Road and ʻIkena Avenue in Paunau Ahupuaʻa, to just past (244 m south of) Hōkiokio Place in Polanui Ahupuaʻa. The project area includes land previously investigated by Jensen (1991). Two previously identified historic properties were re-recorded: a portion of an irrigation ditch that was feature D of SIHP Site 50-50-03-04787, documented by Rosendahl (2000), and the large mounds of SIHP Site 50-50-03-05950, documented by Paraso and Dega (2012). Five new potential archaeological sites were temporarily designated as CSH 1 through 5. CSH 1 consisted of remnants of a Post-Contact basalt wall, CSH 2 was a Pre-Contact agricultural complex, CSH 3 was an electrical transformer of indeterminate age but potentially historic (over 50 years old), and CSH 4 and CSH 5 were potentially historic irrigation pipes.

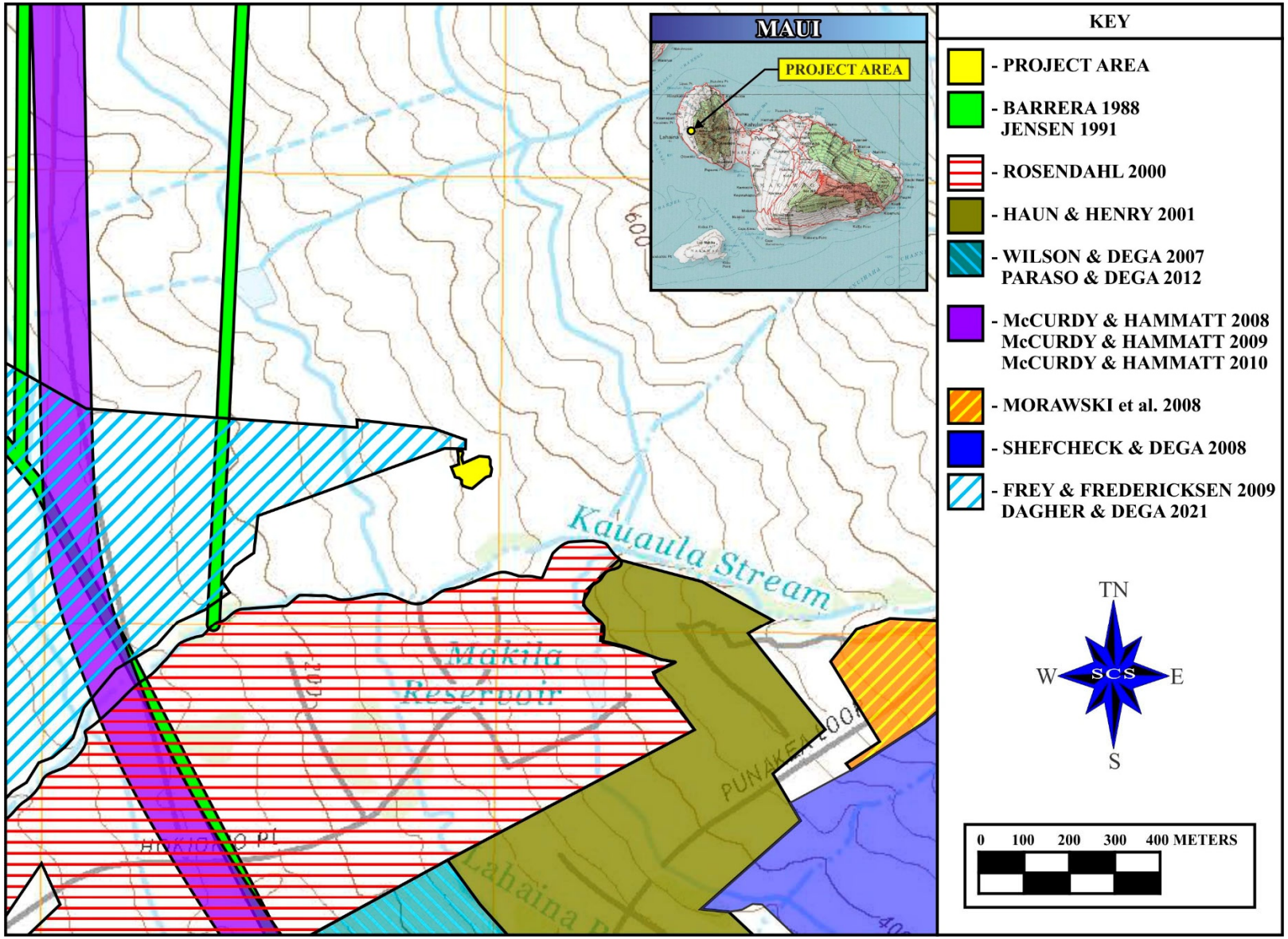

Figure 5: USGS topographic map showing previous archaeology in a roughly 0.5-mile radius around the locations of Launiupoko Aquifer Site L-3

After the 2008 literature review and field inspection, CSH (McCurdy and Hammatt 2009) conducted archaeological inventory survey of the same Lāhainā Bypass corridor to further document the sites found in the literature review and field inspection. CSH 3 and CSH 5 were determined to be modern and not archaeologically significant, while CSH 1 was designated as SIHP Site 50-05-03-06631, CSH 2 was assigned SIHP Site 50-05-03-06632, and CSH 4 was determined to be Plantation Era in origin and assigned SIHP Site 50-05-03-06633. McCurdy and Hammatt (2009:40) also identified an additional ten "irregularly shaped push pile" features that were added to SIHP Site 50-50-03-05950, for a total of 27 features.

CSH (McCurdy and Hammatt 2010) completed an addendum archaeological inventory survey for the same Lāhainā Bypass corridor. The fieldwork consisted of mechanical testing of the push piles (mounds) features of SIHP Site 50-50-03-05950 that would be impacted by the construction. Six of the 27 features of SIHP Site 50-50-03-05950 occurred within the ROW and were subject to mechanical testing. No cultural features or artifacts were recovered, and the push piles were interpreted to be the result of field clearing activities from 1947 to 1951 associated with sugarcane agriculture.

KAUA'ULA DEVELOPMENT

In 1999, PHRI (Rosendahl 2000) conducted an archaeological inventory survey on 230 acres in Polanui Ahupua'a [TMK: (2) 4-7-002:004, (2) 4-7-002:007; (2) 4-007-003:001]. The majority of the parcel was used for sugarcane cultivation. During the survey, two late Pre-Contact irrigation terraces (SIHP Site 50-50-03-04789) adjacent to Kaua'ula Stream were identified as *lo'i*, nine Post-Contact features associated with the sugar mill operation were collectively identified as SIHP Site 50-50-03-04787; and a late Pre-Contact wall segment (SIHP Site 50-50-03-04795) along Kaua'ula Stream was determined to be part of a garden enclosure.

MAKILA SUBDIVISION

Haun and Associates (Haun and Henry 2001) conducted an archaeological inventory survey on 124 acres in Launiupoko and Polanui Ahupua'a [TMK: (2) 4-7-001:001 por., (2) 4-7-004:004 por.]. Four sites consisting of six component features were identified. One of the sites (SIHP Site 50-50-03-04787) had been previously recorded by Rosendahl (2000). The remaining sites include two linear rock piles (SIHP Site 50-50-03-05187), a series of low terraces associated with a concrete and mortared stone ditch (SIHP Site 50-50-03-05188), and a terrace interpreted as a *lo'i*.

LAHAINA BYPASS

In 2006, SCS (Wilson and Dega 2007) conducted a field inspection of a corridor 2.5 miles (4 km) long and 160 ft (49 m) wide within the area surveyed by Paraso and Dega (2012) for a proposed extension of the Lāhainā Bypass [TMK: (2) 4-7-001]. SIHP Sites 50-50-03-05950, 50-50-03-05954, and 50-50-03-05955 were documented once again.

LAUNIUPOKO SUBDIVISIONS

In 2006, SCS (Paraso and Dega 2012) conducted an archaeological inventory survey of 633 acres in Launiupoko and Polanui Ahupuaʻa [TMK: (2) 4-7-001:002 por.]. Ten Post-Contact sites were recorded, including one irrigation ditch previously documented by Rosendahl (2000) as SIHP Site 50-50-03-04787. Five of the sites (SIHP Sites 50-50-03-05950 through 50-50-03-05952, 50-50-03-05955, and 50-50-03-05957) are associated with the sugarcane plantation era, including large rock mounds, terraces, and irrigation ditches. Two sites are rock walls associated with the cattle ranching era, one of which had been previously recorded as SIHP Site 50-50-03-02665. The other rock wall was designated as SIHP Site 50-50-03-05954. SIHP Site 50-50-03-05953 is a scatter of slag fragments and cores interpreted as a Post-Contact work area. The final site (SIHP Site 50-50-03-05956) is an incohesive scatter of Post-Contact materials and midden. Paraso and Dega suggest that the lack of traditional sites in lower Launiupoko is due to a combination of Post-Contact disturbance and a "barren" or non-culturally-affected zone. Subsurface testing yielded negative results.

SCS (Morawski et al. 2008) conducted an archaeological inventory survey on 520 acres located within Launiupoko Ahupuaʻa [TMK: (2) 4-7-001:002 por.]. A total of 35 sites were identified. The previously recorded sites included a boulder wall (SIHP Site 50-50-03-03173), interpreted as an sugarcane plantation era irrigation ditch, a Pre-Contact agricultural complex (SIHP Site 50-50-03-03175) composed of mounds, retaining walls, and enclosures, and a wall segment (SIHP Site 50-50-03-03176). The 32 newly recorded sites (SIHP Sites 50-50-03-05880 through 50-50-03-05911) span the Pre-Contact through plantation eras. Several large agricultural complexes, both Pre- and Post-Contact in nature, and consisting of terraces, enclosures, and modified outcrops, were identified.

SCS (Shefcheck and Dega 2008) completed an archaeological inventory survey on 122.84 acres of undeveloped land in Launiupoko and Polanui Ahupuaʻa [TMK: (2) 4-7-001:029 por.]. Five Post-Contact sites were identified, of which four are extensive clusters of dryland terraces. The remaining site consisted of five ranch walls, which were designated under one site number because of their structural, geographic, and temporal similarity. No cultural materials were recovered.

LĀHAINĀ

From 2006 to 2007, Xamanek Researches (Frey and Fredericksen 2009) conducted an archaeological inventory survey on a 480-acre parcel in Lāhainā [TMK: (2) 4-6-013-016, 018, 025, (2) 4-6-001, 002]. The project area includes Maui's last sugarcane village, Waineʻe Village (SIHP Site 50-50-03-05042), demolished in 2000. A linear wall remnant (SIHP Site 50-50-03-06477) and a remnant of an old railroad bed associated with Pioneer Mill (SIHP Site 50-50-03-06478) were identified. Six subsurface site remnants were also identified. SIHP Sites 50-50-03-06472 and 50-50-03-06474 through 50-50-03-06476 consist of agricultural site remnants. SIHP Site 50-50-03-06471 is a Post-Contact refuse pit. One burial, contained in what appeared to be the remnants of a coffin, was designated as SIHP Site 50-50-03-06473. The report was later revised by SCS (Dagher and Dega 2021).

PROJECT AREA EXPECTATIONS

While Launiupoko may not have supported a sizable Pre-Contact population, archaeological work in the vicinity of the current project area provides evidence of habitation and agriculture. Findings suggest occupation of the area from the 10th century through the plantation era. Launiupoko may have supported temporary and permanent habitation, ceremonial activities, and work areas for tool manufacturing. However, Launiupoko has been heavily impacted by several decades of sugarcane cultivation and cattle ranching activities. Therefore, it is highly probable that any Pre-Contact sites in the area are heavily disturbed, and much of the remaining archaeological sites are associated with sugarcane cultivation or cattle ranching.

FIELD METHODOLOGY AND RESULTS

The archaeological field inspection of Well Site L-3 for the Launiupoko Aquifer Well Development project was conducted in October 23, 2024 by SCS archaeologists David Stielow, B.A. and Derek Butler, B.A. under the supervision of principal investigator Michael F. Dega, Ph.D. Field methods consisted of a 100% pedestrian survey and documentation via digital photographs.

Most of the project area is heavily disturbed with significant dozer push activity, broken boulders with blast holes, drill holes, etc. The south side of the project area is flanked by a shallow gulch. Two boulders with petroglyphs were observed within 1 to 6 m of the boundary of the project area, on the exterior of the survey area. No historic properties were identified within the project area.

Laboratory work consisted of cataloging field notes and photographs. All field notes and digital photographs have been curated and are now stored at the SCS laboratory in Honolulu.



Figure 6: Overview photograph of the project area (view to 240°)



Figure 7: Photograph of a bore hole in a boulder in a dozer push pile



Figure 8: Photograph of a faint anthropomorphic petroglyph (TS-7) pecked into the face of a boulder. Occurs outside project area.



Figure 9: Overview photograph of the project area inside a dozer push (view to 260°)

DISCUSSION AND CONCLUSIONS

On behalf of the County of Maui Department of Water Supply and at the request of Fukumoto Engineering, Inc., Scientific Consultant Services, Inc. (SCS) conducted a field inspection of the project area for Well Site L-3 of the Launiupoko Aquifer Well Development project in October 2024. No historic properties were identified during the field inspection.

Since historic properties have been observed during previous archaeological studies in the vicinity of the project area and several petroglyph boulders occur in the area, just outside the current project boundaries, however, archaeological monitoring is recommended for any ground disturbing activities during this project.

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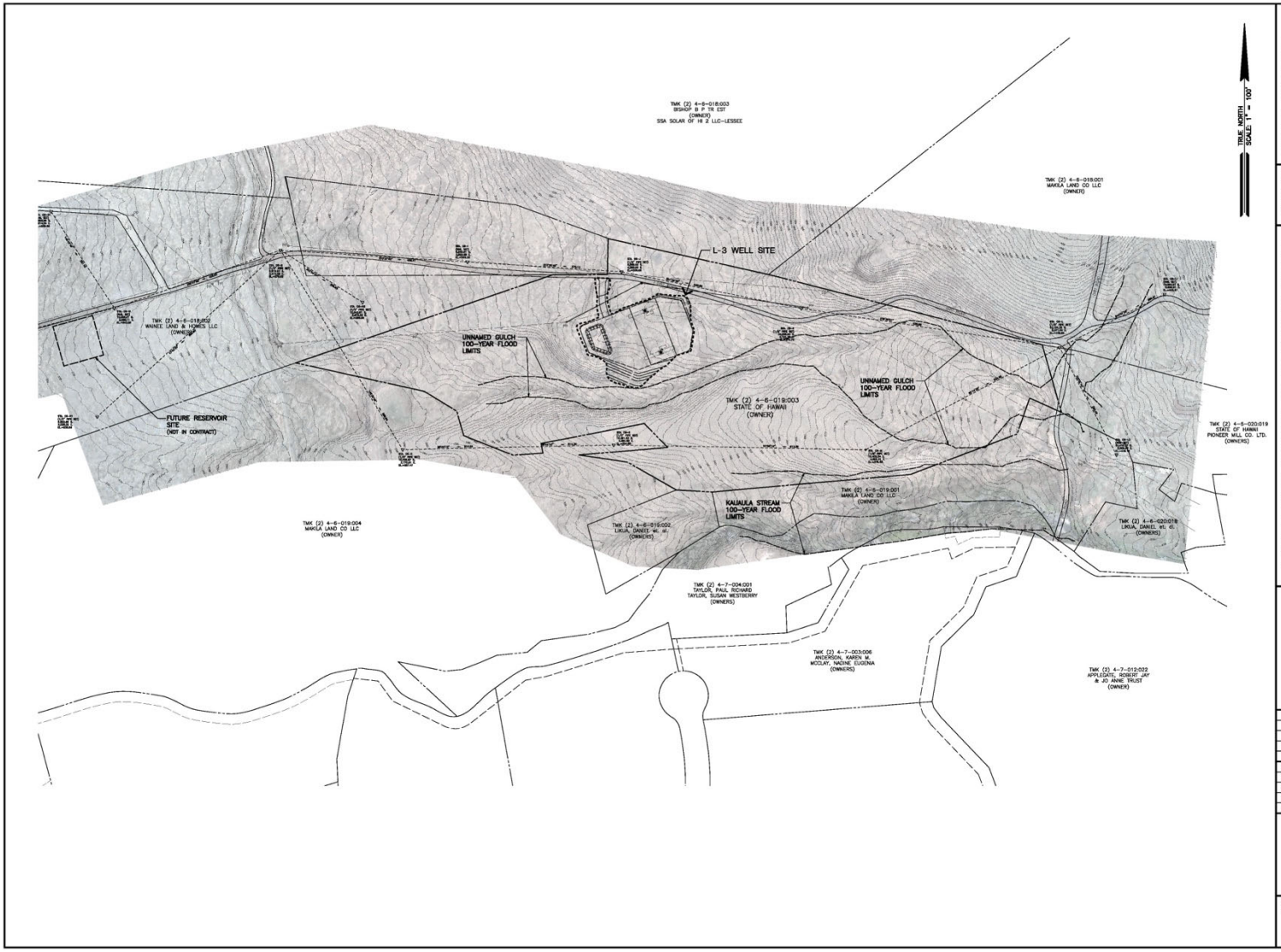
APPENDIX A: SITE PLAN



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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY

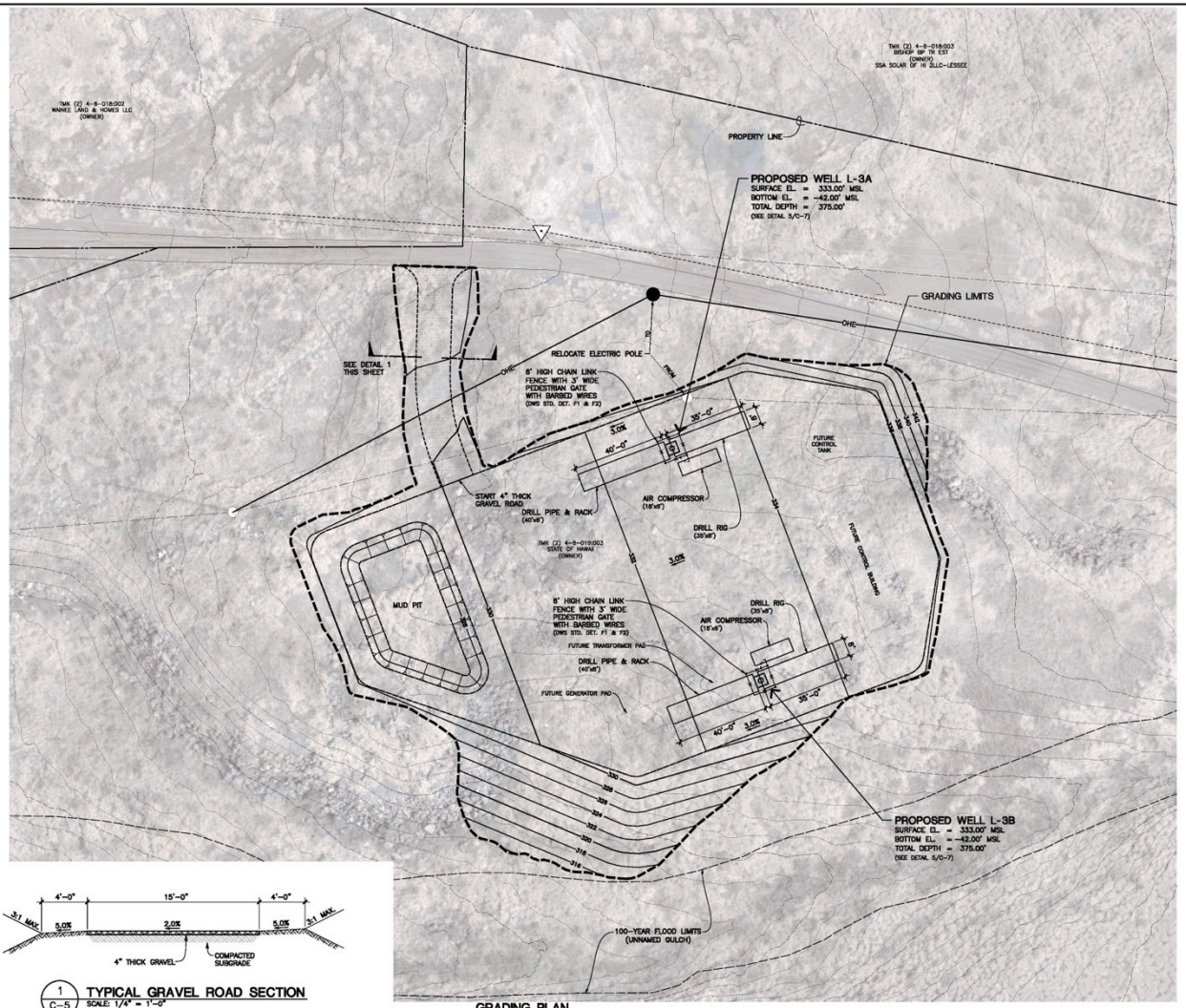
DWS JOB NO. 20-01
TMK: (2) 4-6-019:003
LAHAINA, MAUI, HAWAII

SITE PLAN

DESIGNED BY:	S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	K.F.
DATE:	MARCH 10, 2023
FILE NO:	COM85

SHEET C-4
5 OF 8

APPENDIX B: GRADING PLAN



1 / C-5 TYPICAL GRAVEL ROAD SECTION
SCALE: 1/4" = 1'-0"

GRADING PLAN
SCALE: 1" = 20'
SCALE IN FEET
0 10 20 40 80

NOTES:
1. LOCATIONS OF EQUIPMENT (SUCH AS DRILL RIG, DRILL PIPE AND RACK, AND AIR COMPRESSOR) AND TEMPORARY FACILITIES (SUCH AS MUD PITS) SHOWN ON PLAN ARE SUGGESTED LOCATIONS ONLY. CONTRACTOR SHALL DETERMINE SIZE AND LOCATIONS OF EQUIPMENT AND TEMPORARY FACILITIES.

LEGEND:

4" GRAVEL ROAD

EARTHWORK QUANTITIES:

EXCAVATION = 2,000 CU. YDS.
EMBANKMENT = 2,000 CU. YDS.
AREA OF GRADING = 1.02 ACRES

EARTHWORK QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES.

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Prepared for:
Department of Water Supply
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200 South High Street
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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-019:003
LAHAINA, MAUI, HAWAII

GRADING PLAN

DESIGNED BY: S.O.
DRAWN BY: S.O., N.M.
CHECKED BY: K.F.
DATE: MARCH 10, 2023
FILE NO: COM95

SHEET C-5
6 OF 8

APPENDIX F

CULTURAL IMPACT ASSESSMENT

AA PROJECT NO. 2005

DRAFT

CULTURAL IMPACT ASSESSMENT FOR THE LAUNIUPOKO AQUIFER EXPLORATORY WELLS PROJECT

Panaʻewa and Waineʻe Ahupuaʻa, Lāhainā Moku; Mailepai Ahupuaʻa, Kāʻanapali Moku; Lāhainā Modern Tax District, Mokupuni o Maui, TMK: (2) 4-6-018:007, (2) 4-6-019:003, (2) 4-3-001:001



ʻĀINA ARCHAEOLOGY

COVER IMAGE: LOOKING OUT TOWARDS LĀHAINĀ TOWN FROM PROPOSED WELL SITE L-3. IMAGE TAKEN ON NOVEMBER 2, 2022

DRAFT

CULTURAL IMPACT ASSESSMENT FOR THE LAUNIUPOKO AQUIFER EXPLORATORY WELLS PROJECT

Panaʻewa and Waineʻe Ahupuaʻa, Lāhainā Moku; Mailepai Ahupuaʻa, Kāʻanapali Moku; Lāhainā Modern Tax District, Mokupuni o Maui, TMK: (2) 4-6-018:007, (2) 4-6-019:003, (2) 4-3-001:001

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Executive Summary

Date	February 2025
Project	Launiupoko Aquifer Exploratory Wells
Project Proponent	The County of Maui Department of Water Supply
Project Location(s)	Located in Panaʻewa and Waineʻe Ahupuaʻa, Lāhainā Moku; Mailepai Ahupuaʻa, Kāʻanapali Moku; Lāhainā Modern Tax District, Mokupuni o Maui, TMK: (2) 4-6-018:007, (2) 4-6-019:003, (2) 4-3-001:001
Proposed Action	The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the Lāhainā and Kāʻanapali districts of West Maui. A total of four (4) sites have been considered as potential well sites - Sites L-1 and L-3 in the Launiupoko Aquifer (see Figure 1 1 and Figure 1 2), and Sites H-1 and H-2 in the Honolua Aquifer (see Figure 1 3). A Site L-2 for the Launiupoko Aquifer was previously considered as a potential well site, but its location does not allow an exploratory well as determined by the Hawaiʻi Department of Land and Natural Resources (DLNR). The DWS has selected Sites L-1 and L-3 for construction of the exploratory wells. Two (2) exploratory wells will be constructed at both Site L-1 and L-3 to provide back-up capability for the wells; therefore, a total of four (4) exploratory wells are proposed to be constructed. Sites H-1 and H-2 will be assessed as potential alternative sites. The proposed Site L-1 and Site L-3 wells will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Based on water quality test results and pump tests, the DWS will determine if the exploratory well sites are suitable for conversion to permanent production wells. If successful, the production wells will be constructed to replace 1.55 million gallons per day of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow Standards (IIFS).
Project Acreage	Site L-1 is within a 338-acre parcel Site L-2 is within a 2,013-acre parcel Site L-3 is within a 16.6-acre parcel Site H-1 and H-2 are within a 1,377-acre parcel
CIA Focal Area and Region of Influence	When assessing the presence or absence of direct and indirect effects of the proposed project on the traditional cultural practices and resources of this region, the traditional use and access to such resources from mauka (mountain/upland region) to makai (ocean/coastal region) must be researched and taken into consideration. The region of influence, or study area, for the proposed project is defined as the geographic area encompassed by the known

	traditional boundaries of Waineʻe and Panaʻewa Ahupuaʻa in Lāhainā Moku, and the known traditional boundaries of Mailepai Ahupuaʻa in Kāʻanapali Moku.
Regulatory Context	This Cultural Impact Assessment is a requirement of Chapter 343, Hawaiʻi Revised Statutes and will be included in the Environmental Assessment for the proposed exploratory wells.
Results	Based on testimony for Kuleana claims presented before the Land Commission during the Māhele ʻĀina, and in addition to the stories and information gathered during the background research and consultation completed for this study, it is apparent that settlement and land use within Lāhaina and Kāʻanapali Moku functioned in the typical traditional sense, with a focus on freshwater resources to support agricultural disciplines, and marine resource gathering.
Recommendations	After the background research and extensive community consultation regarding the traditional cultural practices of the current project areas, stakeholders and community consultants strongly recommend the following action items and considerations for the Launiupoko Aquifer Exploratory Wells project, so that the cultural resources and customary practices of this land might be preserved and properly managed. **Assess Existing Wells for Viability** (see Section 6.1.1) It is strongly recommended to explore any current unoperating and/or undocumented wells in the Launiupoko and Honolua Aquifers for alternative sites to the proposed wells. **Establish and Prioritize Community Involvement** (see Section 6.1.2) • Coordinate an advisory board made up of Lāhainā and Kāʻanapali community leaders and residents of the Waineʻe, Panaʻewa, and Mailepai Ahupuaʻa to monitor the progress of the proposed exploratory well development and to facilitate community consultation. The board ensures that people of these areas, who have personal connection to these places and resources can work alongside project managers. • Conduct public community meetings to gather and assess comments and concerns regarding the project. • Consider establishing a public-private partnership between the County of Maui and the communities of the project areas to improve accountability for the impacts the wells may have on the land and its resources. **Protect Natural and Cultural Resources** (see Section 6.1.3) • Outline and execute best management practices (BMPs) to minimize erosion and sediment or lubricant release from project activities into the streams and the ocean. BMPs should also address the threat of seeds of invasive plants being carried into project areas by vehicles and equipment. Vet the BMPs with the

advisory board and implement them with ongoing monitoring throughout the project.

- Restore the native plants of the area by planting native lāʻau in the project area where able to increase access of gathering materials for cultural practices. Recommended plants include ʻōhiʻa, ʻaʻaliʻi, and ʻiliahi.

Ensure Kupaʻāina Access and Establish Security Measures (see Section 6.1.4)

- Ensure safe access is maintained for cultural practitioners who regularly partake in ceremony and spiritiual practices at the Paʻupaʻu Heiau and David Malo's grave, ma uka of the L-3 site area. Access should especially be concerning Ka Papa Kanaka o Paʻupaʻu Heiau, the group of people dedicated to maintaining Paʻupaʻu Heiau.
- Ensure that any access roads are kept secure with a locked gate to prevent trespassers such as the general public and dirt bike riders who contribute to the erosion of the natural environment.
- Due to the high risk of potential fires, create firebreaks and a plan to mitigate fire risks on an ongoing basis.

Acknowledgments

First and foremost, we extend aloha to all who were affected by the fires in Lāhainā on August 8, 2023, many of whom shared their time and manaʻo on this project before the devastation and were directly affected. Our mahalo goes out to the individuals who shared their personal life experiences and traditional knowledge for this study. Information shared helps tremendously in reconstructing the traditional way of life at different times in history and shows how lifestyles, particularly relating to Hawaiian traditions and cultural practices, have evolved.

Most importantly, it is with the sincerest gratitude that we mahalo the following individuals who have contributed greatly to our understanding of traditional cultural practices related to the lands and waters of Lāhainā and Kāʻanapali:

Charlie Palakiko, Cherlyn Tachera, David P.K. Makekau, ʻEkolu Lindsey, Gerald Ponce, Kaimaile Makekau, Kaipo Kekona, Kalai Kahookele, Kalani Kapu, Kanani Puou, Kanoelani Steward, Kapali Keahi, Kaulu Nahoʻoikaika, Keʻeaumoku Kapu, Kekai Keahi, Leonard "Junya" Nakoa, Lokahi Sylva, Lono Kahookele, Malihini Keahi-Heath, Rachel Kekona, Richard W. Iaconetti, Shayne Nameaaea Hoshino, Suzette Montalvo Felicilda, Tamara Paltin, Uʻilani Kapu

Mahalo nui for taking the time, and creating the space, to share your ʻike, manaʻo, and concerns.

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1.0 INTRODUCTION

The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the Lāhainā and Kāʻanapali districts of West Maui. A total of four (4) sites have been considered as potential well sites - Sites L-1 and L-3 in the Launiupoko Aquifer (see Figure 1-1 and Figure 1-2), and Sites H-1 and H-2 in the Honolua Aquifer (see Figure 1-3). A Site L-2 for the Launiupoko Aquifer was previously considered as a potential well site, but its location does not allow an exploratory well as determined by the Hawaiʻi Department of Land and Natural Resources (DLNR).

The DWS has selected Sites L-1 and L-3 for construction of the exploratory wells. Two (2) exploratory wells will be constructed at both Site L-1 and L-3 to provide back-up capability for the wells; therefore, a total of four (4) exploratory wells are proposed to be constructed. Sites H-1 and H-2 will be assessed as potential alternative sites.

The proposed Site L-1 and Site L-3 wells will be drilled, cased, and tested. The test results will be used to determine potential yield and to assess water quality. Existing dirt and gravel roads will be used to access the sites and when necessary, new access roads will be graded and surfaced with gravel. The immediate work sites will be graded to create a gently sloping pad and a chain link security fence will be constructed around each site.

Based on water quality test results and pump tests, the DWS will determine if the exploratory well sites are suitable for conversion to permanent production wells. If successful, the production wells will be constructed to replace 1.55 million gallons per day of surface water to be released into the Kanahā Stream, as required by the State Commission on Water Resource Management (CWRM) to meet interim instream flow Standards (IIFS). It is noted that the CWRM designated the Lāhainā Aquifer Sector Area as a Surface and Ground Water Management Area. This area includes the Launiupoko and Honolua groundwater hydrologic units in which the proposed exploratory well sites are located. The effective date of this designation is August 6, 2022. If the exploratory wells are successful, an application for a Water Use Permit will be submitted to the CWRM for future production wells.

It is further noted that Site L-1 is within the State Conservation Land Use District, and therefore, a Conservation District Use Permit (CDUP) will be obtained from the Board of Land and Natural Resources (BLNR) before commencing work on those sites.

As part of the environmental assessment process for the proposed project, ʻĀina Archaeology conducted a Cultural Impact Assessment including a study of traditional cultural practices within and adjacent to the proposed project. The Guidelines for Assessing Cultural Impacts adopted on November 19, 1997 by the Environmental Council, State of Hawaiʻi states:

> (For) the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place (proposed project area). This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. An ahupuaʻa is usually the appropriate geographical unit to begin an assessment of the cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. (State of Hawaii Office of Environmental Quality Control 2012:11)

Site L-1 is in the ahupuaʻa of Panaʻewa and Site L-3 is in the ahupuaʻa of Waineʻe - both are in the moku of Lāhainā. Sites H-1 and H-2 are in the ahupuaʻa of Mailepai in Kāʻanapali Moku. For this cultural impact assessment, these three ahupuaʻa are considered the overall "study areas" while the footprints of each well site are identified as the "project site." The purpose of this document is to gain an understanding of traditional cultural practices within the study area and identify any potential effects on these practices that may occur during, or as a result of, the implementation of the proposed project.

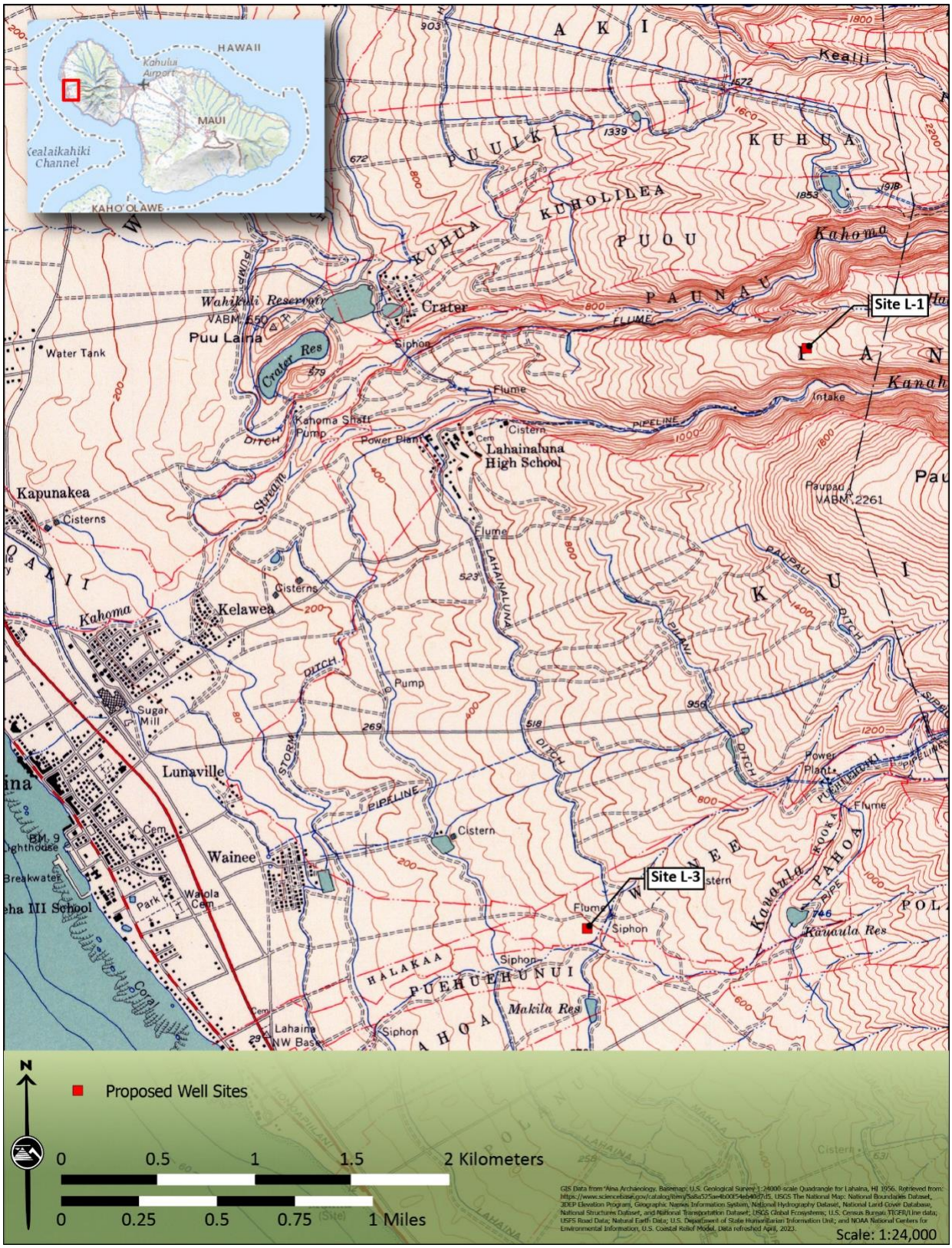


Figure 1-1: A portion of the Lāhainā USGS (1956) 7.5 minute Topographic Quadrangle showing the locations (marked red) of the proposed exploratory wells Site L-1 and Site L-3.

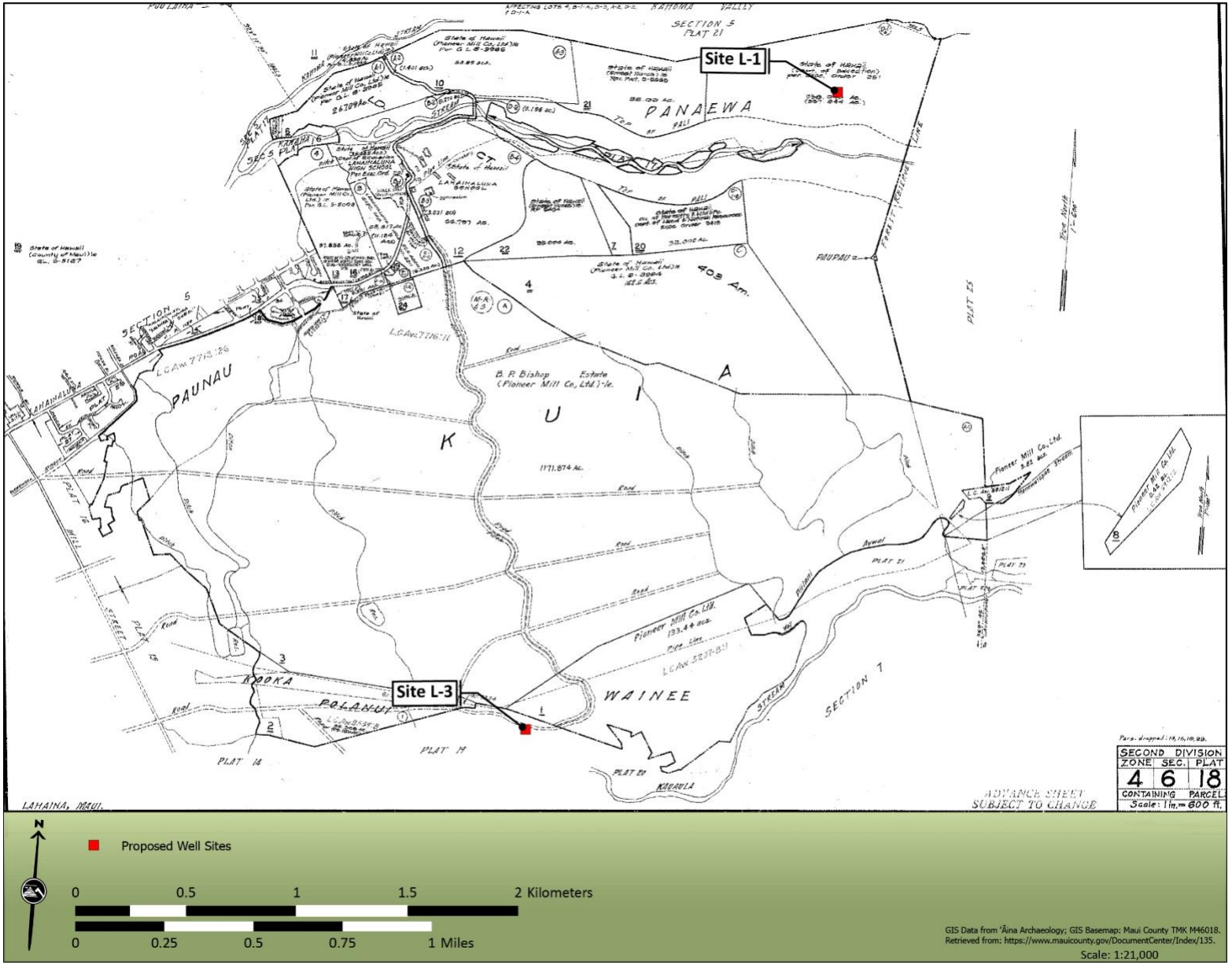


Figure 1-2: Tax Map Key (2) 4-6-18 showing the location (marked red) of the proposed exploratory wells Site L-1 and Site L-3.

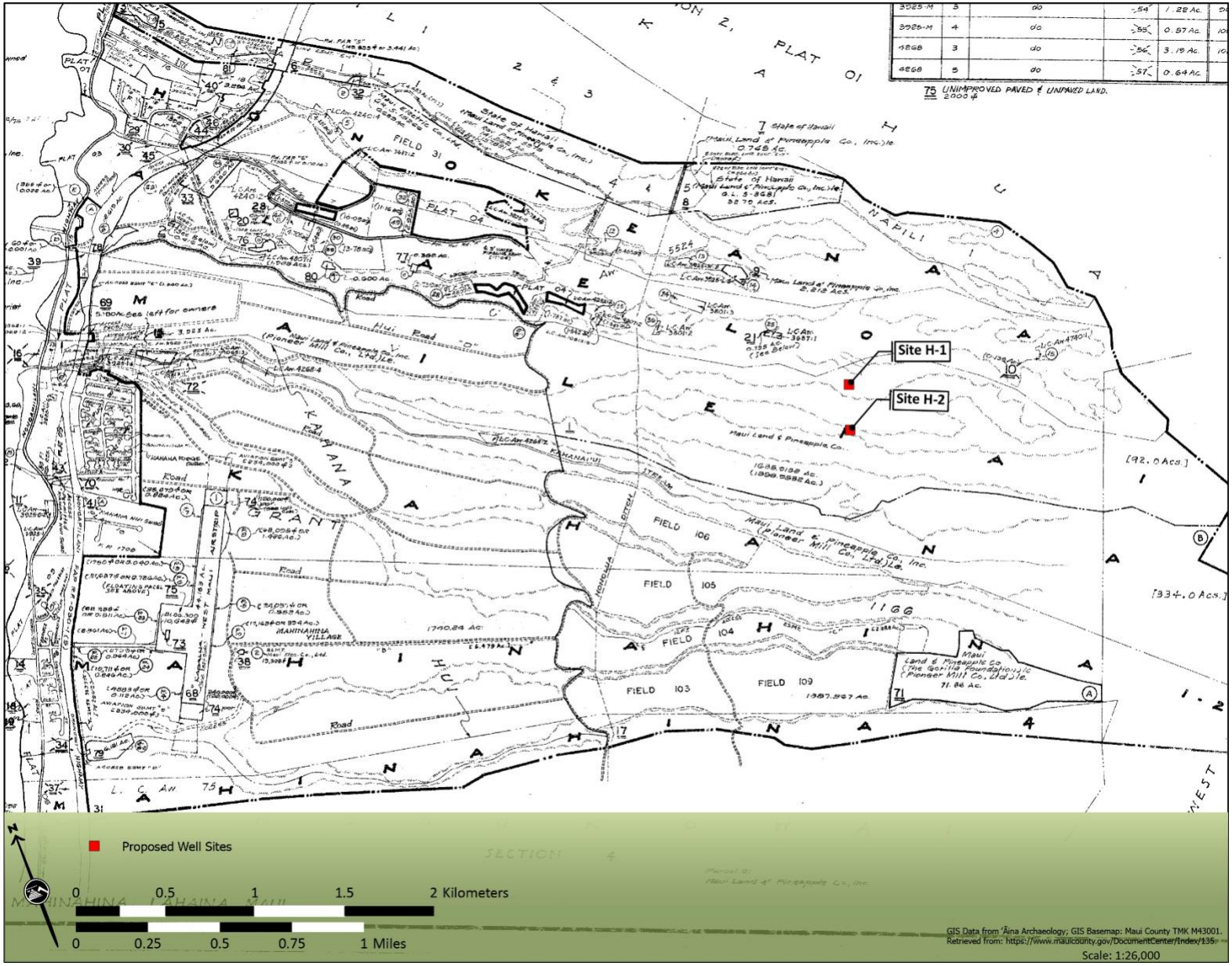


Figure 1-3: Tax Map Key (2) 4-3-01 showing the location (marked red) of the proposed exploratory wells Site H-1 and Site H-3

2.0 ENVIRONMENTAL SETTING

At approximately 728 square miles, Maui is the second largest island within the Hawaiian Island chain (Stearns and MacDonald 1942). The island consists of two major shield volcanoes, the younger East Maui Volcano, referred to as Haleakalā, rises to an altitude of 10,023 feet, and the older West Maui Volcano, referenced as both Mauna ʻEʻeka and Mauna Kahalawai, which rises to 5,788 feet at Puʻu Kukui (Juvik 1998:308). The Launiupoko Aquifer Exploratory Wells proposed project areas are located within two moku, and across three ahupuaʻa. Site L-1 is in the ahupuaʻa of Panaʻewa and Site L-3 is in the ahupuaʻa of Waineʻe, both are in the moku of Lāhainā. Sites H-1 and H-2 are in the ahupuaʻa of Mailepai in Kāʻanapali Moku.

2.1 NATURAL ENVIRONMENT

The climate of Maui is uniformly mild in temperatures and a cool Northeasterly wind, referred to as tradewinds, persists. The moist, warm tradewinds are orographically forced up the windward slopes of West Maui which creates continual rainfall at Puʻu Kukui (Cheng 2014:5) which is the highest point of Mauna Kahalawai. The leeward slopes are dry throughout the majority of the year, however, during the winter months when Southerly winds bring low-pressure systems the coastal leeward areas get much of their annual rainfall (Oki et al. 2010:7).

With four sites located on this leeward side of West Maui, the project areas still have distinct physical characteristics and natural environments that preclude separate outlines. Although the two sites located in Mailepai (H-1 and H-2) are closer in proximity to each other than the other areas, the flora and fauna of the two sites, due to previous land use, are unique enough to engender comparative documentation, as well.

Although there are differences between the sites, documented below, the Maui Komohana (West Maui) environment, as a whole, is host to a bevy of native species that should be considered. Throughout all of the sites, it is possible there may be visitations from the native opeʻapeʻa (hoary bat, *Lasiurus cinereus semotus*), nēnē, ʻuaʻu, (dark rumped petrel, *Pterodroma sandwichensis*), ʻakēʻakē, (band-rumped storm petrel, *Oceanodroma castro*), ʻaʻo (Newell's shearwater, *Puffinus newelli*), and the endangered Blackburn's moth (*Manduca blackburni*).

2.1.1 Site L-1, Panaʻewa Ahupuaʻa

At 1,700 feet elevation, atop a remote ridge between Halonā Gulch and Kanahā Gulch, Site L-1 is located on State-owned Lahainaluna School lands. The soil exhibits the qualities of Rough Mountainous Land with shallow topsoil on steep terrain and an annual rainfall averaging between 30 and 40 inches, predominantly during the winter months (Hobdy 2022c:2).

Site L-1 (along with L-3) is within the Launiupoko Aquifer. The hydrology of this project area is shaped by the general characteristics of the alluvial and basalt assemblages that define the water-bearing properties of the land. Working in tandem with climate, the geology and hydrology

of West Maui affect the water cycle which is connected to the surface and groundwater systems. As Cheng explains:

> Dike-impounded groundwater maintains perennial flow in some... streams at the upper reaches where they intersect the dike-impounded water body. These stream reaches are "gaining reaches" because groundwater contributes to streamflow. In stream valleys where extensive erosion has exposed dike compartments, groundwater from these dike-impounded systems discharges directly to streams. Downstream from the area of dike-impounded groundwater, the water table of the freshwater-lens aquifer system is below the streambed. In many of the... streams, the lower altitude reaches are "losing reaches" because streamflow discharges to the groundwater body. Some streams may lose all flow to the groundwater body before reaching the ocean during low-flow conditions. Volcanic rocks within the study area consist mainly of Wailuku Basalt, which is very permeable, and in dike-free zones these rocks provide an important source of fresh groundwater through the freshwater-lens aquifer system. (2014:3)

Vegetation of the area consists of thirty-four plant species and is predominantly composed of non-native species, most abundantly, Guinea grass (*Megathyrsus maximus*) (Hobdy 2022c:3). Through his survey of the project area, Hobdy (2022c:5-6) identified eleven native plants, five of which were endemic:

Table 2-1. Site L-1 Native Plants

Common Name	Scientific Name	Status
kīlau	*Pteridium aquilinum* subsp. *decompositum*	Endemic
Hawaiian moon flower	*Ipomoea tuboides*	Endemic
ʻenaʻena	*Pseudognaphalium sandwicensium*	Endemic
ʻiliahi aloʻe	*Santalum elipticum*	Endemic
ʻakia	*Wikstroemia oahuensis*	Endemic
manienie`ula	*Chrysopogon aciculatus*	Indigenous
ʻilima	*Sida fallax*	Indigenous
ʻuhaloa	*Waltheria indica*	Indigenous
ʻūlei	*Osteomeles anthyllidifolia*	Indigenous
pūkiawe	*Leptecophylla tameiameiae*	Indigenous
ʻaʻaliʻi	*Dodonaea viscosa*	Indigenous

2.1.2 Site L-3, Waineʻe Ahupuaʻa

Site L-3 is located on the north side of Kauaʻula Stream within a 16.6-acre parcel of State-owned land at an elevation of 330 feet. This site, located about 400 feet downslope from a previous site, was selected to avoid disturbing a pre-contact historic feature (boulder with petroglyph) at the previous site. The soil is characterized as Stony Alluvial Land by Hobdy (2022d:2) who also noted, during his survey, that the vegetation in the area consisted mostly of dry land grasses and scattered shrubs. According to Foote, "Stony Alluvial Land (rSM) consists of stones, boulders, and

soil deposited by streams along the bottom of gulches and on alluvial fans" (1972:120). Rainfall averages around 15 inches per year (Hobdy 2022d:2).

During the summer of 2018 the project area and 1,500 surrounding acres burned. Hobdy's survey of the flora and fauna of the area in 2022 may not have captured all of the data that would have been previously available before the burn, however, his findings of the native plants in the area are listed below:

Table 2-2. Site L-3 Native Plants

Common Name	Scientific Name	Status
ʻilima	*Sida fallax*	Indigenous
ʻuhaloa	*Waltheria indica*	Indigenous
koali kuahulu	*Merremia aepyptia*	Indigenous

Signs and observations of fauna in the area were scant with no observed mammals, one non-native bird, and only seven non-native insects (Hobdy 2022d:6).



Figure 2-1: One of many ʻuhaloa found at proposed well site L-3



Figure 2-2: One of many koali kuahulu found at proposed well site L-3

2.1.3 Site H-1, Mailepai Ahupuaʻa

The first Mailepai site, H-1, is located atop a ridge between Mailepai Gulch and Kaʻōpala Gulch within the Honolua Aquifer on fallow lands previously used for commercial pineapple crops. At 1,280 feet and having lain without a crop for over 20 years, the land is overgrown with dense grassland with a few shrubs and small trees (Hobdy 2022a:2). Hobdy identified the soil as Honolua Silty Clay (HwD) with moderately sloping, well-drained soil.

The climate of Mailepai is only slightly more precipitous than the previously overviewed sites in Lāhainā due to its more northerly location. Rainfall averages 60 inches per year (Giambelluca et al. 2013). Within the Kahana Watershed, which is made up of 5,864 acres, Mailepai Stream is one of two tributaries of the main waterway, Kahana Stream (Group 70 International et al. 2016:3-14). Mailepai Stream rises to around 2,200 feet in elevation and drains into Kahana Stream from the north at 360 feet and has no manmade diversions (Group 70 International et al. 2016:4-16). The hydrology of the area has been impacted by land use, including agriculture and urbanization, resulting in groundwater quality that has detectable levels of three pesticides in drinking water wells (Group 70 International et al. 2016:4-35).

Flora of the area was surveyed in April of 2022 by Robert Hobdy who identified only three native plants at the site:

Table 2-3. Site H-1 Native Plants

Common Name	Scientific Name	Status
niʻaniʻau	*Nephrolepis exaltata*	Indigenous
mauʻu laiki	*Paspalum scrobiculatum*	Indigenous
ʻaʻaliʻi	*Dodonaea viscosa*	Indigenous

The majority of the remaining vegetation is dominated by an aggressive grass species not native to Hawaiʻi: molasses grass (*Melinis minutiflora*) (Hobdy 2022a:3). Signs and observations of fauna in the area were rare and noted to be all non-native, including mongoose droppings, four birds, and four insects (Hobdy 2022a:7).

2.1.4 Site H-2, Mailepai Ahupuaʻa

The second Kāʻanapali moku site, H-2, is in upper Mailepai on a ridge top at 1,240 feet elevation. The soil is Honolua Silty Clay with 16-25% slopes and well-drained soil. Rainfall is the same average as Site H-1 at 60 inches per annum (Giambelluca et al. 2013). The main difference between site H-1 and H-2 lies in land usage; H-2 was not previously used for agriculture and remains relatively undisturbed which allowed for greater observation of flora and fauna. Although non-native vegetation encroachment is present, Hobdy (Hobdy 2022b:3) recorded thirteen native species, including three endemic flora, among forty-two plant species:

Table 2-4. Site H-2 Native Plants

Common Name	Scientific Name	Status
kīlau	*Pteridium aquilinum* subsp. *decompositum*	Endemic
ʻakia	*Wikstroemia oahuensis*	Endemic
ʻōhiʻa	*Metrosideros polymorpha var. glaberrima*	Endemic
ʻaʻaliʻi	*Dodonaea viscosa*	Indigenous
palaʻā	*Odontosoria chinensis*	Indigenous
niʻaniʻau	*Nephrolepis exaltata*	Indigenous
blue	*Dicranopteris linearis*	Indigenous
ʻuki	*Machaerina mariscoides* subsp. *meyenii*	Indigenous
mauʻu laiki	*Paspalum scrobiculatum*	Indigenous
ʻuʻulei	*Osteomeles anthyllidifolia*	Indigenous
alaheʻe	*Psydrax odorata*	Indigenous
pōpolo	*Solanum americanum*	Indigenous

The faunal signs and observations were sparse in the area but numbered greater than those observed at the previous H-1 site. The non-native mongoose was present along with five non-native bird species. Among the five insect species that were observed, only the common globe skimmer dragonfly was indigenous.

3.0 CULTURAL HISTORICAL BACKGROUND

In Hawaiian culture, natural and cultural resources are the same. This belief permeates all aspects of Hawaiian beliefs and practices, even today. Its origin can be seen in one of the principal creation stories, a chant known as the Kumulipo, that orders the origin of plants, animals, and humans along with a shared, unbroken genealogy.

Similarly, the various forms of the natural environment, both animate and inanimate, are believed to be embodiments of Hawaiian gods and deities. From the heavens and volcanoes to the forests and the planting fields, to the shoreline and ocean depths – not to mention the winds, rains, clouds, stars, and the many useful living things – all have some connection to a complex pantheon of akua (gods), kupua (demigods), and ʻaumakua (deified ancestors). These gods and deities are the subject of moʻolelo (traditional stories) that the Hawaiian people told and retold across generations, moʻolelo that explain how things came into existence.

One such moʻolelo depicts the Hawaiian Islands as being born to two gods: Wākea (the expanse of the sky) and Papa-hānau-moku (Papa, who gave birth to the islands), also called Haumea-nui-hānau-wā-wā (Great Haumea born time and time again). In an ancient oli (chant) that tells this origin story, Hawaiʻi Island is first to be born, followed next by Maui:

Hanau o Maui he moku, he aina *Na kama o Kamalalawalu e noho.*	Maui was born an island, a land, A dwelling place for the children of Kamalalawalu. (Fornander 1880:2-3)

In the chant, Maui is called, “a dwelling place for the children of Kamalālāwalu,” and Kamalālāwalu was the grandson of Piʻilani, the 16th century mōʻī (paramount ruler) of Maui and founder of one of its greatest dynasties. One of the traditional poetic names for Maui is Maui-a-Kama or Maui-Nui-a-Kama (Maui of Kama, Great Maui of Kama), named after Kamalālāwalu.

More ancient names include ʻIhikapalaumaewa, who was another child of Papa and Wākea, and Kūlua, which means “twins” and was perhaps inspired by the island’s two volcanic forms (Sterling 1998:1).

3.1 DIVISION OF LANDS

A review of the cultural and historical genealogy of any project area begins with a basic understanding of palena, or place boundaries. The Hawaiian scholar Dr. Kamanamaikalani Beamer explains that this concept of palena involves “a particular type of boundary, one created in a specific context, which defines a place that has unique functions” (Beamer 2014:32). The sections below provide an overview of the project area’s traditional boundaries, along with the names and sayings that speak to the historical functions or characteristics of these places. The Hawaiian Islands were settled between A.D. 900 and 1200, and the long period of voyaging

between Hawaiʻi and central Eastern Polynesia ended circa 1400. The lush and well-watered windward sides of the islands were settled first.

The division of Maui's lands into political districts occurred during the rule of Kākaʻalaneo, under the direction of his kahuna, Kalaihaʻōhiʻa (Beckwith 1970:383). This division resulted in the creation of twelve districts or moku during traditional times: Kula, Honuaʻula, Kahikinui, Kaupō, Kīpahulu, Hāna, Koʻolau, Hāmākualoa, Hāmākuapoko, Nā Poko or Nā Wai ʻEhā (Wailuku), Kāʻanapali, and Lāhainā (Alexander 1882:3; Sterling 1998:3). The moku literally means "to cut across, divide, separate" (Lucas 1995:77). When used as a term of traditional land tenure, a moku is like a modern political district.

Within these moku are smaller units of land called ahupuaʻa, the name of which is derived from the Hawaiian term ahu (altar), which were erected at the points where the land boundary intersected the alaloa (main road encircling the island), upon which a carved puaʻa (hog) image made of kukui wood and stained with red ochre was placed along with the tax of food items from that particular land unit as payment to the aliʻi (chief) during the annual progression of the akua makahiki (Alexander 1882:4).

The typical configuration of the ahupuaʻa extends from the sea to the mountain so that the aliʻi (chiefs) and makaʻāinana (native tenants) could have access to resources of the wao lāʻau or wao nahele (forested region), the wao ʻamaʻu and wao kanaka (cultivated land), and the kula uka and kula kai (the lower grasslands and shoreline) (Alexander 1882:4; Mueller-Dombois 2007). While the boundaries of an ahupuaʻa generally followed prominent landforms (i.e. ridge lines, the bottom of a ravine, a depression in the earth), there were times when a stone or rock that was notable from a tradition or sacred use would mark a corner or determine a line (Alexander 1882:105-106). Along similar lines, the growth of a certain kind of tree, herb, grass, or the habitat of a certain kind of bird would sometimes define a division (ibid).

The proposed project sites are in two moku on the west side of Maui: Lāhainā and Kāʻanapali. The study areas in Lāhainā Moku are situated in the ahupuaʻa of Panaʻewa and Waineʻe. Lāhainā is comprised of twenty-five (25) ahupuaʻa, which from north to south, include: Hanakaʻōʻō, Kahua, Kapunakea, Hāhākea, Aki, Wahikuli, Puʻuiki, Kuhua, Moaliʻi, Kuholilea, Pūʻou, Paunau, Panaʻewa, Pāhoa, Polanui, Pūehuehunui, Halakaʻa, Waineʻe, Pūehuehuiki, Mākila, Koʻokā, Polaiki, Launiupoko, Olowalu, and Ukumehame. The study area in Kāʻanapali is in the ahupuaʻa of Mailepai. Mailepai is one of eleven ahupuaʻa in Kāʻanapali. The eleven ahupuaʻa, from north to south, include: Honokōhau, Honolua, Honokahua, Nāpili, Honokeana, ʻAlaeloa, Mailepai, Kahana, Māhinahina, Honokōwai, and Makaiwa.

3.2 PLACE BOUNDARIES AND PLACE NAMES

In ancient Hawaiʻi, the practice of naming places was widespread, and virtually all aspects of the land and sea could be identified by name. Lyons notes that as a consequence of the long tenancy of the people on land, "every piece of land had its name, as individual and characteristic as that

of its cultivation" (Lyons 1903:23). From beaches, bays, ocean channels, and points to hills, plains, valleys, mountains, and ridgelines, many of the place names we know today have ancient origins.

Names were inspired by the characteristics of the land. They could be literal or metaphoric in that description, or they might be commemorative of a person or event having some relationship to the land. In a place's name, there is often a bit of information about that place before Western contact, so consideration of the place name meanings for the study area may yield insight into the stories, patterns of life, and land uses within the ahupuaʻa of Panaʻewa, Waineʻe, and Mailepai. The names listed below are for areas, divisions, and features of the land and sea that are in the vicinity of the project area, roughly within a radius of several miles. They are just a subset of the many names that comprise these ahupuaʻa, as identified through research of the Māhele ʻĀina documents, Hawaiian language newspapers, and other available historic literary resources. Unless indicated otherwise, the spelling and orthography presented in Table 3-1 are taken from Pukui and others (1974) and Ulukau.org unless alternate sources are listed.

Table 3-1. Place Names Associated with Panaʻewa, Waineʻe, and Mailepai Ahupuaʻa

Place Name	Description
ʻAlaeloa (ahupuaʻa/lae)	Land division and point, Honolua qd. *Lit*., distant mudhen.
Alaloa	Also known as Ke Alaloa o Maui, Piʻilani Trail, and Hoapili Trail; according to Ashdown, "paved with smooth sea-stones to a width of four to six feet and it followed the coastline of all East Maui" (1971:5).
Apahua (heiau)	"Apahua. Wainee, Lāhainā. Credited to Hua-nui, about 50 years later than [Waiie]; fragments of foundation only remain." (Thrum 1908a:38) "Walker Site 8. Cane fields above Wainee. Totally destroyed." (Sterling 1998:33)
Hāhākea	Land division and gulch, Lāhainā qd., West Maui. Perhaps *lit.,* white stalk.
Halelani (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Halekumukalani (heiau)	"Lahaina, in ahupuaa of Halekaa [sic, Halakaa]. A small heiau only." (Thrum 1908a:38) "...now totally destroyed." (Sterling 1998:31)
Halonā	Stream inland of Lāhainā, Maui, mentioned in the Lahainaluna song "Alma Mater," and in the Lāhainā song "Hālona" (Elbert and Mahoe 1970:40). *Lit.,* Peering; place from which to peer, place to peer at, lookout.

Place Name	Description
Hanakaʻōʻō	Land division, reservoir, point, and cemetery, Lāhainā qd., West Maui. Beach park, Kāʻanapali, Maui. At the southern boundary of Kāʻanapali and adjacent to Hanakaʻōʻō Cemetery. The south section of Kāʻanapali Beach begins here and ends at Black Rock to the north. Also known as Canoe Beach. *Lit.,* digging stick bay.
Haua 1, 2 (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission. *Lit.,* smitten.
Halulukoakoa (heiau)	"Lahaina, corner of coconut grove and ahupuaa of Wahikuli, of coral construction." (Thrum 1908a:38) "Walker Site 11. S.E. corner of cocoanut grove at Mala, just north of Kapunakea Camp... in the ahupuaa of Wahikuli... A large heiau for human sacrifice of which but few fragments of wall remain." (Sterling 1998:44)
Hauola	Ancient surfing area, Lahaina, Maui; an off-shore stone here is believed to have been a woman who was fleeing from her enemies when the gods turned her into a stone. *Lit*., dew [of] life.
Honoapiʻilani	Highway around southwest Maui. *Lit*., bays [acquired] by [Chief] Piʻi-lani. Six West Maui bays whose names begin with Hono- (bay) and the islands seen from them (Ka-hoʻolawe, Lā-naʻi, Molokaʻi) were ruled by Piʻi-lani and are famous in song; the six bays are Honokahua, Honokeana, Honokōhau, Honokōwai, Honolua, Hononana. Piʻi-lani's daughter, Piʻi-kea, married ʻUmi in the early 1500s.
Honokahua	Land division, point, stream, village, and bay, Honolua qd., West Maui; cinder cone, Hale-a-ka-lā Crater, East Maui. See Hono-a-Piʻilani. *Lit.,* sites bay. Beach, Honokahua, Maui. Calcareous sand beach backed by vegetated dunes that fronts Fleming Beach Park.
Honokeana	Land division and bay, Honolua qd., West Maui. *Lit*., the cave bay. 1. Bay, Honokeana, Maui. One of six famous West Maui bays whose names begin with the word hono, or bay. Collectively they are known as Nā Honoapiʻilani, the "bays acquired by Piʻilani" (a chief). Honoapiʻilani is also the name of the West Maui coastal highway that connects the six bays. 2. Beach, Honokeana, Maui. Small cobblestone and calcareous sand beach at the head of the bay. Also known as Kaʻelekiʻi.
Honokōwai	Land section, ditch, point, stream, beach park, Lāhainā qd., Maui. *Lit.,* bay drawing water.

Place Name	Description
Honokōhau	Land division, village, stream, falls, ditch, tunnel, bay, and hill (305 feet high), Honolua qd., West Maui (Ii 172; PH 69-70). *Lit.,* bay drawing dew.
Honolua	Land section, village, landing, bay, winter surfing area, stream, mountain (2,627 feet), and quadrangle, Lāhainā district, Maui. (PH 69.) *Lit.,* two harbors. May 1, 1976, the first voyage of the double-hulled Hawaiian voyaging canoe *Hokuleʻa* began here.
Kāʻanapali (moku)	Landing, village, district, and golf course, Lāhainā qd., Maui. Also called Pōhaku-Kāʻana-pali and Kāʻanapali-pōhaku. (PH 83.) *Lit.,* Kāʻana (division) cliff.
Kaʻōpala (gulch)	Beach and gulch, perhaps an *ʻili*. *Lit.*, the rubbish.
Kahalua (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Kahana (ahupuaʻa/lae/stream)	Land division, camp, point, and stream, Honolua qd., Maui. *Lit*., cutting
Kahoma (stream)	Site of petroglyphs, valley, stream, tunnel, ditch, and reservoir, Lāhainā qd., Maui. *Lit.,* the thin one.
Kaluaʻehu	See Luaʻehu.
Kanaele (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Kanahā (stream)	Stream near Lahaina, Maui. *Lit.,* forty.
Kapaulu	Place mentioned near the Lāhainā *heiau* built by Hua. Unable to locate on maps. Possibly an ʻili near Lahainaluna Road.
Kāpua (hono)	Small bay near the boundary between Kahana and Kāʻana-pali, Honolua qd., Maui. *Lit*., strike spawn (lai and manini fish spawned here; people kicked them ashore with their feet).
Kauaʻula (ahupuaʻa/stream)	A strong mountain wind, often destructive, at Lāhainā, Maui. *Lit.*, the red rain (red soil washed away by a storm); Land division, stream, tunnel, reservoir, and ditch, Lāhainā qd., Maui.
Kaulu (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Kaumuokama (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Keawaiki	Land section and lighthouse. Lahaina, Maui. *Lit*., the small passage.
Keonepoko	Fishing area mentioned by Kahāʻulelio (2006:279) but not on maps.
Kuʻia (ahupuaʻa)	Land division, Lāhainā qd., Maui. *Lit.,* obstructed.

Place Name	Description
Kukaua (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded.
Kukuipuka (heiau/puʻuhonua)	"... the place of refuge for West Maui... also heiau." (Thrum 1908a:39) "Kukuipuka Heiau, Walker Site 27. It stands on a high hill overlooking the road and has been largely destroyed..." (Sterling 1998:60) Kukaʻilimoku's land, made a puʻuhonua by Kamehameha I.
Lāhainā, Lahaina (moku)	District, quadrangle, town, roadstead, West Maui, formerly the gathering place for whalers, and the capital of the Islands from 1820 to 1845. Surfing sites on both sides of the harbor are known as Lāhainā Lefts and Lāhainā Rights. The associated wind is Ka-ua-ʻula. Lāhainā - Old pronunciation of Lahaina. *Lit.,* cruel sun (said to be named for droughts).
Lahainaluna	Place and school in Kuʻia ahupuaʻa. Ditch that takes water south from Kanahā Stream to Mākila Reservoir; an account written by W.N. Pualewa in 1863 of *Ka Moolelo o Eleio* states that the ditch was fashioned from the *auwai* created by Wao, sister of Kaululaʻau, and which she named Auwaiawao (Maly and Maly 2007:16). *Lit.*, upper Lāhainā.
Launiupoko	Land section, hill (808 feet high), point, village, ditch, stream, State wayside park, Lāhainā qd., Maui. *Lit.,* short coconut leaf.
Lele	Old name for the Lāhainā district, Maui, so called because of the short stay of chiefs there (*Pacific Commercial Advertiser,* 1857). *Lit.,* altar *or* flight. To fly, jump, leap, hop, skip, swing, bounce, burst forth. Sacrificial altar or stand.
Luaʻehu/Kaluaʻehu	Also referred to as Kalua o Kiha (the pit of Kiha), the "area at Lahaina, Maui, where an Episcopal school, known as Lua-ʻehu School, was established in 1862. The school was moved to Honolulu in 1871 and renamed ʻIolani." *Lit*., red-head pit (a red-haired moʻo lived here). The place where the first constitution of the Hawaiian Kingdom was promulgated, hence it being called the Luaʻehu constitution (Kamakau 1961:370)
Luakona (heiau)	"Near Kapaulu, Lahaina; built by Hua-a-Pohakukaina. Site now lost." (Thrum 1908a:38) "Walker Site 10. Mauka end of Kelawea Camp just north of Lahainaluna Road in native district of Kapaulu. Remnant of heiau walls and platform now used as foundation for native shacks." (Sterling 1998:34)
Mailepai (ahupuaʻa/heiau/ lae/stream)	Land division, point, and stream, Honolua qd., Maui. As a heiau - "Walker Site 13. Near point of the same name. Washed away." (Sterling 1998:52)

Place Name	Description
Makaulii (ʻili)	Among 14 ʻili ʻaina named in Mailepai, none of which was awarded by the Land Commission.
Mākila (ahupuaʻa/lae)	Point, land division, reservoir, and ditch, Lāhainā qd., Maui. *Lit.,* needle. nvt. Maui name for mānai, needle; to string, as lei.
Māla (ahupuaʻa)	Land division and port, Lāhainā qd, Maui. *Lit*., garden. 1. Offshore mooring, Lahaina, Maui. State mooring site off the former wharf. 2. Ramp, Lahaina, Maui. On the west side of the former wharf. Facilities include two ramps, a pier, two docks, and a vessel washdown area. 3. Wharf, Lahaina, Maui. Dedicated on April 5, 1922, by Governor Wallace R. Farrington, the wharf was built specifically to accommodate interisland steamers instead of having them anchor offshore in the Lāhainā Roadstead. However, after strong currents and heavy surf damaged several steamers, they reverted to anchoring offshore and the wharf was never used again as a major interisland passenger and cargo terminal. Smaller boats continued to use it until 1950. (Clark 2002:233)
Malu Ulu o Lele Park	County park, formerly known as Loko Mokuhinia (q.v.); 7.504 acres. The former pond was filled in. *Lit.,* breadfruit shelter of Lele (an old name for Lāhainā district).
Manowaiʻōpae (gulch)	Gulch; location of proposed site L-2 in Kuʻia.
Mokuhinia (loko)	Freshwater pond that surrounded the island of Mokuʻula in Waineʻe ahupuaʻa.
Mokuʻula (islet)	Located in Waineʻe ahupuaʻa, islet located within Mokuhinia pond, according to Sterling "...the tomb of the chiefess Nahienaena which stood in the pond on the east bank, was Mokuula, a little rock island" (1998:39); *Lit*., red islet.
Moomuku (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Ohia 1, 2 (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Pahuaa (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
Pakala (ahupuaʻa)	Land division, bordering Waineʻe ahupuaʻa on the north, Lāhainā qd., Maui. *Lit.*, the sun shines or young of the kala fish.
Panaʻewa (ahupuaʻa)	Land division, Lāhainā qd., Maui.
Paunau (ahupuaʻa)	Land division, Lāhainā qd., Maui. *Lit.,* completely chewed up.
Paʻupaʻu (puʻu)	Ditch and hill (2,561 feet high) near Lahainaluna, Maui, now called Mount Ball, where David Malo is buried. *Lit.,* drudgery (servants were weary of bringing water to bathe the chief's child).

Place Name	Description
Polanui (ahupuaʻa)	Land division, Lāhainā qd.; elevated land section (3,000 feet high), Māʻalaea qd., Maui. *Lit.,* large Pola.
Puaaiki (ahupuaʻa)	Land division located adjacent to Waineʻe ahupuaʻa on Registered Map 1262. *Lit*., small pig.
Puaanui (ahupuaʻa)	Land division located adjacent to Waineʻe ahupuaʻa on Registered Map 1262. *Lit*., large pig.
Puehuehu (ahupuaʻa)	Land division, Lāhainā qd. *Lit*., spray scattered.
Puʻuhewale (spring/stream)	Spring and stream, Honolua qd., Maui. Pronunciation and meaning are uncertain.
Puʻu Kekaʻa	Headland, Kāʻanapali, Maui. Cinder cone in the center of Kāʻanapali Beach. The Sheraton Maui was completed on its summit in January 1963. Also known as Black Rock. *Lit.*, rumbling hill.
Puʻu Laina	Hill (650 feet high), Lāhainā qd, Maui. Cinder cone in the Lāhainā Volcanic Series. A reservoir for Wahikuli is in the crater of Puu Laina at 390 ft.
Puʻunēnē (wahi pana)	Land section, Honolua qd., Maui. *Lit*., goose hill. Small hill in the ahupuaʻa of ʻAlaeloa, the site of a battle between Alapaʻi and Peleioholani during the war between Kauhiʻaimokuakama and Kamehamehanui (Kamakau 1961:74).
Uahaili (ʻili)	Among 14 ʻili ʻāina named in Mailepai, none of which was awarded by the Land Commission.
ʻŪhāʻīlio	Ancient surfing area, Lāhainā, Maui. *Lit*., dog's hindquarters.
ʻUo	Ancient surfing area, Lāhainā, Maui. Not translated.
Wahikuli (ahupuaʻa/ditch)	Land division, gulch, ditch, State wayside park, reservoir, and housing development, Lāhainā, Maui. *Lit.,* noisy place. Pump Ditch takes water from Panaʻewa to Puʻu Koliʻi Reservoir at about 380 ft elevation.
Waiie (heiau)	"Near Kapaulu, Lahaina; built by Hua-a-Pohakukaina. Fragments of foundation now only to be seen." (Thrum 1908b:38) "Walker Site 9. Kapaulu district south of Lahainaluna Road in cane. Totally destroyed." (Sterling 1998:33)
Waikailu (ʻili)	Land section referred to in LCA 4807, see Table 3-4.
Wailehua (heiau)	"Lahaina, in ahupuaa of Makila, at shore, about 130 x 80 ft.; built in time of Kauhi-ai-moku-a-kama, son of Kekaulike, about 1738." (Thrum 1908a:38)Walker Site 6. "Now destroyed." (Sterling 1998:29)
Waineʻe	Land division, village, road, church, and cemetery, Lāhainā qd., Maui. *Lit.,* moving water.
Waiokama (ahupuaʻa)	Land division, Lāhainā, Maui. *Lit.*, water of Kama.
Waiola Church	Congregational church at Waineʻe, Lāhainā, Maui. *Lit.*, water of life.

3.3 RAINS AND WINDS

It is clear that Hawaiian people were keen observers of their environment and in addition to recognizing the unique features of the land, they recognized the unique features of the winds, rains, and other atmospheric conditions. They understood that there were distinct types of wind and rain, with different levels of intensity, duration, timing, sound, and direction, and due to this, they identified them as such through distinct names.

One of the most valuable repositories of Hawaiian wind names is a book called *The Wind Gourd of Laʻamaomao*, which is a translation of a traditional legend, compiled by Moses Kuaea Nakuina and published in 1902. The titular wind gourd was believed to contain all the winds of Hawaiʻi, and they could be summoned by chanting their names. In the legend, a chant calls out the names of the winds in Maui and Molokaʻi, listing Maʻaʻa as the wind of Lāhainā and Nahua at Kāʻanapali (Nakuina 1990:55).

We also find several rain and wind names embedded in ʻōlelo noʻeau (Hawaiian proverbs and poetic sayings), compiled and published in one volume by Mary Kawena Pukui in 1983. Of the 3,000 sayings in the volume, there are five that describe the primary winds and rains of Lāhainā and Kāʻanapali Moku. For each ʻōlelo noʻeau, Pukui provides a literal translation along with some usage remarks that provide context and help us understand the deeper meaning being conveyed.

The Maʻaʻa wind of Lāhainā is recorded again in the ʻōlelo noʻeau below:

> Ka Maʻaʻa wehe lau niu o Lele.
> The Maʻaʻa wind that lifts the coco leaves of Lele.
> Lele is the old name for Lahaina, Maui.
> (ʻŌlelo Noʻeau 1451:157)

The rain named Paʻūpili describes the drenching of the native pili grass traditionally found in Lāhainā; Pukui (1983) shares in two ʻōlelo noʻeau below:

> Ka ua Paʻūpili o Lele.
> The Pili-soaking rain of Lele.
> The plains of Lahaina, Maui, were covered with pili grass in ancient days. When the rain poured the grass was well soaked.
> (ʻŌlelo Noʻeau 1594:172)

> Keikei Lahaina i ka ua Paʻūpili.
> Majestic Lahaina in the Paʻūpili rain.
> (ʻŌlelo Noʻeau 1703:183)

In Kāʻanapali, one rain name is written in the ʻōlelo noʻeau below, also describing the presence of ʻōhiʻa lehua (*Metrosideros polymorpha*) in this district:

> Ka ua Lililehua o Kāʻanapali.

> The Tiny-drops-on-the-lehua rain of Kāʻanapali.
> (ʻŌlelo Noʻeau 1583:170)

Further mention of the Kāʻanapali rain is found in *Ka Nupepa Kuokoʻa* from March 17, 1866, by a G. Willie Kanuha writing in from Lāhainā to make an observation on the Nahua rain:

> This rain is for Kāʻanapali. What is the reason, the root, of this characteristic that is called "Nahua?" In my thoughts, it is because it pains the skin when it touches it, as well as the cold. Therefore, that is the reason for that word, "nahua" or "nahu." Because it is only a light spray of rain, but because of the blowing of the wind, that is the reason it hurts the skin when blown. (Lum and Rivera 2020:31)

3.4 HE MAU MOʻOLELO NO LĀHAINĀ A ME KĀʻANAPALI – TRADITIONAL STORIES AND ACCOUNTS OF LĀHAINĀ AND KĀʻANAPALI

3.4.1 Lele and the Naming of Lāhainā

Before Lāhainā was so named, it was referred to as Lele, meaning to jump, skip, or leap, because aliʻi would stay in this area only for short periods of time (Pukui et al. 1974:131). The name Lele can be found in various ʻōlelo noʻeau as seen above in ʻōlelo noʻeau #1491 and #1594. There are a few origin stories of the name Lāhainā that reflect its meaning of cruel or unmerciful sun, or day of cruelty. Sterling (1998) shares a brief insight into two stories from the *Mrs. Pia Cockett Audio Collection* about the name including a note from Mary Kawena Pukui:

> Not Lahaina, it was Lahainā. Because there was a man, a baldheaded man who went in the sun and his head became sore. That's why they called it Lahainā [hainā = cruelty; la = day, sun].
> *[According to M. K. Pukui, both Ilalaole and Mookini say it refers to a time of terrible drought when the sun was so cruel to the people that it caused everything to wither and dry. This no doubt refers to the time of the Chief Hua of Lahaina, whose killing of his priest brought on the terrible drought.]*

3.4.2 The Legend of ʻEleʻio

Fornander (1917:482-486) documented the Legend of ʻEleʻio, who was a very fast runner who could circle the island of Maui three times a day. His skills were called upon to become the runner of King Kakaʻalaneo, ruler of Maui, who lived in Lele, or Lāhainā at this time. ʻEleʻio was responsible for bringing fish from Hāna for the king to eat.

Several times on his journey back to Lāhainā from the east side, ʻEleʻio would encounter spirits trying to take away the fish or distract him. One spirit, in particular, was of a chiefess named Kanikaniaula, who approached him just three days after dying. Her husband did not know she was a high-ranking chiefess from the island of Hawaiʻi and that she had a rare feather cape symbolizing her status. Within a day, ʻEleʻio brought Kanikaniaula back to life and upon his request, she consented to become the new wife of King Kakaʻalaneo. Kanikaniaula gave ʻEleʻio

her feather cape as a gift for the king. Since ʻEleʻio had not returned to Kakaʻalaneo as usual from Hāna, the king grew angry and prepared an umu (oven) at Lele for ʻEleʻio to burn. With the feather cape on his shoulders, ʻEleʻio ran full speed back to Lele, jumping into the hot umu, which was right next to the king. The king ordered his men to retrieve ʻEleʻio from the pit, and they did. The cape was burned and only pieces remained. Kakaʻalaneo asked ʻEleʻio where he got the cape, and ʻEleʻio told him of Kanikaniaula and that she was to be his wife. Shortly after, Kanikaniaula came to Lele, and she and King Kakaʻalaneo became husband and wife. (Fornander 1917:482-486).

3.4.3 Kakaʻalaneo and his son Kaululaʻau

Nakuina writes that Kakaʻalaneo's reign was the "golden age of Maui's kingdom" through his attention and promotion of agriculture and domestic and peaceful arts (1904:55). Kakaʻalaneo ruled from his court in Lāhainā and planted the many ʻulu and kukui trees in the area that would lend to the phrase "ka malu ʻulu o Lele" (Fornander 1919d:540; Pukui 1983). Kaululaʻau, the son of Kakaʻalaneo and his wife Kanikaniaula, earned a reputation for his mischief and for pulling up these ʻulu trees. As a young Hawaiian boy, it was customary to climb and pick the ʻulu from the trees; however, when Kaululaʻau could not reach the fruit, he would pull the whole tree out of the ground with his hands from his frustration. His father Kakaʻalaneo eventually became angry at his son for ruining their food resource and exiled him to the island of Lānaʻi (Fornander 1917:486). Lanaʻi was inhabited by man-eating spirits at this time and through clever deeds, Kaululaʻau managed to outwit them by hiding in ʻulu trees and using the gum of the tree to blind them, earning his way home to Maui (Abbott 1992:36). After Kakaʻalaneo's death, Kaululaʻau became ruler of Maui (Sterling 1998, W.N. Pualewa, The Legend of ʻEleʻio, Ka Nupepa Kuokoa, Nov 7 1863, HEN 2:932).

3.4.4 Mokuʻula, Loko o Mokuhinia, and Kihawahine

In the ahupuaʻa of Waineʻe and Waiokama, a naturally occuring 11.4-acre freshwater (Cobb 1905:429), spring fed pond named Mokuhinia surrounds the sacred island of Mokuʻula. Klieger defines Mokuʻula as an "axis mundi of the Hawaiian world" (1998:ix) - central to the political and spiritual connectivity of not just the Maui kingdom but to the unified Kingdom of Hawaiʻi and into the modern age.

The loko (pond), Mokuhinia, also referred to as Kalua o Kiha (the pit of Kiha) is surrounded by the chiefly region of Lele known as Kaluaʻehu (the pit of the redhead) (Klieger 1998:5). The region, and more specifically, the pond, is home to one of the most powerful moʻo (lizard) goddesses, Kihawahine. Born as an ʻeʻepa (peculiar) child named Kalāʻaiheana to the great ruling chief of Maui, Piʻilani, and his wife, Queen Lāʻieloheloheikawai, at the sacred birthing stones of Pōhaku Hauola at Mākila, Kalāʻaiheana was deified as a goddess upon her death (Klieger 1998:9). She became known as Kihawahine Mokuhinia Kalamaʻula and, according to Mary Kawena Pukui, was able to move from one pond to another across the many islands, the only such moʻo with this ability (ibid).

In the moʻolelo, "The Legend of Ke-ao-melemele," presented by Moses Manu in *Ka Nupepa Kuokoa*, the legend of many moʻo are told, including that of Moʻoinanea, who placed many of these lizard gods throughout the Hawaiian Island chain from Niʻihau to Hawaiʻi Island. The legend explains (Manu 1885, translated by Mary Kawena Pukui for the Bishop Museum Hawaiian Ethnological Notes 2:875):

> Maui's royal lizard was Kihawahine and it had mana like Moʻoinanea. This was the lizard that had the greatest number of caretakers and many worshipers to deify it. Chiefs and commoners worshiped it all over Maui, Molokai and Lanai in ancient times and to it belonged the pit in the pond of Mokuhinia in Lahaina. Look at the story of Kiha-a-Piilani. Under this lizard were Kalamainuʻu and Kilioeikapua—both were bad lizards. It was said in this legend that Kihawahine made a circuit of Maui and also of Hawaii, Oahu, and Kauai. On this journey there were many worshipers from Hawaii to Niihau. It was the only lizard that went around the islands of the group and this is the tale concerning the people of this lizard, Kihawahine.

As directed to above, by Manu himself, the story of Kiha-a-Piilani, son of Piilani and brother of Kihawahine (Klieger 1998:9), also presents information about the aforementioned goddess, as follows:

> This moʻo, Kihawahine, was a moʻo on whom the parents of these chiefs relied and the place where Kihawahine lived was in a pond lying at Lahaina, Maui, by the name of Mokuhinia [now Malu-ulu-o-Lele park behind Wainee (Waiola) church]. The location of the tomb of the chiefess Nahienaena which stood in the pond on the east bank, was Mokuula, a little rock island. Below this was the den of this moʻo. Tis hold was called, from ancient times until this day Kalua o Kiha (The-den-of-Kiha). (Manu 1884)

The excerpt below comes from a story called "Puna and the Dragon" in *Legends of Gods and Ghosts* that relays a story of two goddesses, Kihawahine, a dragon goddess, and Haumea, also known as Papa, the wife of Wākea and mother to many of the other gods of Hawaiʻi. In this particular moʻolelo, Haumea had a human husband named Puna, who was a chief from Oʻahu. The story follows the events that occur when Kihawahine takes Puna as prisoner and his subsequent attempts to gain his freedom. Puna does eventually escape from Kihawahine and returns to his wife, Haumea, on Oʻahu.

> Two images of goddesses were clothed in yellow kapa cloth, and worshipped in the temples. One was Kiha-wahine, a noted dragon goddess, and the other was Haumea who was also known as Papa, the wife of Wakea, a great ancestor-god among Polynesians. Haumea is said to have taken as her husband, Puna, a chief of Oahu. He and his people were going around the island. The surf was not very good, and they wanted to find a better place. At last they found a fine surf-place where a beautiful woman was floating on the sea. She called to Puna, "This is not a good place for surf." He asked 'Where is there a place?" She answered, "I know where there is one, far outside." She desired to get Puna. So they swam way out in the sea until they were out of sight nor could they see the sharp peaks of the mountains. They forgot everything else but each other. This woman was Kiha-wahine. (Westervelt 1998:152)

Klieger points out that Kihawahine Mokuhinia Kalamaʻula, the deified goddess that once was Kalāʻaiheana, shows up as a distinctive moʻo by those three names throughout Hawaiian historical accounts (Klieger 1998:9). He ascertains that Kalamaʻula on Molokaʻi is associated with Kihawahine through the worship of a lizard goddess there; the excerpt below from Kamakau regarding the use of Mokuhinia as a distinctive name used for Kihawahine seems to validate his hypothesis:

> The moʻo Mokuhinia has been seen on Maui at Kapunakea, in Lahaina, and at Paukukalo and Kanaha in Wailuku; and she showed herself at Kalepolepo at the time that Kamehameha Kapuaiwa died. She has appeared before hundreds and thousands of people. At the close of the year 1838 she almost capsized Kekauluohi, who was going by canoe across the pond of Mokuhinia from Mokuʻula on her way to church at Waineʻe. (Kamakau 1987:83)

3.4.5 Māui and Moemoe

A prevalent moʻolelo of Kāʻanapali from Fornander (1919d:544) involves the famous demi-god, Māui, and his once friend, Moemoe, whose name can be translated as "sleep". The two were said to have lived at Kekaʻa, the lae (cape, point) that marked the boundary between Lāhainā and Kāʻanapali. Moemoe loved to sleep while Māui loved to travel. Whilst they were both attending to their preferred pursuits, a freshet came down upon Moemoe:

> ...and covered him with debris, with the exception of his nostrils; a kukui nut, however, rested on his nostrils and commenced to grow. It grew tall and at the same time tickled the nostrils of Moemoe; so he awoke and said: "Here I am at my favorite pastime, asleep, and yet I am awaked by this cursed kukui tree." (ibid)

Other accounts about Māui and Moemoe do not attribute their relationship as friendship, but as adversaries that resulted in Moemoe being turned into a pōhaku. The story relayed by Fornander (1919b) is about Māui's attempt to snare the sun to slow its path across the sky to enable his mother, Hina, to dry her kapa. While Māui is preparing to capture the sun, he is taunted by Moemoe who calls him a "low down farmer" (Fornander 1919b:538) to which Māui replies that once he had finished his task, he would return to kill Moemoe. Once Māui had completed his quest to slow the sun, he turned his energy to keeping his promise to the lazy Moemoe:

> On his return he called at Moemoe's place. It was absent. Maui traced it to Kawaiaopilopilo. This place is between Kekaa and James' canefield; Moemoe saw him, and it went on in an irregular manner, now towards the mountain and now towards the sea. Maui became greatly angered, so he flew right on and caught the other above Kekaha [Kekaʻa]; he killed it; it turned, however, into a rock. That rock is still lying along there makai of the new road. Its length is nearly seven feet. (ibid)

This "irregular manner" that Moemoe took whilst attempting to elude Māui may be the road that Fornander mentions, located on the northeast side of Kekaʻa, which he states is named after one of the two men involved in the confrontation (Fornander 1919d:544). The road is called "ke alanui kikeekee a Maui," which Fornander translates to mean the zigzag pathway of Maui (ibid).

3.4.6 He Moʻolelo no Pōhakukāʻanapali

Barbara Lyons retold and published a story relayed to her by John Kapaku, a longtime resident of West Maui, in the *Honolulu Star-Advertiser* about a meeting and contest that took place between young chiefs of Molokaʻi and Maui. Part of this contest took place at Pōhakukāʻanapali, near the border of Māhinahina and Kahana:

> A very long time ago, an interesting meeting took place between young chiefs of Molokai and of Maui.
>
> The Molokai chief had sailed in his canoe across the narrow channels that separated his island from Kaanapali [sic] (Pailolo Channel). On meeting a young alii of this vicinity, he remarked that he had heard that there were on Maui some high cliffs.
>
> "But I see nothing here to with the cliffs of Molokai," he went on. "The steepness, great height and spectacular beauty of our pali can hardly be imagined by one who has not seen them.
>
> They rise above the sea like towering battlements, or like the way to Heaven, depending on one's mood. If you have anything like them on Maui, I should certainly like to see it. "He smiled in a confident manner secure in his belief that Maui's cliffs were inferior to those of his island.
>
> Although at first meeting the Maui chief had been strangely attracted to this young man, he was angered and his island pride was hurt to hear the cliffs of Maui slighted. It might be true that the pali of Molokai were higher and steeper – he had no proof that they were not – but he resented the superior way in which it had been said. And surely Maui's cliffs were as beautiful as those of any island in the sea.
>
> I won't allow this fellow to think he can come to Maui and speak in such a way, he thought.
>
> "I dare you then to try to climb one of our cliffs," he said heatedly. "And our wager will be – a bone."
>
> Now, as the Molokai man knew, this meant death for him if he should fail, and death for the other if he succeeded. But he was agile and strong, and well skilled in climbing cliffs on Molokai that almost defied scaling. Besides, it would be cowardly to refuse a challenge.
>
> The Maui chief led him to a boulder that stood near the shore at Kaanapali.
>
> "Is this your cliff?" He was unable to believe his eyes.
>
> "Come to this side," said the other.
>
> A depression in the great rock was revealed. "You must stand with your heels together, and moving both feet at the same time see if you can ascend this rock."
>
> It looked hopeless, as the unlucky man saw at once. But for the honor of his island, as well as the sake of his own life, he made a desperate attempt. The rock slanted outwards above the depression in such a way, however, that it was impossible.

> Again and again he tried to gain a foothold from which he could leap. At last he turned to the Maui man. "You have won," he said simply. "Our wager was a bone. My life is yours."
>
> The Maui chief had been deeply impressed by the efforts of his rival, and couldn't help admiring him for the sportsmanship which had not let him complain when he saw the "cliff." After all, it had been a trick.
>
> "I call our wager off," he said. "Just remember that it is not a good thing to boast. And now, we will be friends."
>
> The "Kaanapali Pohaku" still stands at the spot where this event took place. (Lyons 1957)

3.4.7 Warring Chiefs in Lāhainā

Revolution, rebellion, and usurpation is a theme throughout the stories of chiefly lines in the Hawaiian Islands. Tales of wars and the many battles that ensued, sometimes stretching across vast geographical areas and over many years, extend the breadth of histories that have been transmitted through the ages. Frequently told, retold, and then documented by scholars like Samuel Kamakau, these moʻolelo about the forging of power, chiefdoms, and geneaologies initiate another perspective into the biocultural landscape. The lands of Lāhainā are the backdrop of one such war when Kauhiʻaimokuakama, the brother of the Maui heir, Kamehamehanui, attempted to usurp his brotherʻs rule. Kamakau writes:

> Alapaʻi [ruler of Hawaiʻi Island] returned to Molokai to straighten out matters between the chiefs and the country people and enable them to live at peace with the chiefs of Maui and Lanai. Upon arriving at Maui, he found that Ka-uhi-ʻaimoku-a-Kama, the oldest son of Ke-kau-like by his wife Kaha-walu, had rebelled against Kamehameha-nui, heir to the island. The occasion for this revolt came when stones were being carried for the building of the heiau of Wailehua. The counselor who incited him to rebellion was a kahuna named Pi-naʻau. He said to Ka-uhi, "Let the weak carry stones; the work for the strong is to establish themselves upon the land." Said Ka-uhi, "What shall I do?" Pi-naʻau answered, "Go to war, stand at the head of the government." They therefore seized all the food at ʻAlamihi and kept it under the control of the fighting men of Ka-uhi, enough to support their needs until they reached the fortress at Kahili. Thus began the war against Kamehameha-nui. (Kamakau 1961:72-73)

As the son of Kekaulike, Kauhiʻaimokuakama was touted as a good soldier who had been seasoned through his father's many wars where he acted as commander-in-chief at decisive battles that established peace on Maui and signaled Kekaulike's rule. Although Kauhiʻaimokuakama's kahuna warned of defeat and destitution if he went to speak with his uncle, Alapaʻi, he ignored their entreaties and started the rebellion against his brother. After the first battle, near the future home of David Malo, Kamehamehanui flees to Hawaiʻi with Alapaʻi, where they begin a year-long preparation to return to wage war on Maui.

With Kauhiʻaimokuakama hunkered down in Lāhainā with his ally from Oʻahu, Peleioholani, who was fighting valiantly while outnumbered thirteen to one, Alapaʻi engaged in uncommon siege tactics as noted by Kamakau (1961:74):

> What was this war like? It employed the unusual method in warfare of drying up the streams of Kauaʻula, Kanaha, and Mahoma [Kahoma] (which is the stream near Lahainaluna). The wet taro patches and the brooks were dried up so that there was no food for the forces of Ka-uhi or for the country people. Alapaʻi's men kept close watch over the brooks of Olowalu, Ukumehame, Wailuku, and Honokowai. (Kamakau 1961:74)

Bloody battles were fought throughout Kāʻanapali at Honokōwai, Nāpili, Honokahua, and the war ended at the fiercest encounter at Puʻunēnē. Alapaʻi and Peleioholani, both having lost many men to the slaughter, agreed to peace. After this bloodshed, Kamehamehanui became the ruling chief of Maui, and unlike his father, he was not overly ambitious, nor a lover of war.

3.5 HEIAU AND RELIGIOUS SITES IN LĀHAINĀ AND KĀʻANAPALI

3.5.1 Heiau in Lāhainā and Kāʻanapali

As the place where many aliʻi jumped to and from, Lāhainā is home to approximately six heiau. The first heiau built on Maui are historically associated with the chief Hua (also known as Hua-a-Pohukaina and Hua-a-Kapuaimanaku). The Lāhainā born aliʻi ruled the island before the 10th century (Thrum 1924:24). Erected near Kapaulu (possibly an ʻili or ahupuaʻa near Lahainaluna Road), Luakona and Waiie, are two heiau of Lāhainā built by Chief Hua (Sterling 1998:18). According to Thrum, Luakona was lost while Waiie was in fragments with only the foundation to be seen (1908a:38).

In *Tales and Traditions of the People of Old*, Kamakau (1991:148) presents a moʻolelo of Hua that paid homage to his warrior prowess with his war club, Kalāʻaualomakauahi, and mentions the heiau he built:

ʻO Hua-a-Kapua'i-manakū,	Hua-a-Kapuaʻi-manakū,
Ke ʻliʻi o Lahaina,	The chief of Lahaina,
I hanau no i Kahoma i Kanahā,	Was born at Kahoma, at Kanahā,
ʻO Lelenuikuakamau kahua.	Lelenuikuakamau the site.
O Waiʻie ke ēwe,	At Waiʻie [heiau] the placenta,
O Luakona ka piko,	At Luakona [heiau] the navel cord,
O Kauaʻula ka aʻa,	At Kauaʻula the caul,
I Haleʻili i Kahili.	At Haleʻili, on Kahili.
Noho i Wānanalua,	He lived in Wānanalua,
Hahau i ke kaua o Kaniuhoʻopio,	Made kapu Honuaʻula [heiau];
I hākā i Hakalau;	Smote in the battle of Kaniuhoʻopia,
I pā iā Kaona i Hikianakalā,	Fought at Hakalau;
I ili iā Kana,	Was struck by Kaona at Hikianakalā,
I pale ʻia iā Kalāʻaualomakauahi,	Fell upon by Kana,
	Warded them off with Kalāʻaualomakauahi,

I ka lāʻau kapu a Hua. *Haʻule i Kehoni i Kiʻikewe,* *I ka pā i Niua ke ʻliʻi ʻo Hua.*	The sacred war club of Hua, He died at Kehoni at Kiʻikewe, In the enclosure at Niua, did the chief Hua die. He was taken upland and laid away. (Kamakau 1991:148)

In another moʻolelo about Hua-a-Pohukaina, the scaredness of heiau and those who take care of them is apparent:

> In the tradition of the Huas [for there were four of them], this same Hua-a-Pohukaina became infamous, as it is recorded of him that through a dispute with Leahoomoe, his high priest, about some birds, he in anger condemned the priest to death and his house to be burnt. The vengeance for this act was swift in coming and terrible in its consequences, for the springs dried up; the streams ceased running; no rain fell for three and a half years, and famine and desolation spread abroad, so that Hua and his people perished miserably, whereby the saying arose: "Nakeke na iwi a Hua i ka la" (Rattling are the bones of Hua in the sun). (Thrum 1924:25)

Two generations later, nearly fifty years, another of the four Hua, Hua-nui, of Lāhainā built Apahua Heiau located above Waineʻe (Thrum 1908a:38). The three other heiau, according to Thrum (1909:44) were constructed during, or just before, the reign of Kahekili and overseen by the priest Lanikaula. The three were: Halulukoakoa, Wailehua, and Halekumukalani (ibid). Of these three, the construction of Wailehua was the impetus of Kauhiʻaimokuakama's war with Kamehamehanui and Alapaʻi (see Section 3.4.7). It is also known, along with Halulukoakoa, as being "distinguished as receiving Liholiho's first public duty by his consecration of them in 1802, having been sanctified to that service as heir of Kamehameha at the early age of five years" (Thrum 1924:27). Of Halekumukalani, Thrum (1909:45) stated that the caretaker of the heiau for fifty years recorded that the sound of beating drums could be heard emanating from it on certain nights.

Directly located in the project area within Kāʻanapali Moku is Mailepai Heiau (Walker Site 13). According to Sterling (1998), Mailepai Heiau was located near Mailepai Point and had been completely washed away. Although there are other heiau located within the moku, many of them completely destroyed, the two larger and still visible, Iliilikea and Ma-iu, and located further north in Honokōhau (Sterling 1998:54).

3.5.2 Religious Sites in Lāhainā and Kāʻanapali

Puʻu Kekaʻa in Kāʻanapali is a well-known "leina a ka ʻuhane" (lit., leap of the soul) where departed souls leap into the underworld of Milu. Westervelt explains these places as "almost always [being] on bold bluffs looking westward over the ocean. The spirit unless driven back could come to the headland and leap down into the land of the dead" (1998:246).

According to Fornander, Kekaʻa is also considered a landmark of the kingdom of Hawaiʻi as it was once the capital of Maui during the reign of Kakaʻalaneo (1919d:541). As the capital, it was widely settled by house construction and cultivation with "a great deal of potatoes, bananas, sugarcane, and other things of a like nature" (ibid). It was also here that a great many burials were found such that the students of Lahainaluna were known to gather the skeletons for their study of anatomy (Fornander 1919d:542). Lastly, the puʻu was the place where Kahekilinuiahumanu, ruler of Maui, would practice lele kawa, diving into the sea feet first, to prove his fearlessness and to build connections with the ancestors (Tarallo-Jensen 1987:26).

Another site of significance, the Hauola Stone, is located in the ocean waters of Lāhainā at the ancient surf spot of the same name. Legend has it that a girl, also named Hauola, fleeing her enemies, was helpfully turned to stone by her gods to escape being injured (Sterling 1998:34). The rock seat, awash by the waters of the ʻAuʻau Channel, is significant as the birthing stone of the aliʻi. It is also known to be a sacred site for healing bodily ailments as well as a pōhaku piko, a place where people could hide the umbilical cord of newborns in the hopes they would be healthy throughout their lives (ibid).

3.6 KA ʻOIHANA MAHI ʻAI NO LĀHAINĀ – TRADITIONAL AGRICULTURE OF LĀHAINĀ

The earliest written descriptions of Lāhainā are found in the journals of Vancouver's naturalist and surgeon, Archibald Menzies, from their 1793 expedition. His observations of Lāhainā created excellent records of cultivation in the area:

> Here our conductors importuned us to dine, and a pig being killed and got ready, together with yams and sweet potatoes, we partook of a hearty meal, after which we continued our journey, and soon entered the verge of the woods where we observed the rugged banks of a large rivulet that came out of the chasm cultivated and watered with great neatness and industry. Even the shelving cliffs of rocks were planted with esculent roots, banked in and watered by aqueducts from the rivulet with as much art as if their level had been taken by the most ingenious engineer. We could not indeed but admire the laudable ingenuity of these people in cultivating their soil with so much economy. The indefatigable labor in making these little fields in so rugged a situation, the care and industry with which they were transplanted, watered and kept in order, surpassed anything of the kind we had ever seen before. It showed in a conspicuous manner the ingenuity of the inhabitants in modifying their husbandry to different situations of soil and exposure, and it was with no small degree of pleasure we here beheld their labor rewarded with productive crops. (Menzies 1920:105)

At a later time, Menzies returns to Lāhainā, once again, and describes further:

> ...The village of Lahaina, which we found scattered along shore on a low track of land that was neatly divided into little fields and laid out in the highest state of cultivation and improvement by being planted in the most regular manner with the different esculent roots

> and useful vegetables of the country, and watered at pleasure by aqueducts that ran here and there along the banks intersecting the fields, and in this manner branching through the greatest part of the plantation.
>
> These little fields were transplanted in a variety of forms, some in rows, in squares, in clumps and others at random ; some according to their nature were kept covered with water, while others were with equal care kept dry by gathering the earth around them in little hills . In short , the whole plantation was cultivated with such studious care and artful industry as to occupy our minds and attention with a constant gaze of admiration during a long walk through it, in which we were accompanied by a numerous group of natives that continued very orderly and peaceable the whole time. On our coming near the king's house, the greatest part of them separated from us, particularly the women, on account of the ground round it being tabooed. The royal residence was sheltered with spreading trees and cocoa-nut palms situated near some beautiful fish ponds with which it was more than half surrounded, though they were not all at this time in repair or filled with water. (Menzies 1920:112)

In an excerpt regarding the non-indigenous coconut tree, Fornander offers the story of how the tree came to Lāhainā:

> The coconut is one of the tallest trees growing down in Lahaina. This is how the coconut was obtained : it was brought here by a man with very long bones, named Kane. He came from the border of Kahiki and brought it with him.
>
> This is how Kane brought the coconut: formerly it was short, about one yard. When it was planted it was attended by much labor. A man could reach for the fruit with his hand without climbing. But here is the strange thing: when a certain chief wanted coconut he ordered his servant to climb for some. When the servant reached for the coconut the tree lengthened and grew taller. He was surprised at this lengthening of the tree, so he climbed up. The tree grew taller until it was one hundred fathoms high; so he descended and went to the house of his master. The master asked him: “How about the coconuts?” “I did not get any; to be sure it is only low, but when I started to climb it grew very high.” The chief asked:”Then you did not meet Kane, the owner of the coconut?” He said he had not. The chief answered: “That is the reason you did not get any.” It was a famous saying among the children of that time that you can not get the coconuts of Kane. (Fornander 1919a:596)

Most famously, Lāhainā is poetically referenced as ka malu ʻulu o Lele (breadfruit shade of Lele) for the vast forests of ʻulu, as well as kukui (Candlenut, *Aleurites moluccanus*), that had been planted in the time of Kakaʻalaneo (Fornander 1919d). As the King of Maui, Kakaʻalaneo has been famed in Hawaiian traditions as the first ruler of Maui to promote the importance of agriculture and his emphasis in this area provided his people with a peaceful, golden age (Nakuina 1904:55).

The agriculture of the area was also illustrated by the moʻolelo of the war waged by Alapaʻi whereby he dried up the streams of Lāhainā to make it impossible for the loʻi kalo to feed the people of the area during his seige (see Section 3.4.7). Claims at the time of the Māhele also offer insight into the traditional agricultural and resource gathering practices of Lāhainā (see Section 3.9.5). While kalo (taro) was most certainly a part of the agricultural systems of Lāhainā, kuleana claims and awards also show that kula (pasture lands) was likely an important agricultural usage of lands as noted in the testimony for those land claims. The largest agricultural claim in Panaʻewa was presented in Helu 3963 (see Table 3-2 and Figure 3-1), claimed by Naaoa (but unawarded) for 33 loʻi (watered terraces) in four apana (parcels).

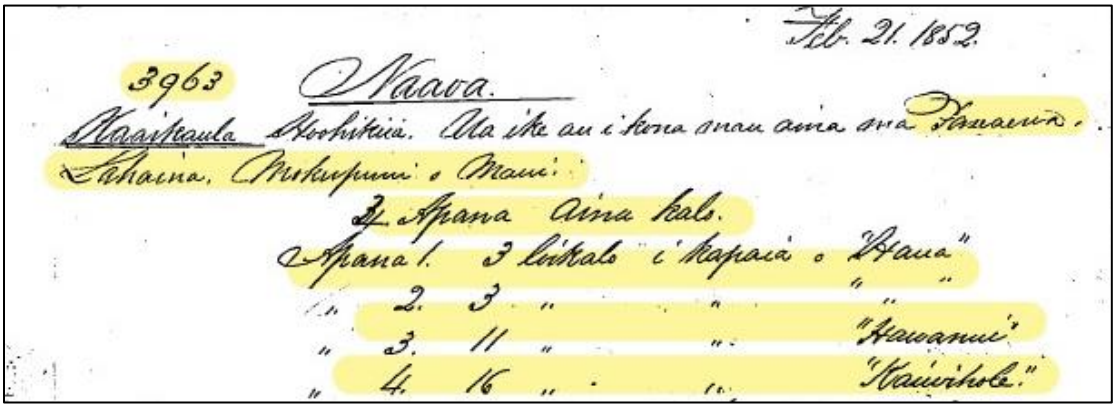

Feb. 21. 1852.
3963 Naaoa.
Kaaikaula Hoohikiia. Ua ike au i kona mau aina ma Panaewa.
Lahaina, Mokupuni o Maui.
3 Apana aina kalo.
Apana 1. 3 loikalo i kapaia o "Haua"
" 2. 3 " " " "
" 3. 11 " " "Hawanui"
" 4. 16 " " "Kaiwihole."

Figure 3-1: A Native Register claim made by Naaoa for Land Commission Award 3963, highlighting the four apana in Panaʻewa as loʻi kalo [Native Testimony, Reel 4, Volume 10, Image 00040, (Office of Hawaiian Affairs 2011)]

Another claim, Helu 6729 (see Table 3-2 and Figure 3-2), from Paunau and Panaʻewa listed a pāhale, four moʻo, eight loʻi, a kula, and the river, as resources that were utilized by the claimant.

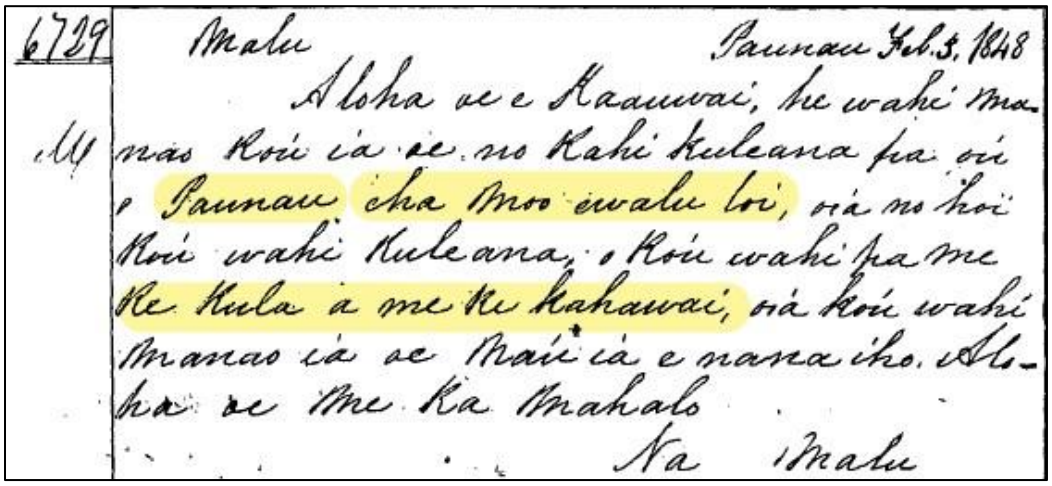

6729 Malu Paunau Feb. 5. 1848
Aloha oe e Kaauwai, he wahi ma-
M nao Koi ia oe no Kahi Kuleana pa oi
o Paunau eha Moo ewalu loi, oia no hoi
Koi wahi Kuleana, o Koi wahi pa me
Ke Kula a me Ke Kahawai, oia koi wahi
Manao ia oe Mai ia e nana iho. Alo-
ha oe Me Ka Mahalo
Na Malu

Figure 3-2: A Native Register claim made by Malu for Land Commission Award 6729 highlighting the presence of four moʻo, eight loʻi, a kula, and a river [Native Register, Reel 4, Volume 6, Image 00208 (Office of Hawaiian Affairs 2011)]

3.7 KA ʻOIHANA MAHI ʻAI NO KĀʻANAPALI – TRADITIONAL AGRICULTURE OF KĀʻANAPALI

Traditionally stretching from Puʻu Kekaʻa to ʻIli o Kukuipuka, Kāʻanapali Moku encompasses five major stream valleys and six bays (hono) which are collectively known as Hono-a-Piʻilani, or the bays of Piʻilani. The watered valleys that drain down the western slopes of Maui Komohana are: Honokōwai, Kahana, Honokahua, Honolua, and Honokōhau. The hono are: Honokōwai, Honokahua, Honolua, Honokeana, Honokōhau, and Honanana.

In *Hawaiian Planter,* Handy states that he was not able to visit the area; however, inquiries sent to D.T. Fleming, the manager of Honolua Ranch and later, Baldwin Packers, resulted in the reply:

> "Honokowai, Honokohua and Honolua, as well as Kahana, there was considerable taro raised in olden times; as a matter of fact, a great deal was raised in Honokowai, where there must have been 30 or 40 acres under cultivation at one time" (1940:106). Fleming states further, "This valley [Honokōhau] watered by a large rivulet the flow of which never ceases, even today when much of its water is piped off in the upper valley-was, and still is, an area of intensive cultivation of wet taro in flooded terraces" (ibid).

In Handy and Handy, the continuing description of Kāʻanapali Moku cultivation in the five valleys stated that they all had extensive loʻi in "their valley bottoms, where terraces rose tier on tier in symmetrical stone-faced loʻi" (1972:494). Further north in the gulches where water only ran during the wet season, wet land taro was also planted in small loʻi (Handy and Handy 1972:495).

At Kekaʻa, once the capital of Maui and the boundary between Lāhainā and Kāʻanapali, a great area of settlement and cultivation was known to have been present (see Section 3.5.2). Loʻi agriculture within the watered areas of Kāʻanapali along with kula ʻuala (potato agriculture) or dry land crop staples as well as coastal resources may have supported a significant population. This picture is somewhat tempered by an attempt at population calculations by early missionaries in the initial decades following 1778, or contact with European and American trade ships. While early missionary census records do not give population estimates specific to each ahupuaʻa, these records do provide the earliest documentation of the size of the native population (Hill et al. 2006:14). During the first census of Maui Island, between 1831-1832, the Kāʻanapali district total comprised 8.5% of the entire island population of 35,062 (Schmitt 1973:18). By the census of 1836 however, the Kāʻanapali population would experience a population drop to 1,341, thus comprising 5.5% of the Maui island population of 24,199 (Schmitt 1973:38).

In the ahupuaʻa of Mailepai in Kāʻanapali, the Māhele claims were scant, but one of them, Helu 4807 (see Table 3-4 and Figure 3-3, awarded to Nika in the ʻili of Waikailu (see Figure 3-3), listed the agricultural resources on the land as moʻo ʻuala and loʻi kalo. With the few claims in this ahupuaʻa it may be more prudent to look at the adjacent areas with Māhele claims to ascertain further agricultural pursuits of the inhabitants of the project area. Claims in the ahupuaʻa of Kahana, just south of Mailepai, refer to moku mauʻu (grasslands), maiʻa (banana), olonā (a native shrub used to create cordage and nets), kō (sugar cane), and lauhala, illustrating the network of subsistence within the Kāʻanapali moku.

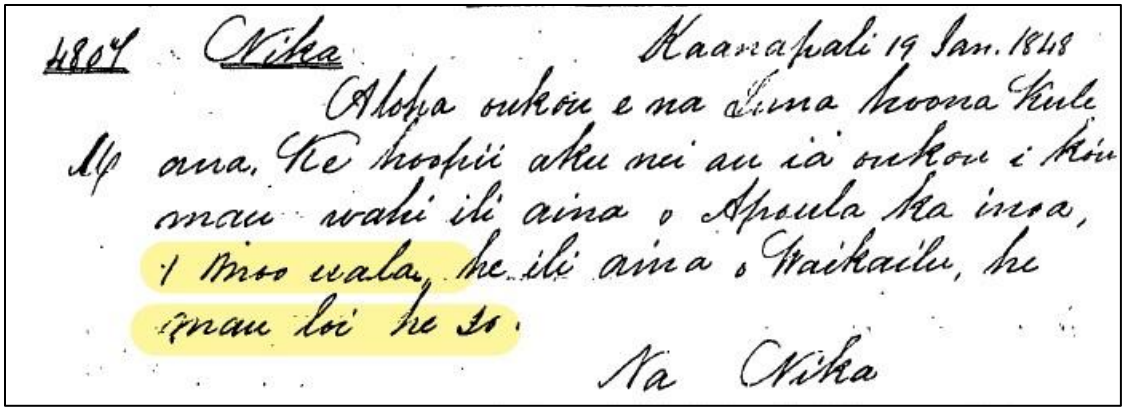

4807 Nika Kaanapali 19 Jan. 1848
Aloha oukou e na Luna hoona Kule
Mp ana. Ke hoopii aku nei au ia oukou i kou
mau wahi ili aina o Apoula ka inoa,
i moo uala, he ili aina o Waikailu, he
mau loi he 30.
Na Nika

Figure 3-3: A Native Register claim made by Nika for Land Commission Award 4807 highlighting the presence of one moʻo uala and thirty loʻi [Native Register, Reel 3, Volume 6, Image 01365 (Office of Hawaiian Affairs 2011)]

3.8 KA ʻOIHANA LAWAIʻA NO LĀHAINĀ – TRADITIONAL FISHING OF LĀHAINĀ AND KĀʻANAPALI

The greatest treasure trove of descriptions regarding native fishing traditions was compiled by the Hon. Daniel Kahāʻulelio, born in Lāhainā at Wailehua in 1835, for *Ka Nupepa Kuokoa* and ran as a series for five months in 1902. Kahāʻulelio, having graduated from local schools and finally, from Lahainaluna College in 1855, was a teacher, legislator, and judge, but is most well known for his descriptive accounts of fishing practices through his own experiences and knowledge (Kahāʻulelio 2006:XI)

As a native son of Lāhainā, the majority of Kahāʻulelio's traditions have an intimate relationship with that place. One such tradition describes the communal, cooperative lau nui fishing that harnessed the collective effort of men, women, and children. A type of net fishing, the actual lau (dragnet) was fashioned through the hard work of the cooperative; those people then became the owners and shareholders of not only the net, but the fishing done with it and the fish caught within it. In expounding about lau nui fishing, Kahāʻulelio stated:

> At this point, your writer shall explain and clarify the size and extent of the places where the lau was stretched in the sea. Mr. Editor, you were familiar with Laʻiolele, or what was known as Huaikaʻuluoleleikamālie during the years that you lived here in ka Malu ʻUlu o Lele, seeing the surf of ʻUo and of Keawaiki, and you would recognize the residence of your writer, there are the fence of the Honorable F.W. Beckley. There is a small landing directly outside of that place called ʻŪhāʻīlio, that was where one end of the lau reached and at ʻUo and Keawaiki the other ended. That was the stretch from one lau canoe to the other and was about three-quarters of a mile from the pier of Keawaiki to the house of that honorable gentleman just mentioned. That was the span of the lau that your writer always fished with, under the direction of my beloved father, until filling one canoe. This fishing place was called Kapualiʻiliʻi, for the fish caught were all small except the kakakī (kala), which was usually larger. (Kahāʻulelio 2006:8)

Another type of fishing that the people of Lāhainā were skilled at was hoʻoluʻuluʻu hīnālea whereby a small woven basket was fashioned and then deployed upon the reefs on calm days with no waves to catch the hīnālea (*Labridae Spp.*) fish (Kahāʻulelio 2006:189). According to the many accounts of fishing practices offered by Kahāʻulelio the waters of Lāhainā were plentiful and the ways in which the people of Lāhainā interacted with their ocean resources allowed them to continue self-sufficient practices well into the 20th century.

In his account of paeaea (long pole) fishing, Kahāʻulelio reveals that during his time at Lahainaluna College beginning in 1853, he and other boys would fish for ʻoʻopu (gobies) from Kanahā Stream (Kahāʻulelio 2006:211). He explains:

> It took only a few minutes to catch some ʻoʻopu nōkea. The entrails were removed and dropped into the stream. On arriving home, high above the town, the Molokaʻi bell sounded. This was the dinner bell and the ʻoʻopu were placed in a dish while raw and fresh. With a bowl of poi, it made a meal, for there was no time in which to broil them or cook them... No boy lacked a fishing pole for ʻoʻopu, for it helped to ward off trouble at times. (ibid)

As in Lāhainā, we can also refer to the great knowledge of native fishing traditions of Kāʻanapali offered by the Hon. Daniel Kahāʻulelio (2006). Although they are usually known as deep sea fish, akule (*Selar crumenophthalmus*) occasionally came close to shore in Kapua at Kāʻanapali and could be seen from shore, making the waters red. It was at this time that those who were not skilled at akule fishing could be successful at catching them. The skilled lawaiʻa (fishermen) of Kāʻanapali are described in the following:

> When the fishermen who are well-supplied with papa (bag) and pākū (curtain) nets see the fish, they call for their canoes, or boards today, and go out to surround the fish with the nets. Two canoes would go ahead and they carried the curtain nets. The head fisherman watches from the shore and when he sees that they have reached the right places, he makes signs by waving his hands. The curtain nets are lowered and every effort is made to draw them shoreward. If the fish are surrounded in this time that the net is lowered, then the bag net is quickly set in place, for the fish are excited then. At this time, no one is allowed to speak nor to make a noise on the canoe until the space in the net begins to decrease. (Kahāʻulelio 2006:201)

The people of Kāʻanapali were also known for mamali ʻōʻio *(Albula glossodonta*) fishing along the reefs and shorelines stretching from Māʻalaea to Kūnounou in search of ʻōʻio. They used hooks for this type of fishing unlike other places where nets were used to catch ʻōʻio (Kahāʻulelio 2006:141). Also within the moku of Kāʻanapali at Kekaʻa were fishing grounds associated with ʻōpelu (*Decapterus macarellus*), which were lured in by scattering pumpkin, papaya, kalo, shrimps, and lohelohe (dragonfly pupa) before gathering the feeding fish into a large, kukui-dyed net with the help of ʻūlei (*Osteomeles anthyllidifolia*) sticks. Some of the women of the area were allowed to assist in hauling the ropes of the net in when ʻōpelu fishing (Kahāʻulelio 2006:103-105).

An oral history interview with Frank Harrison Neizman and Theresa Smith-Neizman, life long lawaiʻa of Lāhainā, revealed that they continued to use the traditional practice of baiting the water with palu (fish lure) made from pumpkin when fishing for ʻōpelu (Maly and Maly 2003b:1002-1003). Mr. Neizman also explained how his kūpuna taught him how to train kākū (barracuda) to be ʻōpelu māmā (guardians) that protect the ʻōpelu from other large, predatory fish and bring the schools to the koʻa for the fishermen (Maly and Maly 2003b:1002, 1004-1009).

At certain times, or places, specific fish, designated by those in power, were not allowed to be taken (Maly and Maly 2003a:306). In a letter dated January 14, 1852, from A. Paki to Keoni Ana, Minister of Interior, Paki, as haku aina (overseer), reports that in Mailepai Ahupuaʻa, the prohibited fish chosen by the konohiki was the nehu (*Encrasicholina purpurea*) (Maly and Maly 2003a:295). Schools of nehu were known to frequent Launiupoko and Keonepoko in the Lāhainā district (Kahāʻulelio 2006:279).

3.9 WESTERN CONTACT AND 19TH CENTURY CULTURE CHANGE

Although there are no written accounts of contact with the expeditionary forces of Captain James Cook in West Maui, it is documented that the English ships were encountered in the waters of Haaluea off of Wailuanui in East Maui at the time of Kalaniopuʻu's campaign against Kahekili (*Ka Moolelo Hawaii* 1838:9). Later, the H.M.S. Discovery under Captain George Vancouver landed in Lāhainā in 1793 whereby Archibald Menzies, the ship surgeon and naturalist quoted above (see Section 3.6), took detailed notes of his time spent collecting plants and admiring the agriculture he described as "cultivated and watered with great neatness and industry" (Menzies 1920:105). By 1865, an article written in *Ka Nupepa Kuokoa* regarding the view of Lāhainā from the ocean, referred to the area as a "dense large forest" with coconut, kou, banana and other trees (Lum and Rivera 2020:29).

3.9.1 Foreign Transient Trade & Whaling in Lāhainā

Lāhainā took part in the provisioning of the trans-Pacific fur and sandalwood trade in the late eigtheenth century (Hammatt 1999); however, the greatest influx of transient foreign trade came with the 1819 discovery (Starbuck 1878:96) of Japanese waters rich with sperm whales to supply the immense need for whale oil during the early nineteenth century (Wong 1987:122). Japan was still operating under *Sakoku* (closed country), which restricted commerce and foreign relations (Totman 2007). This made Honolulu the closest, accessible safe harbor for American, British, and other international whaling vessels in the Pacific (Wong 1987:122). The first American whaler, the *Balena*, to find port in Lāhainā on October 1, 1819, would herald the next 40 years of whaling in Hawaiʻi. By 1822 there were at least thirty sperm whalers from America cruising the waters of Hawaiʻi, using the anchorage of Honolulu and Lāhainā to hunt the many Pacific whale species (Starbuck 1878:96; Wong 1987:122).

In a letter dated October 6, 1845, the Protestant mission at Lāhainā, headed by Reverend D. Baldwin, was reporting that since 1842 there were nearly 400 whale ships there each year (Maly and Maly 2007:44). Records kept by Capt. John Stetson, the American Vice-Consular Agent,

number the American vessels at 291 in 1844 during the same time Baldwin reported (Maly and Maly 2007:55). One year after the date of Baldwin's letter, in 1846, could be considered the peak of whaling with the total ships numbering 429 (Speakman 1978:98). With this magnitude, the impact of the whalers, especially in opposition to the missionaries, was substantial. The difference in their approaches to Lāhainā culminated in numerous outrages (Williston 1937:19) by the whalers when laws promulgated by, the now Christian, Queen Kaʻahumanu, restricted the type of unfettered access to recreation they had grown use to.

One such outrage was violently directed at Reverend William Richards while he was stationed in Lāhainā and was revisited in the 1929 *Thirty-Seventh Annual Report of the Hawaiian Historical Society*:

> The episode of the firing of cannon balls from the decks of a whaler upon the residence of Rev. and Mrs. William Richards in October, 1827, seems fresh in the memories of old-time residents, for it was an outstanding event. Captain Clarke, who was an American, his ship being the whaling ship *John Palmer*, of London, found that the moral restrictions at Lahaina as imposed by the Hawaiian governor, and he, in turn, receiving backing of Mr. Richards and other missionaries, were too rigorous for his ideas of physical and moral license. Incensed, the sailors became an ungovernable mob. The Governor resisted these outbreaks against morality, and in fact decided to detain the captain as a hostage for good conduct on the part of his men. Eventually, the guns [cannon] of the whaler were trained upon the Richards' house and several cannon balls fired at it. The women took refuge in the cellar. Happily, no one was killed. (Taylor 1929:53)

The ʻAuʻau Channel, the waterway between Maui and Lānaʻi, was deemed the Lāhainā Roadstead by the whalers. This roadstead would be used from 1819 through the peak of the industry in the late 1840s and to its demise by the discovery of crude oil in Pennsylvania in 1859 (Black 2010:8). The whaling industry is only one of the many transient foreign trades that greatly impacted Lāhainā after Western contact.

During the whaling decades, Maui also saw a boom in Irish potato (also called ʻuala haole) cultivation in Kula, which was directly linked with the New England ship crews' appetite for familiar foods from home. The availability of Irish potatoes on Maui was one reason why the whalers preferred Lāhainā over Honolulu, as reported in an 1854 Committee on Irish Potatoes advisory for the Royal Hawaiian Agricultural Society:

> From 1840 the natives have been paying more attention to the cultivation of the Irish potato, and have found a ready market in the spring and fall visits of the whaling fleet, who were but too glad to avail themselves (from ʻ40 to ʻ48) to trade cotton cloth at 25cts per yard; that cost from 8 to 10cts, in exchange for potatoes at $3, and often at $1.50 per barrel.
>
> It seems almost incredible at the present time, and at so few years removed, that the natives would plant, (cultivate they did not–nature was generous) and when ripe, dig the potatoes, back a barrel at a time to the beach, a distance of 10 to 12 miles, and sell them at Fifty Cents, yet hundreds of barrels were thus brought in, for years up to

> 1847, when some few carts and pack bullocks were brought into use. (Gilman 1854:138-139)

3.9.2 Lahainaluna Seminary

According to *Memoirs of Henry Obookiah* (ʻŌpūkahaʻia), ʻŌpūkahaʻia was a young Hawaiian born in 1792 who was taken aboard a ship under Captain Britnell, bound for America, and became one of the earliest converts to Christianity (Dwight 1819). Although ʻŌpūkahaʻia died in Cornwall, Connecticut in 1818, well before the missions he inspired made their way to his homeland, his zeal was seen as the driving force behind the American Board of Commissioners for Foreign Missions' (ABCFM) journey to Hawaiʻi. In 1820 the first mission landed on Hawaiʻi Island, and by 1823 they had established a mission in Lāhainā. With the baptism of the high chiefess, Queen Keōpūolani, heralding the acceptance of the Christian faith, the mission soon found it needed a way to educate the Hawaiian people (Dibble 1843).

In his *History of the Sandwich Islands*, Sheldon Dibble, once headmaster of Lahainaluna Seminary, offers the following about the founding of the school, "At the General Meeting of the Mission in June, 1831, it was unanimously resolved to establish a Seminary for raising up teachers and other helpers in the missionary work" (1843:305).

The land for the school was gifted to the mission by Chiefess Kalakua Hoapiliwahine, wife of Governor Hoapili (National Register of Historic Places Inventory - Nomination Form for Hale Paʻi 1975). The first class of the Seminary numbered 25, including the renowned Hawaiian historian, David Malo, who was reported to have been 38 years old at the time (Malo 1898:9). By 1834, the school was home to Hale Paʻi, where the first printing press in Hawaiʻi was housed. The first newspaper called *Ka Lama Hawaii* was printed on February 14, 1834 in Hale Paʻi (Dibble 1843:309). The first boarders, 32 young boys, were admitted to the school in 1836, commencing a shift away from adult learners to a childrens' school for younger scholars aged 10–20 years old (Dibble 1843:312). In 1849, under King Kamehameha III's Minister of Public Instruction, the Seminary was taken in as a public institution by the government (National Register of Historic Places Inventory - Nomination Form for Hale Paʻi 1975).

Among the other notable alumni of Lahainaluna Seminary are Samuel M. Kamakau, prolific Hawaiian historian and scholar; Timothy Haʻalilio, noble and the royal secretary of King Kamehameha III; Joseph Nāwahī, Minister of Foreign Affairs for the Kingdom of Hawaiʻi; and James Kekela, the first Hawaiian to be ordained as a Protestant minister (Emerson 1920:142), fulfilling the design of the Seminary when it was first imagined by the Mission in 1831.

3.9.3 David Malo

As mentioned above, David Malo was one of the 25 inaugural pupils at Lahainaluna Seminary. Born in Keauhou, Hawaiʻi Island, around 1795, Malo has often been distilled down to a Native Hawaiian historian, or even as a native informant, with the posthumously published *Ka Moʻolelo Hawaiʻi*, translated into English by Nathaniel B. Emerson as *Hawaiian Antiquities* in 1898.

However, as Dr. Noelani Arista states in her biographical essay of him in *The Moʻolelo Hawaiʻi of Davida Malo, Vol 2:*

> Malo's life (1795-1853) spans a period of intense transformation in Hawaiian society: the casting down of the ʻai kapu, the engagement of oral/aural literacy with print, the slow movement of systems of Hawaiian knowledge and governance between legitimated and authoritative spoken and written forms, the introduction of Christianity, and the beginning of permanent foreign settlement after nearly fifty years of foreign transcience. Malo was trained to be a **kākāʻōlelo, one skilled at language, a chiefly counselor, and a waihona ʻike, a respository of knowledge under kapu**, and was already a man at twenty-four when the kapu were cast down. (Arista 2020:24, emphasis added)

Malo's training as a kākāʻōlelo and waihona ʻike alongside Kuakini, an aliʻi of Kona on Hawaiʻi Island, became the foundation for acceptance into the court of Queen Keōpūolani in 1822 (Arista 2020:26) and his further training in the Christian ways at the Lahainaluna Seminary and their ministerial and scholarly pursuits. Malo continued to serve the aliʻi, moving with the court of Queen Keōpūolani to Lāhainā in 1823. He was tasked as the Hawaiian language teacher to Reverend William Richards which "elevated him as a person of signficance for Hawaiians as well as the American missionaries" (Arista 2020:27). His service to the aliʻi would find him assisting with other projects such as learning to read, write, and understand the new religion so as to educate not only the missionaries, but the chiefs, as well. According to Arista, Malo was converted to Christianity through his translation of the Gospels into ʻōlelo Hawaiʻi (the Hawaiian language) and he entered Lahainaluna in 1831 as one of the oldest students and continued at the school until 1835 (2020).

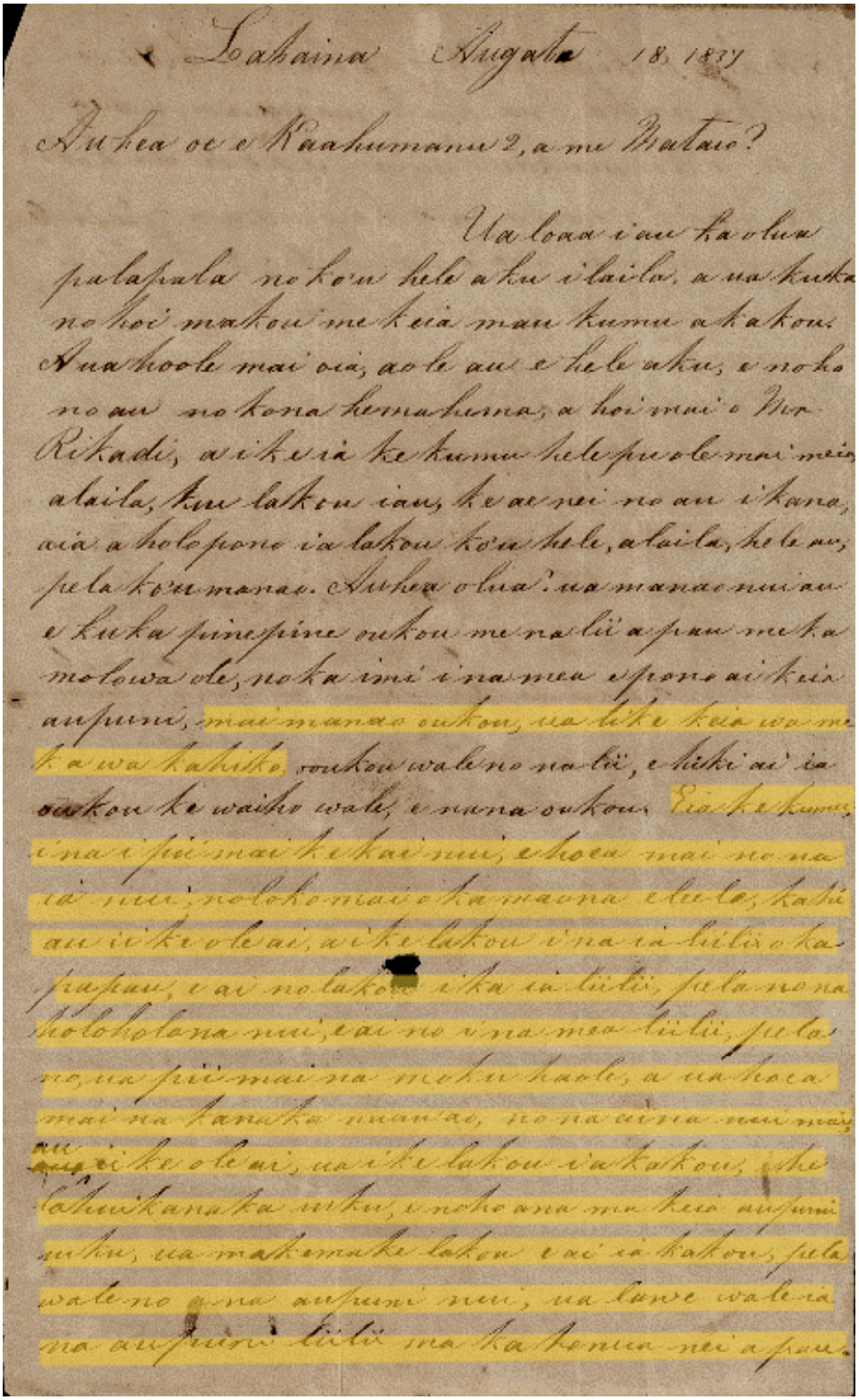
One of Malo's most famous counsels was via a letter dated August 18, 1837, to Kīnaʻu, the designated kuhina nui (prime minister) after the death of Queen Kaʻahumanu. In the letter he uses distinctly Hawaiian imagery to warn the aliʻi to take their work as leaders seriously and not become complacent (see Figure 3-4):

> Mai manaʻo ʻoukou ua like kēia wā me ka wā kahiko... Eia ke kumu, inā i piʻi mai ke kai nui, e hōʻea mai nō nā iʻa nui no loko mai o ka maona [moana] ʻeleʻele, kahi āu i ʻike ʻole ai; a ʻike lākou i nā iʻa liʻi o ka papaʻu, e ʻai nō lākou i ka iʻa liʻiliʻi. Pēlā nō nā holoholona nui, e ʻai nō i nā mea liʻiliʻi. Pēlā nō ua piʻi mai nā moku haole, a ua hōʻea mai nā kānaka naʻauao no nā ʻāina nui mai āu i ʻike ʻole ai. Ua ʻike lākou iā kākou, he lāhui kānaka ʻuʻuku e noho ana ma kēia aupuni ʻuʻuku; ua makemake lākou e ʻai iā kākou. Pēlā wale nō nā aupuni nui; ua lawe wale ʻia nā aupuni liʻiliʻi ma ka honua nei a pau.
>
> Donʻt think that this time is the same as the ancient time. This is the reason. If a big wave comes in, large fishes will come from the dark ocean from a place unseen, and when they see the small fishes of the shallows, they will devour them; such is also the case with large animals; they will prey on the smaller ones. Likewise, the ships of the white man have come, and knowledgeable people have arrived from powerful countries which you have never seen before. They know our people are few in number and living in a small country; they will eat us up. Such has always been the

> case with large countries; the small ones have been taken over throughout the world. (Arista 2020:34, translation by Arista)

Malo was also licensed as a preacher and ordained by the Hawaiian Association of American Ministries in 1852. He served as the kingdom's superintendent of schools, oversaw his own schools, was elected as a legislative representative of the makaʻāinana (commoners), and became known as a radical for his opinions on foreign influences in government and the decrease of the native population (Arista 2020:42-45). Upon his ordination, Malo was installed at Kēōkea in Kula, Maui, where he remained until his death on October 21, 1853, at which point his body was taken by canoe to Lāhainā where he had spent most of his adult life in the service of his kingdom. At the top of Paʻupaʻu (Mount Ball), the hill above Lahainaluna, Malo directed his remains to be buried, according to Fornander (1918:520):

> On the western side of this hill is buried the remains of a celebrated and wise man, David Malo. Here is one of his famous remarks: "If we live together and I die, do not bury me down here at Lahaina; carry me to the top of Paʻupaʻu and bury me there, because the white man is a seeker of land." What he prophesied has come to pass. (Fornander 1918:520)



Lahaina Augata 18, 1837

Auhea oe e Kaahumanu 2, a me Mataio?

Ua loaa iau ka olua palapala no ko'u hele aku i laila, a ua kuka no hoi makou me keia mau kumu a kakou. A ua hoole mai oia, aole au e hele aku, e noho no au no kona hemahema, a hoi mai o Mr Rikadi, a ike ia ke kumu hele pu ole mai meia alaila, ku lakou iau, ke ae nei no au i kana, aia a holo pono ia lakou ko'u hele, alaila, hele au, pela ko'u manao. Auhea olua? ua manao nui au e kuka pinepine oukou me na lii a pau me ka molowa ole, no ka imi i na mea e pono ai keia aupuni, mai manao oukou, ua like keia wa me ka wa kahiko, oukou wale no na lii, e hiki ai ia oukou ke waiho wale, e nana oukou. Eia ke kumu, i na i pii mai ke kai nui, e hoea mai no na ia nui, no loko mai o ka maona e lele, kahi au ii ke ole ai, a ike lakou i na ia liilii o ka papau, e ai no lakou i ka ia liilii, pela no na holoholona nui, e ai no i na mea liilii, pela no, ua pii mai na moku haole, a ua hoea mai na kanaka nuau ao, no na aina nui mai au ii ke ole ai, ua ike lakou i a kakou, e he lahuikanaka uku, e noho ana ma keia aupuni uku, ua makemake lakou e ai ia kakou, pela wale no a na aupuni nui, ua lawe wale ia na aupuni liilii ma ka honua nei a pau.

Figure 3-4: Letter from David Malo to Kīnaʻu and Mataeo highlighting the portion translated, above, by Noelani Arista (Hawaii State Archives, Foreign Office and Executive, Box 402-4 Folder 76, David Malo to Kaahumanu & Mataeo, 1837: Aug 18).

3.9.4 Waiola Church and Waineʻe Cemetery

At the behest of Queen Keōpūolani, wife of King Kamehameha I and highest ranking aliʻi at the time, missionaries from the American Board of Commissioners for Foreign Missions (ABCFM) accompanied her from Oʻahu to Lāhainā in 1823. There in Lāhainā, on Sunday, June 1, 1823, Reverend Charles Stewart and Reverend William Richards held the first Christian service on Maui alongside Taua, the evangelical Tahitian teacher and interpreter for Keōpūolani and her other husband, the Royal Governor of Maui, Ulumāheihei Hoapili. The ABCFM had already selected Lāhainā as a place to establish a missionary station and therefore, with the blessing of Keōpuōlani, began offering Christian teaching, prayer, and singing to those who were present at meetings in the morning and evening (Richards 1825:22-23). In the history presented to the public, Waiola Church claims this as their beginnings (Waiola 2023). Although Keōpūolani died in September 1823, shortly after establishing the mission, an hour before her death she was baptized a Christian by Reverend William Ellis and approved a Christian burial for herself. In his *Memoirs of Keōpūolani*, Reverend Richards quotes her as saying:

> Let not my body be disturbed. Let not my bones be separated and the flesh taken off, as in the days of dark hearts; but let my body be put in a coffin. Let the teachers attend and speak to the people at my interment. Let me be buried in the ground and let my burial be after the manner of Christ's people. (1825:30)

From grass-thatched buildings the congregation grew considerably and eventually found it necessary to build the first stone church in Hawaiʻi, with construction beginning in 1828 and completing by 1832. This church was dedicated as Ebenezera, but was called Waineʻe (moving water) Church, and could seat an estimated 3,000 congregants in its two stories. Since its inception as thatched huts, Waineʻe's church buildings have burned and blown down on five previous occasions, the last time being in 1951, prompting the congregation to change its name to Waiola (living water) in 1953. This church edifice was the longest standing building, celebrating 70 years in 2023 before being burned in the fires of August 8, 2023, two hundred years after the first worship led by Reverends Richards and Stewart (Waiola 2023).

On the grounds of Waiola Church is the church's privately owned graveyard, Waineʻe Cemetery, final resting place of Queen Keōpūolani, her daughter by Kamehameha I, Princess Nāhiʻenaʻena, Kaumualiʻi, last ruling king of Kauaʻi, and others of Hawaiian chiefly lineages. These individuals were moved circa 1884 from their original internment at Mokuʻula, the sacred island within Mokuhinia pond situated west of the current Royal Tomb at Waineʻe (Klieger 1998:82). Other esteemed individuals are also buried in the cemetery, including Reverend William Richards (1793 – 1847), Reverend Enoka Timoteo (1849 – 1917), and Mrs. Alice K. Shaw Kaae (1868 – 1956), the hānai (adopted) daughter of King Kamehameha V and lady-in-waiting to Queen Liliʻuokalani (Lahaina News 2018).

3.9.5 1840-1851 – The Great Māhele

In 1848, King Kamehameha III and 245 aliʻi (royalty) and konohiki (landlord) came together to divide the lands of the kingdom into three classifications. The Crown and the aliʻi received their land titles and awards for whole ahupuaʻa, as well as individual parcels within an ahupuaʻa, which were then subsequently formally granted in 1850 (Alexander 1890:114). The lands given to the aliʻi and konohiki were referred to as Konohiki Lands and lands retained by the King as Crown Lands. The distinction of Crown land is important and defined as:

> ... private lands of His Majesty Kamehameha III., to have and to hold for himself, his heirs and successors forever; and said lands shall be regulated and disposed of according to his royal will and pleasure subject only to the rights of tenants. (Kingdom of Hawaii 1848)

At the death of Kamehameha IV and with lack of a clear heir some confusion as to the inheritance of Crown lands and whether or not it followed the family line or the throne. It was decided by the Supreme Court that under the confirmatory Act of June 7th, 1848, "the inheritance is limited to the *successors* to the *throne*," "the wearers of the crown which the conqueror had won," and that at the same time "each successive possessor may regulate and dispose of the same according to his will and pleasure as private property, in the manner as was done by Kamehameha III" (Alexander 1890:121).

The third classification of lands partitioned out was termed Government lands that were defined and set aside for management in the following manner:

> ... those lands to be set apart as the lands of the Hawaiian Government, subject always to the rights of tenants. And we do hereby appoint the Minister of the Interior and his successors in office, to direct, superintend, and dispose of said lands, as provided in the Act ... (p)rovided, however, that the Minister ... shall have the power, upon the approval of the King in Privy Council, to dispose of the government lands to Hawaiian subject, upon such other terms and conditions as to him and the King in Privy Council, may seem best for the promotion of agriculture, and the best interests for the Hawaiian Kingdom ...(Kingdom of Hawaii 1848)

In 1850, most of the chiefs ceded a third of their lands to Kamehameha III in order to obtain an allodial title for the remainder. The majority of these lands were then placed into 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 and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995:41-51).

In designations of lands as either Crown or Government, and through all awards of whole ahupuaʻa, ʻili, and later land sales to foreigners classified as Land Grants, the rights of the native tenants were expressly reserved, "Koe na Kuleana o Kanaka" (Reserving the Rights of Native Tenants) (Alexander 1890:114). In an Act ratified on August 6th, 1850, the gathering rights of the common people for personal use, which included the gathering of both terrestrial and marine

resources, in addition to the right to water and the right of way on the lands of the Konohiki, were guaranteed and embodied in Section 10477 of the Civil Code (Alexander 1890:114-115). By this same Act, resolutions passed by the Privy Council granted fee simple titles, free of all commutation, with the exception of awards granted within the towns of Honolulu, Lāhainā, and Hilo, to all native tenants for their cultivated lands and house lots (hereafter referred to as kuleana land) (Alexander 1890:115). Claims of the native tenants, or kuleana land claims, were presented to and heard by the Land Commission whose duty was to:

> ...ascertain the nature and extent to each claimant's rights in land, and to issue an Award for the same which is prima facie evidence of title "and shall furnish as good and sufficient a ground upon which to maintain an action for trespass, ejectment or other real action against any other person or persons whatsoever, as if the claimant, his heirs or assigns had received a Royal Patent for the same." (Alexander 1890:110)

Testimony for kuleana lands often included claims for multiple ʻili, or apana, located both mauka and makai. These claims were recorded under a single helu, or case number, and brought before the Land Commission for consideration. Kuleana land awards, or kuleana claims, that were approved by the Land Commission, were granted to tenants of the land, native Hawaiians, naturalized foreigners, non-Hawaiians born in the islands, or long-term resident foreigners, who could prove occupancy on the parcels prior to 1845 (hereafter referred to as Land Commission Awards [LCA]). Despite the effort to allocate lands to the makaʻāinana, much of these lands would ultimately be obtained by foreigners in payment for services rendered to the Kingdom.

The following three tables (see Table 3-2, Table 3-3, and Table 3-4) summarize the Māhele claims that could be found for the ahupua'a of Mailepai, Waine'e, and Pana'ewa. The tables list, when available, the acreage, resources present, and location of each claim, and whether they were awarded.

Table 3-2 Summary of Land Commission Awards for Panaʻewa Ahupuaʻa sourced from Office of Hawaiian Affairs (2011)

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
236M	Kaolulu		Lahaina	FT: a claim to land with "some houses" on it. Land previously belonged to the claimant's father and was passed to him.	N	
285	Kamakini		Waianae, Panaʻewa, Paeohi	Pa 1: a claim to three pāhale in Waianae in Lahaina Pa 2: a claim to a pā in Paeohi and Panaʻewa Pa 3: a claim to a pā in Panaʻewa east of the road going to Lahainaluna	N	
303, 304, 305, 307	Kuakamauna		Panaʻewa	Pa 1: a claim to a pā with a loʻi poalima; Pa 2: a claim to a pā in Panaʻewa and Lapakea.	N	
320	Kaolulo		Panaʻewa	MA: a claim to 19 1/2 ruda = 123/1000 acres in Panaʻewa, Lāhainā	Y	
327	L. Kaauwai			NR: a claim to one kuleana pāhale in Lāhainā	N	
328 (327)	Kamakini		Panaʻewa	NR: a claim to a pāhale at Ukumehame; a claim to a pāhale in Panaʻewa makai of Polokama; a claim to a pā in Panaʻewa located mauka of the pā of Kuakamauna.	N	
353	Lani		Panaʻewa	NR: a claim to a kuleana pāhale in Lāhainā. NT (for Kahai): a claim to a pā in Pana'ewa	N	
464 (and 2762)	Nawaakoa		Panaʻewa, Paunau, Lapakea	NR: a claim to two pā in Panaewa NT: a claim to two pāhale in Lahaina FT: a claim to three pāhale in Lapakea Lahaina. MA: a claim to 3 parcels of land: Apana 1 in Paunau Apana 2 in Paunau Apana 3 in Lapakea Helu 464 and 2762 - Apana 1 in Lahaina	N	

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
472	Keoni Kiwini		Panaʻewa	NR: a claim to a pāhale in Lāhainā NT: a claim to a place in Panaʻewa	N	
616	Analipo Kelelou		Panaʻewa	NR: a claim to a pāhale kuleana land in Panaʻewa	N	
720	I. Kamakini		Panaʻewa	NT: a claim to a pāhale in Panaʻewa consisting of three lots.	N	
3963	Naaoa		Panaʻewa	NT: a claim to 4 Apana of kalo land in Panaʻewa, Lahaina Apana 1: 3 loi kalo called "Haua" Apana 2: 3 loi kalo called "Haua" Apana 3: 11 loi kalo called "Hawanui" Apana 4: 16 loi kalo called "Kaiwihole"	N	
5116	Samuela Kanae		Panaʻewa	FT: a claim to Aupokopoko ahupuaʻa and one house lot in Lahaina. MA: An award for land in Panaʻewa, Lāhainā	Y	Panaʻewa: .07 acres Aupokopoko: 6.58 acres
6478	Kapohaku		Panaʻewa, Lapakea	NR: a claim to kuleana pāhale in Panaʻewa, Lāhainā FT: a claim to a house lot at Lapakea, Lāhainā. MA: An award for 31 Roda in Panaʻewa, Lāhainā	Y	
6549	Hauola		Panaʻewa	NR: a claim to kuleana land in Paeohi in Lāhainā, Maui FT1: No witness FT2: a claim to land in Paeohi, Lāhainā with a house lot, kalo land, and a kula. FT3: a claim to a house lot and a piece of land for cultivation in Panaʻewa, Lāhainā MA: a claim to 4 parcels of land: Apana 1 in Paeohi (1.29 acres); Apana 2 in Panaʻewa; Apana 3 in Panaʻewa (14 roda); Apana 4 a pāhale in Panaʻewa (10 roda)	Y	Apana 1: 1.29 acres in Paeohi

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
6604	Pule		Panaʻewa	NR: a claim to kuleana land in Panaʻewa, Lahaina FT: a claim to a farm with kalo and kula in Panaʻewa NT: a claim to land with kalo, kula, and house lot.	N	
6729	Maluo		Panaʻewa	NR: a claim to kuleana land in Paunau with 4 moʻo, 8 loʻi, a kula, and the river FT: a claim to a house lot in Panaʻewa; a claim to kula and kalo in Paunau; a claim to a house lot and kula in Paunau MA: a claim to land: Apana 1: a pāhale in Panaʻewa, Lāhainā (3 ruda & 6 ruda) MA2: a claim to 2 parcels of land: Apana 1: in Paunau, Apana 2: in Panaʻewa MA3: a claim to 2 parcels of land: Apana 1: Mahele 1 in Paunau (1.10 ruda) andMahele 2 in Paunau (37 ruda); Apana 3: in Panaʻewa (3 ruda)	Y	
9812B	Kelolou		Panaʻewa	MA: a claim to a pāhale in Panaʻewa, Lāhainā (8 ruda) NT: a claim to land in Panaʻewa	Y	
10806 M	Kauikeaouli (Kamehameha III)		Panaʻewa	Multiple claims to pāhale in Lahaina,	Y	
11151	Keaweolalo		Panaʻewa	FT: a claim to a house lot in Panaʻewa, Lāhainā with two houses. MA: a claim to land in Panaʻewa, Lahaina, Maui (16 ruda)	Y	
11216	Mikahala Kekauonohi		Panaʻewa	NT: a claim in Panaʻewa in Lāhainā Maui- just one of many claims from this aliʻi	Y	

Table 3-3 Summary of Land Commission Awards for Waineʻe Ahupuaʻa sourced from Office of Hawaiian Affairs (2011)

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
61	Ulumaheihei		Waineʻe	NR/NT: a claim to Hale pōhaku o Hoapiliwahine	N, postponed	
241 (See B)	Solomon D. Burrows		Waineʻe	NT: a claim to land mauka of the church FT: a claim to land "*S.D. Burrows is in possession of a land in Lahaina up back of the church and just below Kekauonohi's former house. Burrows is my son-in-law. I went with him to Hoapili about 1839 and I heard Hoapili orders to cue of his men to go and measure off the piece which Burrows now has, perhaps an acre, and he did so. He has a possession of it down to the present time. I supposed that it is given to him for having built a house for Hoapili."*	Y	1 acre
277	Kanaina (Lunalilo)		Waineʻe	NR: a claim to a kuleana pāhale at Lāhainā, 18 pa total NT: a claim to Apana 4, pāhale at Waineʻe, Keaumoku; a claim to Apana 17, pāhale at Waineʻe, Laahiwa	Y	
302	J.A. Kuakini	Waiokama, Mokuhinia	Waineʻe	NR: a claim to a pāhale in Lahaina NT: a claim to a pāhale in Waineʻe, Lahaina; a claim to a pāhale in Waineʻe, Lahaina; a claim to a pāhale in Mokuhinia, Lahaina	Y	

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
				MA: a claim at Waiokama, Waineʻe, Lahaina		
322 (1)	Kaleipaihala		Waineʻe	NR: a claim to a kuleana with a poalima in Waineʻe	Y	154.25 acres
322	Kaipo		Waineʻe	FT: a piece of 0.477 acres of land in Waineʻe certified by Kaleipaihala (the konohiki) MA: a claim to a pāhale in Waineʻe	Y	0.477 acres
381	Nalehu		Waineʻe	NR: a claim to land	N	
484	Kaiheekai, Kaaiheekai		Waineʻe	MA: a claim to a house lot	Y	
526	Kalaimoku	Mokuhinia	Waineʻe	NT: a claim to a pāhale with two homes in Mokuhinia	Y	
782	Alexander M. Buch		Waineʻe	FT: a claim to a building lot in Waineʻe, Lāhainā	Y	0.35 acres
3425B	Alu		Waineʻe	FT: a claim to land in Waineʻe, Lāhainā NR: a claim to 3 loʻi and 1 moʻo aina MA: a claim to 3 parcels of land: Apana 1: a kula; Apana 2: a pauku aina kalo; Apana 3: 2 kula	Y	
4452	Kanaina for Kalama		Waineʻe	NR: a claim to a pāhale near Mokuhinia in Lāhainā; a claim to another pāhale near Mokuhinia in Lāhainā	N	
4533	Malo		Waineʻe	NR: a claim to a pāhale in Waineʻe FT: a claim to a house lot, 8 loʻi, and kula in Waineʻe FT: *"The ancestors of Malo planted the coconut trees and titled the land."*	Y	

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
4878EE	Makaiole		Waineʻe Puaʻa	NT: a claim to 8 apana in Waineʻe: 1: Pāhale, 2: Aina maloo, 3: Kula, 4: Kula, 5: (ineligible), 6: Aina kalo and kula, 7: (ineligible), 8: (ineligible) MA: a claim to 5 parcels of land: Apana 1: 5 loʻi and kula in Waineʻe Apana 2: a loʻi in Waineʻe Apana 3: a kula in Puaa Apana 4: a pāhale, kalo, and kula in Puaa Apana 5: a kula with kalo in Puaa	Y	
4878FF	Poopuu		Waineʻe	MA: a claim to 3 apana: Apana 1: a pāhale Apana 2: (unknown) Apana 3: a loʻi maloʻo	Y	
4878N	Kaekae		Waineʻe	FT: a claim to kula and kalo land	Y	
4878O	Olala		Waineʻe	MA: a claim to 3 parcels of land: Apana 1: a kalo land and a kula Apana 2: a kalo land, a pāhale, and a kula Apana 3: a moʻo kula	Y	
5207B	Kalaipaihala	Maomao, Kaluaokahui	Waineʻe Olowalu	FT: a claim to a house lot, 6 kalo patches, and 3 upland ridges at Olowalu. MA: a claim to land: Apana 1: a pauku aina kalo at Maomao MA3: a claim to 2 parcels of land: Apana 1: a lele for Waineʻe ahupuaʻa; Apana 2: land in the ahupuaʻa of Waineʻe	Y	MA3: Apana 1: 147 acres Apana 2: 1 acre
5247	Kuakini		Waineʻe	NR: a claim to 2 loʻi, a moʻokanu; a claim to 5 loʻi in Waineʻe	N	
6218	Namauu	Mauae/Mauai	Waineʻe	NR: a claim listing helu from 6203 to 6219 consisting of pauku aina, moo aina, moo, hale, pāhale, pa aina, loi, mau loi, kuleana hale, and hale.	Y	1.46 acres

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
				6218 is listed as Mauae in Waineʻe		
6388	Kuakamauna		Waineʻe	NR: a claim to a pā in an ʻili in Waineʻe	N	
6481	Kailimeeau		Waineʻe	NR: a claim to a house lot in Waineʻe NT: a claim to a kula at Waineʻenui	N	
6784	Naai		Waineʻe	MA1: a claim to aina kuleana in Waineʻe MA2: a claim to 2 parcels of land in Waineʻe: Apana 1: a parcel of land 3 ruda and 23 mau roda; Apana 2: a parcel of land 1 ruda and 16 mau roda MA3: a claim to aina kuleana in Waineʻe	Y	MA1: 5 acres MA3: 1 acre
6786	Kamohomoho		Waineʻenui	NR: a claim to land in Waineʻe as part of a list of 25 helu FT: a claim to kula land and a house lot in Waineʻenui MA: a claim to one parcel of land: Apana 1: land in Waineʻenui, Lāhainā	Y	Apana 1: 2.52 acres
6857	Nakaikuaana		Waineʻe	a claim to 2 apana in Waineʻe	Y	
6869	Kawaioahu		Makila, Waineʻe	MA: a claim to 2 parcels of land: Part 1 in Makila; Part 2 in Waineʻe		
6905	Kaneakua		Waineʻe	NR: a claim to land in Waineʻe FT: *"The land here claimed does not belong to the claimant. He is sick and requested to state land... [ineligible] not well understanding what he did."*	N	
6906	Kekahuna		Waineʻe	NR: a claim to land in Waineʻe	N	
6928	Mele		Waineʻe	NR: a claim to land in Waineʻe	N	
7607	Kaiwaioni		Waineʻe		N	
7679	Kalaipaihala		Waineʻe	NR: a claim to land in Waineʻe ahupuaʻa	N	

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
				FT: Identical with No. 5207 Ulumahheihei		
7712	M. Kekuanaoa		Waineʻe	NT: a claim to a pāhale on 3 apana in Lāhainā: Apana 1: a pāhale in Pelekane; Apana 2: a pāhale in Pelekane; Apana 3: a pāhale in Wainee	Y	
7715	Lota Kapuaiwa		Waiokama	NR: a claim to Waiokama ahupuaʻa in Lāhainā	Y	
8135	Hihio		Puaa	NR: a claim to a place in Puaa	N	
8427	Kapahukauila		Waineʻe	NR: a claim to pāhale near the pond of Mokuhinia in Lāhainā	N	
8559B	Lunalilo		Waineʻe		Y	
8888	Kapu		Waineʻe	NT: a claim to 3 parcels of land: Apana 1: a pāhale in Waiokama; Apana 2: a loʻi kalo; Apana 3: a pāhale in Waineʻe	N	
9812	Kamano		Waineʻe	NR: a claim to land at Waineʻe		
9813	Namaka		Waineʻe	MA: a claim to 4 apana in Waineʻe: Apana 1: a parcel in Kauaʻula Valley; Apana 2: a parcel in the kulanakauhale of Lāhainā; Apana 3: a parcel mauka of Apana 1; Apana 4: a parcel in Waineʻe at the opening of Kauaʻula Valley	Y	Waineʻe: 4 ap: 2.25 acres 2 ap: 1 acre
9820	Paele			NR: a claim to land at Waineʻe	Y	
9822	Kaailau		Waineʻe	MA: a claim to 5 parcels of land: Apana 1: a pauku aina kalo in Kauaʻula Valley; Apana 2: a aina kuleana in Waineʻe; Apana 3: a parcel in Kauaʻula; Apana 4: a parcel in Kauaʻula; Apana 5: a kihapai in Kauaʻula	Y	
10806	Piikoi		Waineʻe	a list of 76 helu	Y	
10896	Helekunihi		Waineʻe	NR: a claim to land in Waineʻe Lāhainā, *"i ka puka o kaluakini"*	N	

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
11153	Waihele		Waineʻe	FT: a claim to a house lot with 4 kalo patches in Waineʻe Lāhainā	N	

Table 3-4 Summary of Land Commission Awards for Mailepai Ahupuaʻa sourced from Office of Hawaiian Affairs (2011)

Helu	Claimant	ʻIli	Ahupuaʻa	Land Claim	Awarded (Y/N)	Acreage
3764	Alaala		Mailepai	MA: a claim to 2 parcels of land in Mailepai: Apana 3: a kula ʻuala; Apana 4: a kula ʻuala	Y	Apana 3: 0.53 acres; Apana 4: 0.3 acres
4807	Nika	Waikailu	Mailepai, Alaeloanui, Alaeloaiki	NR: a claim to a **moʻo ʻuala and 10 loʻi** FT: a claim to 2 kula ʻuala and a house lot in Alaeloanui MA: a claim to 5 parcels of land: **Apana 1: a kula ʻuala in Mailepai**; Apana 2: a kula ʻuala in Alaeloanui; Apana 3: a pāhale in Alaeloanui; Apana 4: a kula ʻuala in Alaeloanui; Apana 5: a kula ʻuala in Alaeloaiki	Y	**Apana 1: 1.7 acres;** Apana 2: 1.5 acres; Apana 3: 0.25 acres; Apana 4: 1.3 acres; Apana 5: 2.75 acres
5254	L. Konia		Mailepai, Honokeana, Honokahua, Kahana, Alaeloa	MA: a claim to 2 parcels of land: Part 3: Alaeloa 1 & 2: pauku in Honokeana, Honokahua, Mailepai; Part 4: Mailepai: pauku in Kahana and Honokahua	Y	Part 3: 823 acres Part 4: 798 acres

3.9.6 1850-1900 – Foreign Influence and Changing Economies

The unifying of the Hawaiian Islands in 1790 and the arrival of missionaries in the 1820s changed the socioeconomics and agricultural practices of the region. The traditional Hawaiian ahupuaʻa system struggled against foreign entreprenuers pushing for private land ownership and a market-based economy. The Great Māhele of 1848 solidified the privitization of land, allowing capitalism to take root and foreign businesses to dominate the landscape. The Civil War prevented the American South from milling sugar which allowed room for Hawaiʻi to compete in the lucrative California sugar market (MacLennan 1997:99), leading many entreprenurs to begin various milling operations in the islands. For nearly a century following 1840, sugar milling in West Maui grew from a small cane field cultivated by David Malo (Rolph 1917:168-169), to a massive 10,000 acre operation operated by the Pioneer Mill Company (Honolulu Star-Bulletin 1947).

3.9.6.1 Sugar in Hawaiʻi

Kō, or sugar cane (*Saccharum officinarum*), made its first appearance in Hawaiʻi during the initial settlement by Polynesians. The highly adaptable cane evolved multiple variations as it traveled and thrived throughout the Pacific Islands for generations (Handy et al. 1991:183). In Hawaiian wet-taro farming, kō was found along embankments separating flooded terraces, while in dry-taro and sweet-potato farming the kō was planted as hedges or a windbreak (Handy et al. 1991:186). Sugar cane was a "lifesaver" at times of famine, a treat in times of abundance, an easement for unpalatable medicine, and possibly a hygienic tool to clean teeth (Abbott 1992:41; Handy et al. 1991:186). Kō was also planted for its colorful aesthetic (Abbott 1992:40). Leaves of the plant were sometimes used as wall coverings, the stalk as a dart in games, and the skin for plaiting braids (Handy et al. 1991:187).

The beginning of the industrial sugar boom in the Islands occurred when Captain Pardon Edwards brought a "bundle of choice" sugarcane from the Marquesas Islands to Kauaʻi in 1854, making a pit stop in Lāhainā and dropping some off with Consul Chase and F.A. Oudinot. The new "Tahitian" cane outperformed the previous "Cuban" variety in growth rate, healthier rooting, sweetness, and hardiness against pests (Dorrance and Morgan 2000:177). It quickly became known as "Lāhainā Cane," the preferred variety that catalyzed the sugar mill industry (Davies 1884; Royal Gardens Kew 1894:418-419), leading a number of small sugar companies to begin cane cultivation (Donham 1994:4-5). This resulted in seven sugar plantations operating by 1856, planting 2,150 acres in sugar and producing 277 tons of sugar per annum (Dorrance and Morgan 2000:6).

In 1869, King Kamehameha V, F.W. Hutchison of the Lāhainā Sugar Company (The Pacific Commercial Advertiser 1874:4), and James Makee of Rose Ranch in ʻUlupalakua, joined efforts to begin the West Maui Sugar Association in Lāhainā (known later as West Maui Sugar Co.). Z.S. Spalding joined as manager and helped acquire the Lāhainā Sugar Company in the late 1860s (Lee-Greig et al. 2008:30). By 1867 the sugar plantations had begun to affect the traditional

subsistence practices of the native residents of Lāhainā to the point of famine (Kahaulelio 1867). An investigative committee made of prestigious Lāhainā residents including Judge D. Kahāʻulelio, who wrote prolifically about ʻoihana lawaiʻa (fishing traditions), accounted the reasons for the famine in Lāhainā, all of which were tied to sugar either directly or indirectly (ibid). After sugar prices plummeted in 1870, James Makee's son, Parker Makee, took over as manager (Lee-Greig et al. 2008:30). Shortly after, mill production began to slow as the Makees became preoccupied with running the Makee Sugar Co. in Kauaʻi with future King Kalākaua (Thrum 1925:86). King Kamehameha V died in 1872, and by 1874, the remaining associates decided to sell the West Maui Sugar Company to the Pioneer Mill Company (The Pacific Commercial Advertiser 1874:4). By the turn of the century, Pioneer Mill would purchase 12,500 acres of land in Lāhainā, Launiupoko, Wahikuli, and Kāʻanapali (Donham 1994:4-5). By the beginning of the next century, Hawaiʻi was home to 59 plantations with 128,024 acres and an annual yield of 289,544 tons (Dorrance and Morgan 2000:6).

3.9.6.2 Pioneer Mill Company

James Campbell, a Lāhāina carpenter, began a small sugar mill in 1860 and was soon joined by Henry Turton and James Dunbar (Wilcox 1996:19, 126) under the company name Campbell & Turton (HSPA Plantation Archives 2004). In 1862, the plantation became known as the Pioneer Mill Company (PMCo), (The Pacific Commercial Advertiser 1864) and ten years later acquired the West Maui Sugar Company (The Pacific Commercial Advertiser 1874). For years Campbell was known locally as "Ona Milliona," the millionaire of West Maui (The Hawaiian Gazette 1900). In 1877, Campbell turned over his company share to Turton (McCandless 1936:65; The Honolulu Advertiser 1935). By 1882, PMCo had obtained permission to build a railroad across plantation property, the haul harvested cane between Kāʻanapali and Lāhainā (Orr 2005:54). This rail line expanded under Alexander Isenberg in 1901 and would be in use until the end of World War II with the introduction of hauler trucks. In the 60 years of operation, the train hauled tons of raw sugar from Kāʻanapali to the mill at Lāhainā for processing (Orr 2005:55, 57). In 1885, Hackfeld & Co. (later known as American Factors and modern-day Amfac/JMB) purchased controlling shares of the Mill (Jones and Osgood 2015:160; Wilcox 1996:126) and acquired additional land tracts controlled by Bernice Pauahi Bishop Estate that included important water sources vital to plantation expansion (Lee-Greig et al. 2008:31).

Another narrative places Benjamin Pittman as the founder of the Pioneer Mill in 1862 (Jones and Osgood 2015:160). Pittman then entered into a mortgage deed with Campbell and Turton in 1867 (Maly and Maly 2007:984). A separate account places this same sale in 1876 (The Honolulu Advertiser 1935), but this is likely a transposition of the year, since a court case between Campbell and Turton and a neighboring cane field places the plantation ownership pre-1871 (The Hawaiian Gazette 1871). It is possible that Campbell and Turton began the Mill in the early 1860s on land belonging to Pittman, but based on numerous sources it seems that Campbell and Turton were likely the founders of the Pioneer Mill Company.

As the Mill expanded into the 20th century, major change was also occurring across the Hawaiian Islands. Queen Liliʻuokalani had worked determinedly to restore power to the monarchy after the death of King Kalākaua in 1891, but was illegally overthrown and imprisoned in her own home two years later. At the same time, the U.S. had entered war with Spain. With the threat of losing both a strategic military position and economic hub in the Pacific, U.S. President William McKinley signed an annexation resolution in July 1898, at the protest of native Hawaiians and the Queen herself, making the Hawaiian Islands a Territory of the United States (Daws 1968:284-290). This act largely benefited industrious foreign businessmen on the Islands, and was directly in opposition to the desires of over half the population of native Hawaiians (Schamel and Schamel 1999).

3.10 THE CURRENT PROJECT AREA IN THE 20TH CENTURY

Missionaries have long impacted the landscape of the Hawaiian Islands. One of the most prolific missionary families were the Baldwins, when Reverend Dr. Dwight Baldwin and his wife Charlotte arrived in Lāhainā in the 1830s (Gomes 2009). Over the next century, the family purchased land across the island, finding more lucrative business as landowners than proselytizers. Many parcels of land in Mailepai were purchased by the Baldwin family. Throughout this century, pineapple would become the second largest cash crop, next to sugar, in the Maui Island economy.

3.10.1 1900-1950 – Early 20th Century

3.10.1.1 Honolua Ranch

In the latter years of the 19th century, Henry Perrine (H.P.) Baldwin, son of Reverend Dr. Dwight Baldwin, began leasing and purchasing tracts of land in West Maui with the intention of establishing a cattle ranching operation. Headquartered at Honolua Bay, the ranching operation involved the sale of livestock (polled Angus cattle and some horses), wood, coffee, watermelons, onions, corn, alfalfa, potatoes, and pineapple, as well as running a store (Hill et al. 2006:17; Wilcox 1996:126). Honolua Ranch did not engage in the sugar industry; however, as the water needs of the sugar cane fields under PiMCo expanded, H.P. Baldwin entered into an agreement with the sugar plantation in 1901 to construct Honokōhau Ditch. By 1904, the Honokōhau Ditch system delivered approximately 20 million gallons of water per day to the Pioneer Mill fields (Hill et al. 2006:19). In 1912, the Honokōhau Ditch system was replaced by the Honolua Ditch (Orr 2005:56).

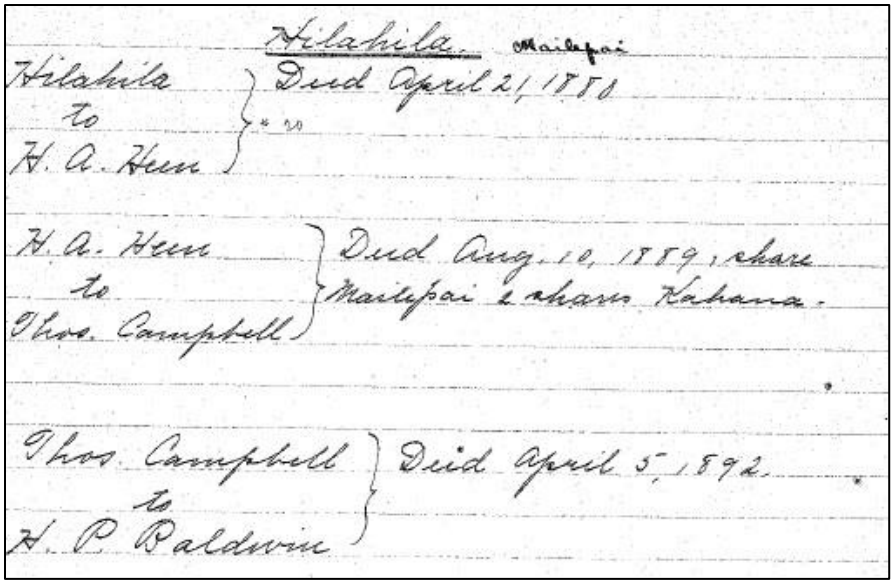


Figure 3-5: An entry from the Fleming Journals from Baldwin Packers showing the transfer of land in Mailepai from the originator, Hilahila, to the owner in 1892, H.P. Baldwin. (Smith:69)

3.10.1.2 The Start of Pineapple on Maui

The beginning of the pineapple industry on Maui started in 1890 when D.D. Baldwin began experimental pineapple plantings in Haʻikū, eventually incorporating the Haiku Fruit & Packing Co., Ltd. in 1903 (Baldwin 1920:12). In 1912 H.P. Baldwin appointed D.T. Fleming to manager of Honolua Ranch and named his son, H.A. Baldwin, as president and his successor. At Honolua Ranch, Fleming experimented with planting 20 acres of pineapple (Orr 2005:56). The result was a success and under his guidance the cattle ranch was converted to a pineapple plantation and by 1919 production figures of the plantation showed that the number of pineapple cases packed had doubled from the previous year's 41,702 to 83,223 (Hill et al. 2006:17; Wilcox 1996:65).

In 1920, the ranch changed its name to Baldwin Packers, which was later incorporated as Baldwin Packers, Ltd. A new cannery was constructed at Māla in Lāhainā, the old Honokahua Cannery was shuttered and the Honokōhau/Honolua water system was put into use for both pineapple and sugar cultivation (Hill et al. 2006:17; Orr 2005:56). PiMCo continued to lease lands and purchase water from Baldwin Packers, Ltd. By 1957, aerial photographs show that the ahupuaʻa of Kahana were cultivated in sugar cane from the lands behind the wetland and village area of Kahana to the 700 ft. contour, while the lands from the 700 ft. contour to the forest reserve were cultivated in pineapple. By 1969, the Baldwins and Alexander & Baldwin Inc., merged their West Maui and East Maui ventures forming the Maui Land & Pineapple Company, Inc., (ML&P) and listed the company's stock for public sale (Hawaii Tribune-Herald 1969:8).

3.10.1.3 West Maui Wells and Water Ditches

As conveyed through the histories of the companies above, water is a very important resource. Although the lands of West Maui were fertile and the climate suited cultivation, water in the vast kula was scarce. Traditional habitation was near the coast, centered around watered valleys, and

irrigated through ʻauwai. Reverend Richard Williams describes this situation in a letter dated August 30, 1823, to *The Missionary Herald* after arriving in Lāhainā in May:

> Our houses are comfortable at this season, and we hope will remain so most of the year, as very little rain falls at this place. During the three months that we have resided here there has been none at all. Nearly all that grows, not only in Lahinah [sic], but on all this part of Mowee [sic], is watered artifically by streams from the mountains. (Maly and Maly 2007:29-30)

The use of traditional methods of irrigating the areas of Lāhainā was also noted by missionary printer, Elisha Loomis, in his journal entry of June 2, 1824:

> The village extends more than two miles along the seashore, and about half a mile back, and contains, as Mr. R supposes, 5000 inhabitants. It is watered by one or two streams which descend from the mountains a little distance back and except in a very dry season, may be said to be very fertile. The water is conveyed to all parts of the land that is cultivated and without this process it would be entirely barren, as it seldom rains. (Maly and Maly 2007:30)

This arid yet fertile environment was still the case when sugar plantations began to harness the plains of Maui Komohana to begin their lucrative business. To combat water scarcity, which impeded the further growth of their industry, PiMCo drilled their first artesian well in 1883, coinciding with the construction of Lāhainā Pump Ditch I (Scheuer and Isaki 2021:54). By 1901, they had constructed eight reservoirs to store the water drawn from their eight artesian wells located in Lāhainā, Kāʻanapali, and Wahikuli to connect 25 miles of ditches that irrigated their cane fields (ibid).

Within three years, PiMCo had a total of 45 artesian wells that reported a yield of 35 mgd in 1904 (Dorrance and Morgan 2000:181). Michael M. Oʻ Shaughnessy, the foremost irrigation engineer of his time (Wilcox 1996:45), explains that other than on Oʻahu, where artesian supplies are uniquely more plentiful, “pumping has to be very cautiously prosecuted as too great a lowering of the sump level will increase the quantity of salt in the water, running it up to 100 or 200 grains per gallon, which renders it unfit for irrigation purposes, as it incrusts [sic] the soil with salt and damages the cane plants” (O'Shaugnessy 1904:422).

Although diversion of water in the beginning of commercial sugar cultivation resembled the traditional agricultural ʻauwai, the main difference was the permanent transport of the water out of the streams with no return to the watershed. Spurred on by the success of Alexander and Baldwin’s Hāmākua Ditch, which diverted water from East Maui to the central plains (Dorrance and Morgan 2000:180), PiMCo began acquiring water from West Maui valleys by using eight different collection systems. The largest, Honokōhau Ditch, commissioned from Honolua Ranch in 1901, had intakes at Honokōhau, Kaluanui, and Honolua streams; the seven smaller systems PiMCo built itself (Wilcox 1996:126). When it was completed in 1904 the Honokōhau Ditch was 12.5 miles long and had a capacity between 30 mgd to 39 mgd, but it was quick to degrade due

to landslides and ongoing maintenance issues (Wilcox 1996:127). By 1912, another large system was in the works, coined the Honolua Ditch, it ran alongside the previous ditch with a key difference in engineering: cement lined tunnels (idib). This new system, further augmented through improvements in 1923, had the capacity to move 70 mgd from the streams to the fields (Wilcox 1996:130).

Of the seven remaining systems that PiMCo built themselves, the Honokōwai Ditch was the largest, its beginning as a small, galvanized iron flume in 1898 culminated in a concrete lined tunnel spanning 1.55 miles with sources at the Amalu and Kapaloa branches of Honokōwai stream by 1918 (Wilcox 1996:133-134). The six other systems were smaller and named for the streams they tapped: Kahoma, Kanahā, Kauaʻula, Launiupoko, Olowalu, and Ukumehame (Wilcox 1996:134). According to a 1941 Manager's Report, in total, harnessing all of their complex water systems, PiMCo reported using 91.82 mgd of water for its operations that year (Maly and Maly 2007:965).

3.10.2 1950-Present – Mid-20th Century to the Modern Era

3.10.2.1 Maui Land & Pine in the 20th Century

Looking to further expand their entrepreneurial ventures across Maui, the Baldwins expanded into resort development, taking advantage of their nine miles of "beach-fringed coastline" (Sutton 1978). In 1969, Colin Cameron took control of ML&P from Alexander & Baldwin (Cho and Tanji 1999:A1), and quickly rezoned 325 acres (Gomes 2009) of their 22,000 acres of farmland for resort development under the Kapalua Land Company, a subsidiary of ML&P (Sutton 1978). By 1978, the "centerpiece to the whole pineapple paradise: The Kapalua Bay Hotel" opened with 196 rooms (Gomes 2009), fronting "Fleming's Beach," locally named for D.T. Fleming, long-time sugar and pineapple land manager (Sutton 1978).

In 1988, ML&P set aside 8,304 acres of land in the West Maui Mountains for the Puʻu Kukui Watershed Preserve, managed in partnership with The Nature Conservancy (Maui Land & Pineapple Company Inc. 2020). Four years later, ML&P officially granted The Nature Conservancy a conservation easement to open the Preserve to the state's Natural Area Partnership program and to receive state funding to maintain the acreage. Among the flora and fauna of the Preserve are ʻōhiʻa forests and other endemic plants such as greensword, as well as ʻiʻiwi, ʻapapane, and ʻamakihi birds (The Honolulu Advertiser 1992:A4). Today, the Preserve is the largest privately owned preserve in the state, and home to endangered flora and fauna and a vital water resource for West Maui (Pu'u Kukui Watershed Preserve 2014).

The 1990s marked a significant change in ML&P's entrepreneurial focus. Instead of focusing on their pineapple subsidiary, the company continued to shift towards resort development. In 1992, the Kapalua Land Co. partnered with the Ritz-Carlton Hotel Co. and Nissho Iwai Corp. of Japan to open the 550-room Ritz-Carlton Kapalua hotel (Tanji 1989:A-4). Once construction began, however, the project became less acclaimed for the resort venture but rather from a spectacular feat of grassroots activism. During excavation of the sand dunes at Honokahua Bay, Hawaiian iwi

kūpuna (skeletal remains) were found, totaling 1,200 burials (Richardson 2019). Burials were reinterred and protest efforts forced hotel construction to move further inland. Eventually in 1990, the Hawaiian Burial Treatment Law was passed ensuring that unmarked burials receive the same protections as modern-day cemeteries (ibid).

In 1999, AOL founder Steve Case purchased a 41% stock in ML&P becoming the largest stakeholder in the company and stabilizing its finances (Cho and Tanji 1999:A2). In further efforts to revitalize ML&P, the company decided to partner with other resort conglomerates to raze the Kapalua Bay Hotel and replace it with a $300 million condominium and luxury time-share resort (Shaefers 2006). At the end of the 20th century, the agricultural operations of West Maui began to flail as the neighboring resort industry boomed. In response, ML&P ended pineapple canning in 2007, focusing on their own resort development enterprises. In 2008, the company cut pineapple production in half, and the following year shut down roughly 3,000 acres of pineapple production in Hāliʻimaile, Haleakalā, and Honokōwai. The Ritz-Carlton Club and Residences at Kapalua Bay, a joint venture with ML&P and others, opened the same year (Gomes 2009).

3.10.2.2 Planes, Trains, and Condominiums: Infrastructure for Tourism

Resort construction on the Kāʻanapali coast began in 1959 as the Pioneer Mill owner, American Factors (now Amfac/JMB), began looking for other sources of income. The entrepreneurial dream was to create "one of the foremost resort areas in the world" (Honolulu Star-Bulletin 1962b:21). The Royal Lahaina resort complex was the first to open in December of 1962 (Bryan 1964:6), closely followed by the Sheraton Maui Hotel (Honolulu Star-Bulletin 1962a:25). The same year, Amfac, Inc. also opened the Kāʻanapali Airstrip with the goal of opening West Maui to more tourism. The airstrip closed in 1982 when news that Hawaiian Airlines would soon create its own airport in West Maui (Kaanapali Airstrip 2020). In 1987, Kapalua Airport opened, located immediately east of the project area. The airport is still in use today and owned by the State Department of Transportation (Kapalua Airport: West Maui 2020).

By the late 1970s, Lāhainā was a leading tourist destination and became the resort model for other islands across the Pacific (Fisher 2006:130). Historic landmarks, like the Pioneer Mill smokestack (Pioneer Mill Smokestack 2017) and the Mill's "Lahaina, Kaanapali & Pacific Railroad" (History 2014) were converted to tourist attractions. According to statistics from Maui County, Lāhainā/Kapalua/Kāʻanapali had the highest number of visitor units in 2016 (County of Maui 2017).

Hotel construction, especially on the coast, required the removal of hundreds of burials (Rockett 2010), specifically surrounding Puʻu Kekaʻa. Puʻu Kekaʻa, the Hawaiian name for "Black Rock," is the lava point at the northern most end of Kāʻanapali Beach. The Puʻu has been known for centuries as a leina a ke akua, a jumping off point for the spirits. The sacred site was home to ancestral burials for indigenous Hawaiians in ancient times through the plantation families and laborers during the plantation era (Akana 1997). Those who were involved in the grading of the surrounding lands for the various hotels in the area remembered seeing hundreds of bones

scattered throughout. These bones were removed and re-interred, “but the spirits of [Hawaiian] ancestors still walk the land” (Akana 1997).

In 2001, the Hawaiian organization Na Kupuna O Maui staged a peaceful demonstration walking the path connecting two sacred West Maui sites: Puʻu Kekaʻa in Kāʻanapali and Mokuʻula in Lāhainā. The demonstration ended with leaps from the puʻu, spanning the space between the physical and spiritual realms (Rockett 2010).

3.11 PREVIOUS ARCHAEOLOGY

Roughly 17 formal archaeological studies that include cursory reconnaissance, intensive archaeological inventory survey, and archaeological monitoring have been completed within a one-mile radius of the current project area. The following table, Table 3-5, presents a summary of the archaeological studies while Figure 3-6 illustrates the locations and extents of these studies in relation to the project area.

Table 3-5. Summary of Previous Archaeological Studies in a One-Mile Radius of the Project Areas

Reference	Location	Type of Study and Summary of Findings
Hommon (1982)	Waineʻe, Lahaina	Reconnaissance: Windshield survey of the project area near Waineʻe Village, which primarily consisted of sugar cane with other vegetation. Observations of present and past sugar cane cultivation was recorded. No archaeological sites or materials were found or identified.
Barrera (1989)	Lahaina	Reconnaissance: Pedestrian survey of three alternatives for the then proposed Lāhainā Bypass, beginning at Puamana Beach Park and branching out to various elevations and terminating at either Hanakaoʻo (all three alternatives) or Honokōwai (Alternative C -- upper elevation). The reconnaissance level survey resulted in the initial identification of two previously unrecorded sites, an agricultural complex at Kahoma Stream and a habitation terrace at Honokōwai Stream, and noted that the SIHP -01598 (Pioneer Mill), SIHP -01775 (Kahoma Stream Terrace System Complex), SIHKP -01596 (Hale Paʻi Printing House), SIHP -01208 (Kahoma Petroglyph Complex), SIHP -01776 (Haia Terrace System), SIHP -01207 (Honokōwai Petroglyphs), and SIHP -01208 (Honokōwai House Outline) were either intersected by the proposed alternatives or in close proximity to the proposed alternatives.

Reference	Location	Type of Study and Summary of Findings
Jensen (1991)	Lahaina	Inventory Survey: Pedestrian survey of an approximate 7-mile corridor. Four historic properties comprised of 28 component features were identified within or adjacent to the study corridor while six additional historic properties were noted as being close but outside of the project area of potential effect. Identified features included a trail (SIHP -2489A) habitation and possible habitation sites (terraces [ACH 10-17-90, SIHP -2485, -2490C] and walled enclosures [SIHP -2489C, -2490A]), agricultural sites (terraces [SIHP -2489A and D, -2490B, -2491] and walled enclosures [SIHP -2847A), boundary features (walls [SIHP -2487B and C]), and confirmed and possible burial areas (Puʻu Koliʻi Cemetery, SIHP -2489).
Jensen and O'Claray (1991)	Lahaina	Supplemental Inventory Survey: Survey of three new offsite construction features (offsite sewer, water improvement features, and road extension) associated with the proposed residential development project as part of the Lahaina Master Plan. The three features reach the lands of Hanakaoo, Honokōwai, Kuhua, Kuholilea, Puou, Puuiki, and Aki. No new sites were identified in the areas of potential effect.
Pantaleo (1991)	Lahaina	Inventory Survey: Archaeological surface survey for the proposed Lahainaluna reservoir and water treatment facility east of Lahainaluna High School and north of Kahana Gulch. The survey results note that the project area has been previously and extensively cleared, most likely for pasture land. A historic stone and masonry foundation was identified.
Jensen (1992)	Lahaina	Inventory Survey: Archaeological inventory survey for a proposed highway realignment corridor about seven miles long. Four archaeological sites comprised of over 28 component features were identified in the project area, in or near the corridor. Three of the four sites were previously documented (SIHP Sites2 484,2 489, and 2490). The third site was newly identified as SIHP 2847. Another six archaeological sites were documented adjacent to the proposed corridor; all of which were previously identified in a previous project. The slight modification of the project area and the new route was pedestrian surveyed. The new route primarily consisted of modified sugarcane fields with no cultural resources.

Reference	Location	Type of Study and Summary of Findings
Robins et al. (1994)	Lahaina	Inventory Survey: Survey with limited subsurface testing that stretched from Māʻalaea, Wailuku to Lahaina. 34 sites and site complexes were identified with varying levels of archaeological significance. The findings were split within two primary survey areas designated by the preferred and final preferred alignment of the proposed transmission line. The identified sites included intensive non-irrigated agricultural features, temporary and permanent habitation sites, significant heiau and shrines, a travel route, a marker site, a possible human burial, historic ranching walls, irrigation canals, flumes, and a possible historic railroad bed associated with large-scale sugar cane agriculture. Appropriate buffer zones were established along with recommendations for mitigative measures to avoid disturbance to any of the archaeological sites during construction.
Fredericksen and Fredericksen (2000)	Waineʻe, Koʻoka, and Puaʻanui in Lahaina	Inventory Survey: Inventory survey of a 5-acre parcel in Waineʻe, Koʻoka, and Puaʻanui in Lāhainā for the proposed Ka Hale a Ke Ola resource and housing center. One previously identified site was identified (SIHP 50-50-03-5042), which consists of two surface features likely associated with historic Waineʻe Village. Feature A is a surface wall that includes a large boulder with a family inscription, likely a boundary marker. Feature B is a retaining wall.
PHRI (2000)	Lahaina	Inventory Survey: Inventory survey with shovel testing and backhoe trenches for the Kauaʻula Development project. Three agricultural sites were identified, Site 4789, 4787, and 4795. Site 4789 contains two loʻi, or irrigated terraces. Site 4787 consists of nine features associated with sugarcane cultivation. Site 4795 is a wall segment that likely is associated with a historic garden enclosure.
Fredericksen and Fredericksen (2003)	Lahaina	Inventory Survey: Pedestrian survey and subsurface testing of an approximate 0.5-acre parcel. Surface survey and mechanically assisted testing of seven exploratory trenches did not result in the identification of historically significant or culturally sensitive sites or features within either surface or subsurface contexts.
Morawski et al. (2005)	Waineʻe	Inventory Survey: Inventory survey consisting of subsurface testing of an approximately 12,365 square feet lot on Waineʻe Street. One subsurface scatter and two subsurface pit features (Features 2 and 3) were identified and subsumed under SIHP 50-50-03-5701. The subsurface scatter featured glass bottles and fragments, stoneware sherds, whiteware sherds, porcelain sherds, and indiscriminate faunal materials. Feature 2 contained bottles and bottle fragments, whiteware bowl rim and base ceramic sherds, a metal ʻōʻō, charcoal, and a fragment of a plastic comb. Feature 3 contained glass fragments (possibly from a candle holder or lamp), and a large quantity of homogenous small rounded basalt cobbles.

Reference	Location	Type of Study and Summary of Findings
Paraso and Dega (2006)	Launiupoko and Polanui, Lahaina	Inventory Survey: Inventory survey on 633 acres of undeveloped land in Launiupoko and Polanui Ahupuaʻa. Ten total sites were identified. Five sites identified are associated with the sugarcane plantation era including large rock mounds, terraces, and irrigation ditches. Two more sites were identified as rock walls associated with the cattle ranching era. One identified site was a scatter of slag (mill by-product) fragments and cores, which was interpreted to be a historic work era. Another identified site was a modified rock deposit/bedrock area containing a small cache of coral fragments. The last of the ten sites was a midden and lithic scatter containing historical material such as glass and metal fragments.
Willman et al. (2008)	Honokōwai, Kāʻanapali	Monitoring: Monitoring of sand replenishment in the dune system of North Kāʻanapali that was damaged during a severe storm. The project area included four small dune breah acres totaling less than 2 acres. No new historic properties were identified during the premonitoring surface survey or the monitoring of the sand replenishment and dune restoration activities.
Cordle and Dega (2008)	Lahaina	Inventory Survey: Systematic pedestrian survey along four proposed road corridor segments along existing field roads. The study resulted in the identification and documentation of five Historic-era features associated with previously recorded historic era commercial sugar infrastructure (SIHP 50-50-03-04420) constructed by Pioneer Mill Co. These features include two reservoirs (Features 4 and 6), a concrete-lined ʻauwai (irrigation ditch) (Feature 5), and two earthen furrows or ditches that parallel two of the existing dirt roads (Features 7 and 8).
Hill et al. (2008)	Kelawea, Paeohi, and Wahikuli	Inventory Survey: Survey of a 55-acre corridor across Kelawea, Paeohi, and Wahikuli Ahupuaʻa due to the modified alignment of the Lāhainā Bypass. The modification was a result of a previous find of a system of over 400 early historic era agricultural terraces (SIHP 50-50-03-6277). This survey included pedestrian survey, mechanized subsurface testing, geophysical testing, and mechanical exploration. Two historic to modern-era agricultural push piles were identified in former cane lands.
Lee-Greig et al. (2009)	Lahaina	Inventory Survey Level Documentation: Formal archaeological documentation of over 400 early historic era agricultural terraces (SIHP 50-50-03-06277), a portion of which was identified in the original 1990 alignment for northern terminus of Lāhainā Bypass Phase IA
Perzinski and Dega (2014)	Honolua	Inventory Survey Level: Two previously documented historic properties and one previously undocumented water diversion wall were identified, including a historic agricultural terrace (SIHP No. 50-50-10-1471 Feature 12), retaining wall (-1754 Feature 6), a historic bridge crossing Honolua Stream (-1754 Feature 11), and a water diversion wall in Honolua Stream (-6812 Feature 1).

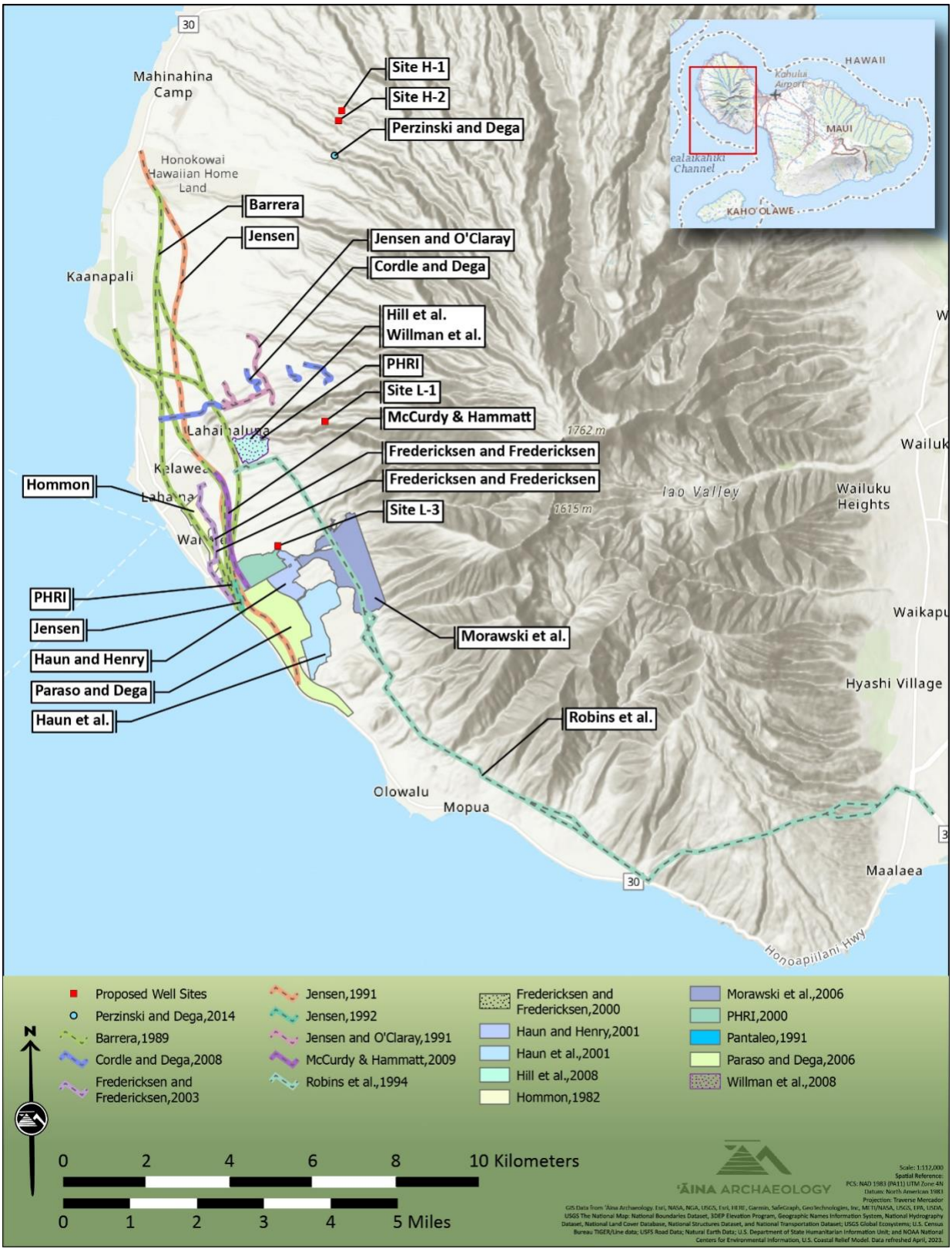


Figure 3-6 : Previous archaeological studies conducted within and near the project area.

4.0 CONSULTATION METHODS AND RESULTS

4.1 SCOPING AND COMMUNITY OUTREACH

In an effort to identify individuals with knowledge of the traditional cultural practices within and adjacent to the proposed project as it relates to this study, contact was initiated with government agencies, advisory councils, local community organizations, and traditional cultural practitioners, along with kamaʻāina and kūpuna with generational ties to the proposed project area. Follow up attempts were then made to all contacts on the initial mailing list in a good-faith effort to make contact. Letters and project area maps showing the location of the proposed well sites were mailed out with the following accompanying text:

> ʻĀina Archaeology is conducting a cultural impact assessment (CIA) for the Proposed Launiupoko Exploratory Wells Project.
>
> The County of Maui, Department of Water Supply (DWS) proposes the construction of exploratory wells in the moku of Lāhainā and Kāʻanapali. A total of five (5) sites have been considered as potential well locations - Sites L-1, L-2, and L-3 in the Launiupoko Aquifer, and Sites H-1 and H-2 in the Honolua Aquifer. Two exploratory wells will be constructed at Site L-1 and an additional two exploratory wells will be constructed at Site L-3. As such, a total of four (4) exploratory wells are proposed for construction. Sites L-2, H-1, and H-2 will be assessed as potential alternative sites. The potentially affected parcels to be evaluated as potential exploratory well sites are outlined in Table 1, below.

Table 1. Project Parcels

TMK	Jurisdiction	Project Component
(2)4-6-018:007	**State of Hawaiʻi**	**Site L-1 and Access Roads**
(2)4-6-025:002	State of Hawaiʻi	Site L-2 (Alternative Site) and Access Roads
(2)4-6-019:003	**State of Hawaiʻi**	**Site L-3 and Access Roads**
(2)4-3-001:001	Maui Land & Pineapple Company, Inc.	Site H-1 (Alternative Site), Site H-2 (Alternative Site), and Access Roads

> The Guidelines for Assessing Cultural Impacts adopted on November 19, 1997, by the Environmental Council, State of Hawaiʻi states:
>
> *(For) the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place (proposed project area). This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment... An ahupuaʻa is usually the appropriate geographical unit to begin an assessment of the cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area.*
>
> *(State of Hawaii Office of Environmental Quality Control 2012:11)*

For this cultural impact assessment, it is our current understanding that the five project sites are encompassed by four (4) ahupuaʻa. L-1 is in the ahupuaʻa of Panaʻewa, L-2 is in the ahupuaʻa of Kuʻia, and L-3 is in the ahupuaʻa of Waineʻe – all are in the moku of Lāhainā. H-1 and H-2 are in the ahupuaʻa of Mailepai in Kāʻanapali Moku (see enclosed maps).
The ahupuaʻa of Panaʻewa, Kuʻia, Waineʻe, and Mailepai are considered the overall "study areas" while the footprints of each well site are identified as the "project site". The purpose of the cultural impact assessment is to identify and evaluate potential impacts on traditional cultural practices as a result of the proposed project.

We are seeking your kōkua or help and guidance regarding the following aspects of our study:

- General history and present and past land use within and adjacent to the project site(s).
- Knowledge of cultural resources that may be impacted within the proposed project site(s) - for example, traditional plant gathering sites, traditional access trails, historic sites, archaeological sites, and burials.
- Knowledge of traditional gathering practices in Panaʻewa, Kuʻia, Waineʻe, and/or Mailepai - both past and ongoing.
- Cultural associations of the areas of Panaʻewa, Kuʻia, Waineʻe, and/or Mailepai such as moʻolelo or connections to legendary accounts.
- Referrals of kūpuna or elders who might be willing to share their cultural knowledge of the project site(s) and surrounding ahupuaʻa lands.
- Any other cultural concerns the community might have related to traditional Hawaiian or other cultural practices within or in the vicinity of the proposed project site(s).

Table 4-1 presents the community consultation effort conducted with kamaʻāina, Hawaiian cultural advisors and Hawaiian organizations. Individuals who expressed personal knowledge of the study area and gave their consent to share their manaʻo for this study, are presented in subsequent sections.

Table 4-1. Outreach Summary

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Noelani Ahia	Community Member	Y	n/a	Recommended by Keʻeaumoku Kapu

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Foster Ampong	Cultural Descendant	Y	n/a	No comments. Noted that he has the reserved opportunity to weigh-in on manaʻo provided by others
Brenda Arcangel	Community Member	Y	n/a	Did not respond to requests for comment
Josepha Beauchamp	Community Member, Paki Family		n/a	Did not respond to requests for comment
Janeece Beauchamp	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Joey Cabatingan	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Deanna Cabatingan	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Ernest Cabatingan, Sr.	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Puaokamele Dizon	Community Member	Y	n/a	Recommended by Keʻeaumoku Kapu. Declined to provide comment
Kamu Dizon	Community Member	Y	n/a	Recommended by Tamara Paltin. Did not respond to requests for comment
Michele Hoʻopiʻi	Community Member	Y	n/a	Deferred to Foster Ampong
Shayne Nameaaea Hoshino	Community Member	Y	Y	Recommended by Keʻeaumoku Kapu. Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1
Richard W. Iaconetti	Community Member	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Charles Kaʻaiʻai	Community Member	Y	n/a	Did not respond to requests for comment
Ernestine Kahalekai	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Kalai Kahookele	Community Member, Paki Family	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1
Lono Kahookele	Community Member, Paki Family	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1
Jasen Kaimikaua	Community Member	Y	Y	Participated in group interview at Nā Aikāne o Maui and provided individual manaʻo, see Sections 4.2.1
Kamana Kaimikaua	Community Member	Y	n/a	Did not respond to requests for comment
Sila Kaina	Community Member, ʻAha Moku o Maui: Kāʻanapali	Y	n/a	Did not respond to requests for comment
Vernon Kalanikau	Community Member	Y	Y	Expressed interest in providing comment, but did not respond to further requests for comment
Archie Kalepa	Community Member	Y	n/a	Did not respond to requests for comment
Glenn Kamaka	Community Member, ʻAha Moku o Maui: Kaʻanapali	Y	N	Recommended by Keʻeaumoku Kapu and Tamara Paltin. Shared he is not maʻa to the areas referenced. Recommended to reach out to Hinano Rodrigues and Kekai Keahi

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Keʻeaumoku Kapu	Resident, ʻAha Moku o Maui, Na Aikane o Maui	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1 Participated in Site Visit to L-3, see Section 4.3.2
Uʻilani Kapu	Resident, ʻAha Moku o Maui, Na Aikane o Maui	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1 Participated in Site Visit to L-3, see Section 4.3.2
Kalani Kapu	Community Member	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1
Joy Kaupe	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Bula Kaupe	Community Member, Paki Family	Y	n/a	Did not respond to requests for comment
Kapali Keahi	Community Member, ʻAha Moku o Maui: Lāhainā	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1
Kekai Keahi	Community Member, ʻAha Moku o Maui: Lāhainā	Y	Y	Interviewed with Junya Nakoa and Kanoelani Steward, see Sections 4.2.2 and 4.2.3
Malihini Keahi-Heath	Community Member	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1
Kaipo Kekona	Community Member, ʻAha Moku o Maui: Kaʻanapali	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1
Rachel Kekona	Community Member	Y	n/a	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Kamaile Kimokeo	Community Member	Y	n/a	Did not respond to requests for comment
Laureen Kodani	Community Member	Y	n/a	Did not respond to requests for comment
Etan Krupnick	Community Member	Y	n/a	Acknowledged receipt of outreach but did not provide additional comments
Lahaina Hawaiian Civic Club		Y	n/a	Recommended by Hinano Rodrigues. Did not respond to requests for comment
Ekolu Lindsey	Community Member, Maui Cultural Lands President	Y	Y	Interviewed, see Section 4.2.4
Alfred Lonoaliʻi Kahoʻokele III	Community Member	Y	n/a	Did not respond to requests for comment
David Kawika Lopes	Community Member	Y	Y	Participated in group interview at Nā Aikāne o Maui, see 4.2.1
David P. K. Makekau	Community Member, Paki Family	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1
Kaimaile Makekau	Community Member, Ka ʻOhana Paki, Landowner	Y	Y	Interviewed, see Section 4.2.5 Attended Kāʻanapali site visit, see Section 4.3.1
Dane Maxwell	Former Maui-Lānaʻi Island Burial Council Lāhainā Representative	Y	Y	Did not respond to requests for comment
Fay MacFarlane	ʻAha Moku o Maui Technical Kakoʻo	Y	n/a	Did not respond to requests for comment

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Suzette Montalvo Felicilda	Community Member, ʻAha Moku o Maui: Lāhainā	Y	Y	Participated in group interview at Nā Aikāne o Maui, see Section 4.2.1 Participated in Site Visit to L-3, see Section 4.3.2
Kaulu Nahoʻoikaika	Community Member	Y	n/a	Recommended by Keʻeaumoku Kapu. Did not respond to requests for comment
Christopher "Ikaika" Nakahashi	State Historic Preservation Division: History and Culture Branch	Y	n/a	Recommended to reach out to native tenants, Keʻeaumoku Kapu, and Kaipo Kekona; and to reserve the rights of native tenants
Leonard "Junya" Nakoa	Cultural Descendant	Y	Y	Interviewed with Kaimaile Makekau and Kekai Keahi, see Section 4.2.2 and 4.2.5
Kahikilani Niles	Community Member, ʻAha Moku o Maui: Lāhainā	Y	n/a	Recommended by Keʻeaumoku Kapu. Did not respond to requests for comment
Charlie Palakiko	Community Member	Y	Y	Recommended by Junya Nakoa and Tamara Paltin. Participated in group interview, see Section 4.2.1
Mark Palakiko	Community Member	Y	n/a	Recommended by Tamara Paltin. Did not respond to requests for comment
Tamara Paltin	Community Member, Maui County Council Member for West Maui	Y	Y	Interviewed, see Section 4.2.6
Gerald Ponce	Community Member, Paki Family	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1

Name	Affiliation	Contacted	Personal Knowledge (Y/N)	Comments
Joe Ponce	Community Member	Y	n/a	Did not respond to requests for comment
Kanani Puou	Community Member	Y	Y	Participated in group interview, see Section 4.2.1
Hinano Rodrigues	Community Member, State Historic Preservation Division: History and Culture Branch	Y	N	Said he knew little regarding project areas and recommended posting to Maui News, Lāhainā News, and Ka Wai Ola. Recommended reaching out to Lāhainā Civic Club
Felimon Sadang	Community Member, ʻAha Moku o Maui	Y	n/a	Recommended by Keʻeaumoku Kapu and Kaipo Kekona. Did not respond to requests for comment
Kanoelani Steward	Community Member	Y	Y	Recommended by Ekolu Lindsey and Tamara Paltin. Interviewed with Kekai Keahi, see Section 4.2.3
Lokahi Sylva	Community Member	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1
Cherlyn Tachera	Community Member, Paki Family	Y	Y	Attended Kāʻanapali site visit, see Section 4.3.1
Kainoa Wilson	Community Member	Y	n/a	Did not respond to requests for comment
Lopaka Wilson	Community Member	N	n/a	No contact information could be acquired

4.2 FORMAL INTERVIEWS

4.2.1 Group Interview at Nā Aikāne o Maui – March 21, 2023

Attendees: Keʻeaumoku Kapu, Kalani Kapu, Uʻilani Kapu, Rachel Kekona, Kaipo Kekona, Kapali Keahi, Suzette Felicilda, Nameaaea Hoshino, Charlie Palakiko, Kanani Puou, David Kawika Lopes, Richard W. Iaconetti, Malihini Keahi-Heath

Traditional Cultural Practices and Resources

Aquatic and Marine Life

Keʻeaumoku questioned how the amount of water drawn from the proposed wells could affect the stream flow and subsequently affect aquatic and marine life. Kawika noted the importance of the stream water flowing continuously to the ocean to properly feed and create a healthy environment for the fish.

Plants and Lei Resources

Kawika shared that he picks flowers and other foliage resources in the mauka areas above the potential well sites to make *lei*. He and his family have been making *lei* by gathering from the mountains for a hundred years. They typically gather ʻōhiʻa (*Metrosideros macropus*, *M. collina* subsp. *polymorpha*) and ʻaʻaliʻi (*Dodonaea*) to make lei. Keʻeaumoku noted that ʻaʻaliʻi is prominent in Lāhainā because it sustains a lot of cultural practices. Richard also noted that ʻiliahi (*Santalum spp*.), or sandalwood, is prevalent in Lāhainā Moku and where other lei resources are found because of its parasitic nature. He shared that where there is ʻaʻaliʻi or ʻilima (*Sida*) around in the area, ʻiliahi is typically around, too. Keʻeaumoku shared a similar example of plants like this thriving off of one another such as laʻamia (*Crescentia cujete*). Through Richard's observations of the natural environment over the years, he stated that ʻiliahi is trying to come back after the past years of drought. Uʻilani added that ʻiliahi grew to be big in these areas.

Kapali shared that the mauka areas in each ahupuaʻa need to be reforested with native plants that once thrived there including ʻiliahi, koaiʻa (*Acacia koaia*), koa (*Acacia koa*), and milo (*Thespesia populnea*)

Heiau, Burials, and Ceremonial Practices

Uʻilani shared that they gather wai from the piko of both Kauaʻula and Kahoma Rivers for their ceremonies. Because of this significant practice, Keʻeaumoku and Uʻilani shared the importance and desire to have their access maintained. Keʻeaumoku shared that they are involved in Ka Papa Kanaka o Paʻupaʻu Heiau, a group that maintains and cares for Paʻupaʻu Heiau. As a group, they make the huakaʻi to Puʻukoholā, and haumāna of the group have certain requirements to meet before they can go. Keʻeaumoku explained one example that the haumāna have to gather and prepare different types of wana to present as hoʻokupu at the heiau. They also periodically visit David Malo's grave at Paʻupaʻu to drink ʻawa and honor him. Richard noted that Paʻupaʻu is in Panaʻewa near L-2.

Keʻeaumoku recalled the name of a property in Panaʻewa called Keoihoiho, and he shared that Keoihoiho is documented to have burials. Kapali expressed concerns that the drilling could potentially impact these burials at Keoihoiho. He also shared his concern regarding the wells' impact on erosion, noting that the current erosion he's witnessed across Lāhainā and Kāʻanapali is significant.

Regarding Well Sites L-1 and L-2 and Access

Keʻeaumoku asked if the County would be putting in a road to get materials for the well up to site L-1. With this in mind, he shared that another community member, Greg Brown, recently had

a well that was drawing salt water and had collapsed. It couldn't be remedied so the well was abandoned. Mr. Brown's well was near the Makila Reservoir. Similarly, Uʻilani asked if a road will be created to transport materials to well site L-2 or if materials will be dropped by helicopter. If the County did decide to create a road to either of the well sites, Keʻeaumoku wondered how the County would minimize general access from the public.

The group collectively agreed that general public access to these spaces and the road development itself would negatively impact the wao kele, wao akua, and their traditional cultural practices and resources. They noted that an easement would suggest an open invitation to unwanted users such as hikers and bikers to go up mauka. Keʻeaumoku, Kawika, and Kalani shared that they already deal with people trespassing on their property and into these areas on a daily basis. They described that trespassers typically ride past them saying they are going up to the State's current easement, but still trespass their private property in the process. Kawika noted that trespassers trample over their plant resources. Additionally, Susan shared additional concern for potential contamination of the natural environment by any foreign matter brought on their shoes. Introducing the wrong kind of seed or substance could potentially kill or harm the cultural resources and native plants in the area.

Specifically in Panaʻewa, Kapali shared similar experiences regarding dirt bike riders going up mauka to ride their bikes. He shared that he fenced off the access point because the riders know that the State's gate isn't locked and can easily be opened. Kapali did not put a lock on the State's gate, but he fenced the area to deter the bike riders from accessing the uplands. Kapali explained that the land agent thanked Kapali for putting up the fence because their agents have been experiencing issues with that user group as well. Kapali explained that accessing these spaces is a right for Kānaka Maoli, for native tenants, and not necessarily all of the general public.

Regarding well site L-2, Keʻeaumoku noted that the County will have to go through Kamehameha Schools land and State Reservation Land to access the site. He also added that Kamehameha Schools is transferring 1,400 acres in the area to Kuʻia Educational Farm, which he suspected would present an access issue with Kuʻia Farms as well. Keʻeaumoku emphasized that if an easement were to be established through the County and Kamehameha Schools, that access should be maintained for cultural and traditional practitioners. Notably, Keʻeaumoku and his group go mauka to Paʻupaʻu periodically to clean the area and one of the access routes is near L-2. Keʻeaumoku described that they go through their road in Kauaʻula, around the property, and then straight up to Kuʻia. He wants to ensure that if an easement is developed, their access is maintained.

Risk of Fires

In addition to potential harm to cultural resources, Keʻeaumoku shared that there would be a greater risk of fires with more people accessing these mauka lands. He shared that the last three fires in the Lāhainā area were said to have an undetermined source. Keʻeaumoku explained that stopping the general public from accessing these areas would help narrow down a fire source if

and when it happens again. For example, he shared one event where he and his family had to confront 18 off-wheelers who wanted to go joyriding in the mountains. Keʻeaumoku explained that when vehicles like that are riding across dry plains, the catalytic converter heats up and causes a fire risk. Additionally, he noted that there is a sign saying "high potential risk of fires" and "do not trespass" at the entry gate to the area, which should deter users. Keʻeaumoku hopes that the County can create a caveat to protect the areas from general public access.

Richard shared his experiences with a tour company that would ride buggies and trucks near the perimeter of his ranch land. He explained that he noticed fireweed seeds in their tire tread, which is poisonous to livestock, thus creating a threat to Richard's cattle. After a rain, he noticed fireweeds growing and immediately took to burning them to rid of the plant. Richard emphasized that anyone who accesses the mauka lands need to stop at the barn below before to clean their shoes and their vehicles to prevent invasion of foreign plants.

Richard shared that he wrote a letter to the County previously requesting for rules to be put in place that would require 50+ acres of land to have firebreaks or irrigation to mitigate the risk of fires. He described his experiences with houseless individuals leaving rubbish behind and starting fires.

Regarding Well Site L-3

The group expressed a consensus of concern regarding the elevation of well site L-3. At 390 feet, they mentioned the likeliness that the well would draw salt water, thus defeating the purpose of the well.

Susan shared specific concerns regarding well site L-3 in the Waineʻe Ahupuaʻa. She understands the project's intention to replace surface water in Kanahā River; however, she questioned why Kauaʻula River isn't being considered and why water is proposed to be taken from Kauaʻula's ahupuaʻa to feed another. She emphasized that the flow of Kauaʻula River doesn't reach the ocean. Susan shared that she and her family along with other families along Kauaʻula River irrigate the water for loʻi kalo, but always route it back into the river.

Also regarding L-3, Kapali stated that Waineʻe is pretty tapped out of water. He explained that Launiupoko is historically not a significant source of water, so the consistent drawing of water from this ahupuaʻa is an abuse of the resource in his eyes. Kapali added that digging more wells and drawing more water is egregious upon what has already been taken from the ahupuaʻa.

Keʻeaumoku shared that upon accessing well site L-3 and adjacent spaces, he found a rather large rock, described to be as large as a school bus, covered in petroglyphs. He has a significant overall concern about the potential negative impacts of the project on cultural sites through each ahupuaʻa; however, the petroglyph rock is of his highest concern.

Keʻeaumoku also shared concern about including information about the petroglyphs in the report at the risk of information getting to tourists who may want to mahaʻoi, or go see, the site. Keʻeaumoku recommended a preservation buffer around the petroglyph site to ensure no

additional negative impacts. He shared the example of the petroglyph rock in the Olowalu area that has been subject to people etching their names and graffiti on the rock.

Keʻeaumoku shared that he noticed an engineer at L-3 over the course of a few days. He explained that around the bend of Kaula Road, there are dry-stack rock walls that could be impacted by the transportation of equipment and materials to the well site. Keʻeaumoku described a time when Peter Martin had previously tried to put a well next to their hydro plant and planed over an existing road without community consultation. He emphasized that the road to access the site is not guaranteed to hold depending on the kind of machinery the County needs.

Recommendations for Feasibility Studies and Water Management Concern

Richardʻs longstanding lifestyle and work in Lāhainā have allowed him to see firsthand the changes in land use and environmental impacts over time. He explained the impact of developers such as Maui Land and Pine, who, according to him, typically look for high-density, residential areas where residents can walk to and from without the need for a vehicle. Richard expressed his concern that the currently undeveloped land will be headed in the direction of development, which will increase the demand for water. He stated that water is running low at the current wells in Māhinahina for various reasons.

Richard shared an experience with Alpha, Inc. regarding a previous well being dug in Māhinahina at around 1,400 feet elevation. He described that when they were digging the second well site closest to the pine forest, Alpha was using soap to lubricate the drill. Richard witnessed the soapy water coming out as they were keeping the drill wet and the soapy water flowing into the river. At the time, Richard talked to Alphaʻs crew to learn more about the chemical uptake, or how synthetic or natural the soap was and how it would break down in the land and water. He stated that the crew wasn't sure of the nature or effects. Keʻeaumoku shared that he witnessed a similar occurrence when a well was drilled near Kauaʻula River by the reservoir in that area. They both articulated concerns about using soap as a drilling lubricant and how it could affect the land and the stream water should it get inside.

Richard shared that when the lands in Lāhainā and Kāʻanapali Moku were being prepared to grow sugar in the lower elevations, systems were developed to irrigate water. These systems utilized horizontal wells which guide the water from the wells to tunnels, to the stream, through diversions, and to the reservoirs. Richard recommended that the County monitor and assess the existing horizontal well system before drilling the new exploratory wells.

Keʻeaumoku also expressed concern regarding the number of potential well sites proposed without being certain of the current conditions of the current wells. He described that one well that's operated by Alexander & Baldwin (A&B) is "up-coning" and drawing salt. He added that Gunnar's well hasn't been fully tested. Along these lines, Keʻeaumoku described the aquifer as "beat up" because of its history of sustaining plantation wells. He questioned how the proposed wells could potentially negatively impact the aquifer further. Ultimately, Keʻeaumoku

recommended analyzing the current conditions of the existing wells, any recurring problems that could happen with the new wells and planning for more effective mitigation and management.

Richard shared his knowledge of a study done by Dr. Chen of the University of Hawai'i in the 1980s that assessed the aquifers of the West Maui Mountains. He noted that there has not been an aquifer study since then and highly recommends that a study be conducted for the entire aquifer system around West Maui Mountains, Maui Komohana, looking at the 12 separate aquifers. Richard referenced data found in Dr. Chen's study, stating that 34.5 million gallons of water per day could be drawn out from the entire aquifer system in the 1980s when the study was conducted. Next, he presented the question if the County knows what's available now in the aquifers that would determine the feasibility of digging more wells. Richard shared his experience with monitoring rainfall with gauges he set up around his land, which helps him determine where to put his cattle. Richard recommended once again for a new aquifer study to be completed to reach a full understanding of the current conditions of the aquifers.

In addition, Richard shared the importance of keeping the mauka reservoirs full of water, especially at Kahoma. He noted that they can be full without sacrificing the Interim Instream Flow Standards (IIFS). Richard went on to share strategies to maximize water retention such as avoiding taking water in the middle of the day, and instead taking water when it rains. He explained that the helicopters went straight to the reservoirs during the fire to collect water due to their quick access, which allows them to keep up with putting out the fire. Keʻeaumoku also noted that the State decommissioned a lot of the reservoirs.

Kapali and Keʻeaumoku referenced the Water Use Development Plan in their concerns that the information is 30 years old and outdated. Kapali shared his thoughts that the County has to be held accountable to the community regarding how they extract water and for what purpose. He suspects the well water will serve future development and questioned how the County plans on ensuring there is sufficient water and resources for current residents and houses in Maui. Keʻeaumoku shared that the existing well at Kauaʻula is temporarily fixed and only has a minimal amount of water coming out. He also questioned if the proposed exploratory wells are being drilled for future developments. Keʻeaumoku recommended an advisory board to be put together to manage the well development and community consultation moving forward.

Recommendations for Additional Outreach

The group recommended the following individuals for further consultation: Glenn Kamaka, Kekai Keahi, Archie Kalepa, Felimon Sadang, Kaipo Kekona, the Kaina ʻohana, the Casco ʻohana, and Lopaka Wilson.

4.2.2 Kekai Keahi and Leonard "Junya" Nakoa

Kekai Keahi is a kupaʻāina of Lāhainā Moku. His family grew taro and originates from Halona, Kanahā, and Kahoma, where he was raised. Mr. Keahi's grandfather's mother is Emily Haiakekai, and her father is Pili Haiakekai, whose father is Haiakekai. Haiakekai is the original descendant

from whom Mr. Keahi and his family inherited the lands they call home. Their land is located in Paunau in Panaʻewa, in Kanahā. Paunau is also in Kahoma. Their family has a graveyard in Kukuikapu where the two rivers of Kanahā and Kahoma meet. Mr. Keahi shared that his family was responsible for ensuring that Lahainaluna had access to water as far back as 1831. Furthermore, Mr. Keahi shared that his family was the only family that was able to retain their land, whereas the lands of other ʻohana were taken by the plantation. Mr. Keahi shared that Halona was known for a rare tree called uhiuhi (Mezoneuron kavaiense), which has a dense hardwood.

Speaking for the Panaʻewa and Paunau areas, Mr. Keahi explained that he could foresee problems happening if new pipes and powerlines were installed in the project areas including having to work with people unfamiliar with the moku and managing unwanted access to Halona (i.e., trails and bikers). He also noted that there could be detrimental effects to resources including contaminated water, and decreased stream flow in Kahoma and Kanahā streams. Mr. Keahi explained that particular attention should be given to gaining areas (where water enters the stream and makes a spring) and losing areas (water going back down into the ground as recharge) that the wells will affect. He went on to explain that for every one foot of water pulled out of the well, salt water infiltrates 40 feet inland. Water is being pulled out faster than the rain can refill it. Mr. Keahi stated that it takes 16 years for water to percolate back down in the ground.

Mr. Keahi shared his concern for the sustainability of the Launiupoko aquifer. He explained that a sustainable yield for the Launiupoko aquifer would be 6.6 million gallons of water; however, the aquifer is currently running 10 million gallons of water, 4 million gallons over what is considered the sustainable yield.

Once water was established in Kahoma, Mr. Keahi described two incidents that occurred. A storm plugged up the intake area managed by West Maui Land Company and forced the water back to the reservoirs, which drained/dewatered the entire Kahoma stream. He stated that 80% of the native stream life was lost. The land of the intake area is owned by Kamehameha Schools, which allows West Maui Land Company to manage the intake (who also takes plenty of water on the whole side of West Maui in the first place). The second incident is when one of West Maui Land Company's shareholders used the reservoir as water slides for tourists by opening up the entire intake system and de-watering the entire stream, losing another 80% of native stream life. Mr. Keahi emphasized that the Kahoma and Kanahā streams are contentious and fragile; the streamflow is not like Honokōhau or ʻĪao.

Exploratory well site L-1 is located near Halona Stream, which is right on the ridge between Kahoma and Kanahā Valley. Mr. Keahi noted that this distance could be a losing reach. He shared that Kahoma tends to gain some water at Halona. So in that area, it may be gaining. In Kanahā, he feels it's a losing area. Mr. Keahi explained that when the 1.5 million gallons of water are put back in a stream, water will be lost to recharge, so by the time water reaches down at the confluence at the Kahoma and the Kanaha junction, it's not going to be that 1.5 million gallons. He estimates they might lose 500,000 gallons or so until it joins up with Kahoma right above the

bypass bridge. He described Kahoma as kind of a gaining area that probably would be affected the most.

Regarding stream life, Mr. Keahi shared that he and his ʻohana ended up restocking about 12,000 to 15,000 hīhīwai and ʻōpae to Kahoma Stream; however, the ʻoʻopu returned to Kahoma stream all by themselves. He noted that it's only a matter of time before Kanahā Stream will also be re-populated. The loʻi kalo in Kahoma have been restored and now the loʻi kalo in Kanahā are the next to be restored.

Mr. Keahi shared his concern that private wells in the Lāhainā Moku are lacking governance by the State of Hawaiʻi. He explained that during times of water restrictions set by the County for residents, private wells don't heed to the restrictions. Instead, private wells continue to water golf courses, make sure swimming pools are full, and that hotel rooms have water for showers and toilets for tourists.

Mr. Keahi shared that he feels the only place the water can come from is Kāʻanapali Moku. Water originally slated for the Hawaiian Homelands subdivision was given by the County to build Kāʻanapali Ocean Resort and the hotels at Puʻu Kekaʻa/Puʻu Koliʻi. Hawaiian Homes were stuck without water and needed to come up with $20 million to find another water source.

Mr. Keahi explained that the County needs water from Kanahā to dilute already contaminated water containing chlorides from existing wells. He also shared that the Waipuka and Kanahā wells' salinity levels exceed the Federal standards by about 650 parts; 250 is allowable. He noted that almost all the wells in the Launiupoko Aquifer have high chloride levels. With this in mind, Mr. Keahi opposes the "restoring of stream flow" by putting contaminated water back into Kanahā stream. This would negatively impact all stream life such as ʻoʻopu, ʻōpae, and hīhīwai. After getting water back in Kahoma stream, Mr. Keahi shared that it took six to eight years to saturate the stream enough where it could flow down to the muliwai where the water was clean and cool.

Furthermore, Mr. Keahi noted that digging wells was not a part of the plan put forth by the water commission. The state said that 1.55 million gallons from the Kanahā stream were going to be put back into the stream, but not from another well. He noted that West Maui is a designated water management area, and the plan is illegal if the County plans on sourcing more water for public consumption from any of the exploratory well sites, rather than just restoring the streamflow. Furthermore, Mr. Keahi shared that the water being put back into Kanahā stream should be used to maintain the families and resources already in the area, and not allow for the issuing of more building permits.

Mr. Keahi noted that the solution to the exploratory wells project is to talk to the public first. He has not heard of a public meeting on the project and highly urges the County to schedule public meetings on Zoom or in person so that the community can share their thoughts. Mr. Keahi described the Lāhainā community as tight and close-knit. They defer to residents from the

specific moku, do not speak on the other's behalf, and are prepared to protect their resources. Public meetings would allow for the right discourse to properly address this project.

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Leonard “Junya” Nakoa is also a kupaʻāina of Lāhainā. He shared that in a County budget meeting the previous week, the water company shared that they will be building more wells in Lāhainā. Mr. Nakoa’s concern is that they were content to talk about more Lāhainā wells in the budget meeting, but have not attempted to talk with the Lāhainā community about them. He shared that this feels sneaky. A public meeting should be scheduled to address the Lāhainā community’s questions and concerns.

Mr. Nakoa shared frustration with West Maui residents having water restrictions while witnessing no restrictions for hotels, and the lack of affordable housing for residents. Mr. Nakoa shared his opposition to this exploratory wells project and strongly urged the County to hold a public meeting in West Maui.

4.2.3 Kekai Keahi and Kanoelani Steward

Kanoelani Steward was born and raised in Lāhainā. She is currently a *kumu Kaiapuni* at the Lāhainā Intermediate School. She paddled canoe her whole life, where Kekai Keahi served as her paddling coach. After graduating from high school, Ms. Steward went to Oʻahu and Hilo for college and returned to Maui after earning her degrees. While being back in Lāhainā, Ms. Steward became closely involved in community issues happening in the community, especially issues relating to water. Around that time, she was working with The Nature Conservancy, where her projects were focused on the water throughout West Maui. The interim instream flow standards (IIFS) that exist today are part of the work that was done while she was involved. Ms. Steward explained that ever since then, issue after issue needed to be addressed including water, beach restoration, development, marginalization, and the like. Her Master’s degree was focused on water issues and the historical information presented in the Hawaiian language newspapers.

Ms. Steward shared that she feels Kahoma is relatively untouched aside from where they are building. She shared that there are many archaeological sites she has visited alongside Huliauapaʻa and Nohopapa to do a visual assessment. In those sites were a few heiau and too many *pā* pōhaku (rock walls) to count. Ms. Steward described that they were uncertain if the remaining walls were from abandoned loʻi as a result of water access being taken away, or if they were from houses or housing areas. Going further up the valley, she described that it was evident that the area produced a great amount of food for those who used to live in that space, which is linked to the historic abundance of freshwater from the Kahoma Stream. With this in mind, Ms. Stewards emphasized the likeliness of there being water at L-1; however, the well would mimic the historic negative impact of the sugar plantations on the freshwater resources in the Lāhainā area.

Ms. Steward shared that she participated in fish surveys throughout various streams in West Maui including Kahoma, Ukumehame, Olowalu, Kauaʻula, Honolua, and Honokōhau. Kanahā Stream was too dry to do any surveys on fish. In their last survey, Kahoma was the only one that contained all five ʻoʻopu species: kupa, naniha, nākea, ʻalamoʻo, and nōpili. She credited the restored streamflow in Kahoma and the new IIFS to the ʻoʻopu returning to the streams.

Ms. Steward mentioned that different mele, like Lei Nahonoaopiʻilani, speak of maile growing at Halona before, although she has not seen some personally currently.

Ms. Steward shared that she feels there are many undocumented wells, including privately owned wells, that go against water being a public resource. Even though wells may be private, they should not be privately utilized water. She explained that the county should be looking into these undocumented and/or private wells and take them back as a public resource. If there is difficulty in finding out where these wells are, the county can then turn to CWRM, especially because of the designation in West Maui. Ms. Steward wondered about the purpose of "exploring" areas for more wells that the community isn't in support of, when there may already be areas already available for wells. She added that the county should look into who is using the water from Kanahā Stream now and prioritize those public users over upcoming development.

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Mr. Keahi shared that his family land stretches mauka to makai, which includes the Kalepa, Haia, Kailihou, and Keahi families from Hālona, Kahoma, and Kanahā. They still reside in the area and engage in their cultural practices and care for their cultural resources. Out of all the kuleana lands in Kahoma, only the Keahi and Kalepa families have clear titles to their properties. There are dozens of other kuleana landowners who are still trying to get their land back from the plantation that sold their lands to West Maui Land Co. The removal of access to freshwater forced people off of their lands.

Mr. Keahi's family was the last to raise taro up until his eighth grade or freshman year of high school. They are getting back to raising taro now when they can. He described his upbringing as mauka and makai. At his family's house on the beach, they would jump into the ocean, and at his family's house up mauka they would jump from the backyard into the river. Mr. Keahi's family members are interred at their mauka home and there is also a birthstone where upon his tūtū and her generation were born.

Streamflow Restoration Efforts and Initial Project Concerns

Referencing the Ka Paʻakai Analysis, Mr. Keahi began sharing about the potential cultural impacts the proposed projects may have on the areas in Lāhainā. He explained that Māla is the place where Kahana, Kahoma, and Hālona streams flow to the ocean. Kahoma Stream was the first that he and fellow community members, like Ms. Steward, fought to restore mauka to makai streamflow. In the same area near Māla, it is called Kapunakea. Mr. Keahi shared that his grandma explained the meaning of the name Kapunakea is a vast, freshwater spring. His

grandma's house is on the beach in Kapunakea, and water bubbling out of the sand can clearly be seen during low tide. Mr. Keahi is concerned that the lack of freshwater reaching this place would negatively affect the limu (seaweed), since the limu is dependent on freshwater to thrive.

There is a new skimming well at Waineʻe that was established by the West Maui Land Co. about a month prior to this interview. Once that well was established, Mr. Keahi shared that the spring in front of Keʻeaumoku Kapu's place at Nā Aikāne o Maui dried up. The skimming well is likely pulling less water than planned for the proposed wells in the project. With that being said, Mr. Keahi is highly concerned about how the proposed wells could also dry out the current freshwater springs in Lāhainā. In addition, he described both Launiupoko and Honokōhau aquifers are maxed out in terms of how much water can be pumped out of the ground. He is concerned that there won't be enough water for everyone once the pending projects and developments are approved and completed.

Since L-1 as a potential well site is likely to disrupt the connectivity of water for Kahoma Stream to reach the muliwai, Mr. Keahi emphasized that it would affect the IIFS and should be taken off the list of potential sites. Furthermore, the impact in question should be brought to the Commission on Water Resource Management (CWRM). The proposed project's goal to meet the IIFS in Kanahā Stream should not affect the IIFS in Kahoma Stream.

Regarding L-3, Mr. Keahi explained that the site is likely going to hit salt water at its low elevation, especially since there are other wells hitting salt water further mauka.

Regarding the return of water to Kanahā Stream as proposed by the project, Mr. Keahi emphasized that it is a restoration of following the law that hasn't been followed for years. The return of 1.5 million gallons of water to Kanahā Stream is not a benefit in his eyes, but rather something that should have been done and water that should not have been taken in the first place. Knowing that the public depends on these waters, Mr. Keahi explained that the county approved more water permits than the actual water system could supply. He shared about a huge new apartment building that just got developed in the last two months and another upcoming development project of rental housing. Before the projects started, Mr. Keahi and other community members asked the county where the water would come from, knowing the supply was already low. He referenced Catalina Island, where the amount of water and rainfall they receive determines how many people can live on the island, knowing that resources are limited. Hawaiʻi should be approached in the same way, where resources should be understood as finite. Mr. Keahi described that people move to Hawaiʻi with a "continental ideology" that resources are limitless, and that desalination of ocean water will solve the water shortage, and yet there is no stop to exhausting the resources. He also described the fact that there are more Native Hawaiians living outside of Hawaiʻi than within the islands. This exodus, as he calls it, is a major negative cultural impact of resources being mismanaged and people having to leave their homeland just to afford to survive. In addition, another cultural impact is the people who do leave Hawaiʻi will feel more at-home on the continent rather than on their ancestral lands.

Aquatic Life and Resources

Mr. Keahi shared that he and other community members did multiple restocking efforts of hīhīwai and ʻōpae in Kahoma Stream by bringing some over from East Maui. Their efforts are continuing. They release the hīhīwai and ʻōpae at the muliwai and about a mile up from the bridge that crosses over Kahoma.

After the return of Kahoma Stream's flow, within a few months, Mr. Keahi shared that they started to see a return of several fish such as ʻanae, āholehole, ʻōʻio, and enenue. His family house is at Māla, on the beach, right next to the muliwai of Kahoma, Kanahā, and Hālona. He was raised in this house and has been fishing and diving from these waters since then and to this day. Mr. Keahi shared that during his father's time, they never saw enenue in the area near their home since the estuary was dry and the enenue fish relied on freshwater to spawn. Today, the school of enenue fish was so big that Mr. Keahi's father, who is now 85 years old, thought that something was wrong. Mr. Keahi described this experience as a "sliding scale", where each generation is accustomed to the level of resources during their time, rather than seeing the larger decline of resources over time. In this case, the scale was reversed, and Mr. Keahi and his father saw the return and growth of resources. He mentioned two types of ʻōpae that they saw return to Kahoma as well. In short, Mr. Keahi shared that when you give life a chance, it rebounds and returns in a relatively short time.

Mr. Keahi shared two incidences where the mismanagement of the water intake by West Maui Land Co., had extreme negative impacts on the natural resources. One incident occurred when the Kahoma Stream dried up, and they lost 80% of the aquatic life in Kahoma. The second time, a West Maui Land Co. owner shut off the intake to the stream in order to fill up his reservoir and more aquatic life was lost. Mr. Keahi noted that the second incident happened after the IIFS was established. Within these two incidents, 15 years' worth of work to restore the native aquatic species was lost. With this in mind, the concern is high for how L-1 could cause similar damage to the streamflow, the aquatic life, and the community's restoration efforts.

Regarding Well Site L-1

Regarding the proposed well sites, Mr. Keahi shared that he is only comfortable speaking for L-1 directly since he is only from that area. Even though there are multiple people and areas involved, they respect one another and the decisions they make concerning where they are from. They don't speak for someone else's home. He shared that he is not against necessarily finding a source of water, it's more about where the water comes from, the effects, and how many effects will be allowed to happen if the project moves forward. He hopes that the community voice had more weight and influence on a project, rather than being dismissed and mitigation to happen. With mitigation, there is still a loss.

Mr. Keahi described that L-1 is near where he and other community members are seeing water coming back out of the ground in the streambed. So, he assumes that if L-1 was established, the spring water would stop coming out of the streambed. Before they were able to get more water

released into the streams, Mr. Keahi explained that water would run at the confluence of Kahoma and Hālona streams. However, going further up the streambed is dry. With that in mind, he shared that there could be a direct correlation between L-1 and the potential to cause the water in the area of Kahoma and Hālona streams to dry up. If there is no continuous water flow down to the ʻauwai, then it would have a direct negative impact on the aquatic life in those areas. With the spring coming out of the streambed and with the water being released at the top of the streams, it's about 500,000-1,000,000 gallons of water coming down, which is just enough to reach the muliwai. If that streamflow is stopped by the well installment, and the water can't reach the muliwai, Mr. Keahi explained that the ʻoʻopu won't be able to spawn and migrate up and down the stream. In addition, the disruption of water flow would prevent water from reaching the taro patches along Kahoma. He stated that out of all the proposed well sites, L-1 would have the most negative impact on cultural and natural resources, and therefore is the well site he most opposes.

Regarding access to L-1, Mr. Keahi shared that it's not easily accessible and that a road would have to be bulldozed to get there. He also shared that he used to hunt in those areas frequently and recalled lots of uluhe fern and cow trails. Ms. Steward added that access to the site alone has a negative cultural impact. Notably, Mr. Keahi presented the question of how the county will get access to the well sites since they will have to go through their kuleana lands. They fought to get the water back because it is law, but they shouldn't have to be the ones to pay for it by providing access.

Water Restrictions: Residents versus Resorts

Looking at the project area map, Mr. Keahi noticed the gap between Panaʻewa (L-3) and Mailepai (H-1 and H-2). Knowing the area is made up of primarily hotels and resorts, he questioned why those areas aren't also being considered for well sites. He explained that residents are under water restrictions and are faced with fines if they use excess water by the county. However, simultaneously, the hotels and resorts in Kāʻanapali are exempt from this. Swimming pools, ponds, showers, golf courses, landscaping, and all hotel amenities have no restrictions on water. Mr. Keahi stated that it seems as if the residents and Hawaiians are targeted to endure the hardships of less water.

Furthermore, Mr. Keahi noted that water is a public resource that should never be privatized. It should always be managed by either the county or the state and if that's the case, there should be no difference between pumping water from the wells that supply water to the resorts and taking water from new wells in the Panaʻewa area. They all come from the same water source and the same aquifer. If residents who use this water are put under restrictions, why aren't the hotels under restrictions too, since they use the same water sources? The tourists in hotels get to swim in the pools while residents struggle to water their yards and wash their cars for fear of being fined. Mr. Keahi described the situation as a double standard.

Mr. Keahi shared that he is fighting now so that his kids do not have to fight as hard to ensure they have water to drink. On the other hand, his father's generation was used to not grumbling or saying anything. Mr. Keahi emphasized that the act and intent of passing down culture, wisdom, knowledge, and language is a cultural tradition, but so is passing down the weight of their responsibility to care for the land and resources.

Lastly, Mr. Keahi shared that when he and other Native Hawaiians share at community meetings about their cultural/historical experiences or knowledge passed down from their parents or grandparents, it's perceived as mythological rather than factual. However, when others share the same thing, it's taken seriously. This is a reason why Mr. Keahi shares that the community is vigilant, cautious, and sometimes aggressive when sharing their concerns, but simultaneously they fight hard to protect their land and resources. Lāhainā is the first place in Hawai'i to have a water designation for their stream and groundwater, and for all of their streams to be restored. They fought for 17 years to see these changes and Mr. Keahi stated they would continue to fight.

4.2.4 'Ekolu Lindsey

'Ekolu Lindsey is a lineal descendant of Lāhainā Moku and the president of the nonprofit organization Maui Cultural Lands. Mr. Lindsey's primary concerns around the project are the potential impacts on cultural aspects of the proposed well sites, and access by the community to these sites.

Mr. Lindsey hopes that proper Best Management Practices (BMP) to minimize any sediment release into the stream or the ocean will not only be outlined, but implemented. He expressed that BMPs are often put in place at the beginning of a project, but never maintained. Sediment caused by any development in the mauka areas flows down through the streams to the ocean, negatively impacting the coral and reef ecosystems. Mr. Lindsey noted that the coral and reefs are considered cultural sites. Living on Front Street by the ocean, he is able to witness how dirty the ocean water gets due to the influx of sediment erosion, notably after the fires. Well-outlined and implemented BMPs could greatly improve this issue.

Mr. Lindsey shared that there is a women's heiau located mauka in the ahupua'a of Launiupoko just beyond the site at L-3 that needs to be accessible to cultural practitioners and community members. Although he mentioned that there is no name, he did recall there being a Walker Site number associated with it.

Mr. Lindsey shared that various other landowners in the project area and surrounding areas have also requested to install backup wells. He explained the analogy that there are a lot of straws going into the same cup. Although it can be understood that each valley has its own primary water source, the amount of water proposed to be taken from the collective of all the requested or proposed wells is concerning. Private water companies are looking at digging three backup wells. He also asked if there are caps on the amount of water that can be drawn. His primary concern is that more accessible water (via wells) means more development.

Although Mr. Lindsey couldn't speak to exact cultural historical sites in the areas of H-1 and H-2 proposed well sites, he did mention his experience with Honokōwai Stream and the Department of Hawaiian Home Lands and their need to dig new wells.

Mr. Lindsey explained that it takes about 25 years for rainwater in the mountains to accumulate and percolate the aquifer. Taking into consideration the 5 years that West Maui has been in a drought, the loss of canopy, and the foraging of ungulates, it seems to him that "they are shooting themselves in the foot" by allowing so many wells to be dug in West Maui.

He expressed that well water tastes better and requires much less treatment than surface water. However, he does have concerns that drawing too much water via wells will damage the aquifer, negatively affecting cultural sites and the future availability of water for the community.

If the construction of the proposed wells moves forward, Mr. Lindsey is concerned about the introduction of invasives to the landscape that can come from equipment, trucks, and people accessing the sites up in the mountain. Any seeds that get brought in could easily take over native plants and resources in the area.

4.2.5 Kaimaile Makekau and Leonard "Junya" Nakoa

Kaimaile Makekau is a lineal descendant of the Pākī ʻohana and resides in Kāʻanapali Moku. Ms. Makekau shared various potential impacts on cultural resources and practices in areas adjacent to and nearby the proposed project sites of H-1 and H-2. Notably, the moʻowahine Kihawahine, stream life, freshwater use, and various agricultural and aquacultural resources for subsistence, along with concerns regarding water management, distribution, and scarcity. She stated that she opposes the proposed exploratory wells in both Launiupoko and Honolua aquifers; and any water well development. Ms. Makekau also opposes any entry to the private crown easements of LCA 11216.

Ms. Makekau shared her concerns about if there is the extraction of water out of the aquifer, it will drain and affect the surface flows of the streams, watersheds, and therefore Kihawahine. She emphasized that the watersheds/aquifers throughout the island are what keep the island healthy. After a previous water diversion, she shared her experience of watching ʻoʻopu, ʻōpaenui, and hīhīwai take their last breaths. She described an empty punawai left behind with thousands of shell remains.

Ms. Makekau described the streams and springs as the cooling system of the geothermal energy and lava deep below the earth's surface; therefore, she noted that if the springs are drained, the heat will increase. Furthermore, Ms. Makekau explained the rapid decline in the health of the atmosphere, coral reef systems, stream life, and the ocean; noting global warming as one factor. Ms. Makekau added that if the water systems are not properly managed and monitored, the draining of the aquifer could possibly drastically tilt the Earth's axis and cause an immediate ice age.

In terms of cultural and environmental impact, Ms. Makekau shared that anything water-related impacts culture. Notably, Ms. Makekau shared that Hawaiʻi is not growing food for kamaʻāina, but rather she feels there is catering to the demands of hotels and the tourist industry. Her concern is that keiki and generations after won't have the chance to taste ʻoʻopu, hīhīwai, and ʻōpae due to the development or mismanagement of lands. Water is the most valuable and powerful thing in Hawaiʻi.

Ms. Makekau shared her concerns if the current and any newly developed water wells will be properly monitored to ensure they don't get over-drained or depleted. She strongly advocated that any wells need to be monitored correctly by people who truly care about the environment and its resources and not those who prioritize profits.

Ms. Makekau also shared about the subdivision Plantation Estates that was developed above Honolua. She explained that Hawaiians previously diverted the rivers specifically so that the red dirt doesn't run off into Honolua Bay. However, Ms. Makekau explained that the river was filled by the developers of Plantation Estates, which caused red dirt to run off and fill Honolua Bay for 10 weeks following Hurricane Lane. Ms. Makekau shared that she dives Honolua Bay and ʻĀhīhī Kīnaʻu frequently, but the runoff damaged the coral reefs significantly. She continued to share her concerns that any diversion of water flow or draining of water could interrupt the mauka to makai flow, which will negatively impact the coral reefs. The coral reefs are already susceptible to the effects of mismanagement of waste and chemicals.

Ms. Makekau's final concerns are about the mismanagement of all natural resources that could have detrimental effects on future generations of people in Hawaiʻi.

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Leonard "Junya" Nakoa is a community member of Lāhainā. He shared his agreement with Ms. Makekau that the less freshwater that goes to the ocean, the more negative impact on stream life and ocean life. Mr. Nakoa also shared his concerns that water is being distributed unfairly on the West side of Maui; it seems water is being prioritized for hotels, golf courses, pools, and the wealthy, rather than for the local residents. He shared that another community member in Honokōhau explained that the only way the Honokōhau community would share the water from their valley, is if it's going to the Hawaiians and local residents specifically.

4.2.6 Tamara Paltin

Tamara Paltin moved to Maui in 2001 and moved to West Maui in 2002. She worked for about 20 years as an ocean safety lieutenant in Honokahua near D.T. Fleming's beach. Ms. Paltin's husband's grandfather used to farm in the Panaʻewa area before Hawaiʻi became a state. She shared that Hans Michael married her husband's aunty, Emily Neizman, and he eventually gained a lot of the Neizman's family land. Kapali Keahi's father Moon; however, did not sign over their family land to Mr. Michael. Ms. Paltin went on to explain that Mr. Michael has goats in the

Panaʻewa area that naturally created an access trail. Eventually, he only granted exclusive access to the lands mauka of his area to the County and not to the Neizman families.

Ms. Paltin shared that she heard the name Kanahā refers to 40 ponds that used to exist in the mauka areas of Kanahā Stream. From those ponds and through the underground waterways, the moʻo Kihawahine could travel from Kanahā all the way to Haneoʻo in Hāna and to Mokuhinia Pond in Lāhainā. The moʻo also had a connection through the waterways to Violet Lake or Kiʻowaiokihawahine located near Puʻu Kukui.

Ms. Paltin shared that she had learned the whole Kuʻia area had ʻulu trees, which lent to the poetic description of Lāhainā, "malu ʻulu o Lele". However, a fire had burned most of the ʻulu trees and by then the majority of the water had already been diverted for the plantations.

Ms. Paltin also frequently helped the Palakiko family in Kauaʻula and their loʻi kalo restoration efforts. Around 2007, they successfully restored several loʻi kalo; however, a significant decline in water caused many of the loʻi kalo to rot. Ms. Paltin described that some of the community members were upset and frustrated at this loss of water. The group of people that worked to restore Kauaʻula then moved to work in Honokōhau instead, since their water levels weren't an issue affecting their loʻi. After some time working in Honokōhau, a similar incident happened where the water was shut off and loʻi could no longer thrive. Ms. Paltin shared that she eventually stopped going to Honokōhau and is uncertain if people continued on.

Ms. Paltin shared that the loʻi kalo in Honokōhau gets the water directly from the Honokōhau Stream; however, a few storms around 2019 caused the streamflow to get blocked off. Shortly after, Maui Land & Pine Co. Inc. had changes in leadership and decided to close the intake to the stream. The loʻi then became dry. Landslides in the area also caused the traditional ʻauwai to get blocked off. Ms. Paltin considered if using machinery would be useful in clearing the ʻauwai, but she deemed it too precarious and suggested that maybe the water needs another route to flow.

Ms. Paltin shared that the loʻi kalo she helped to restore in Lāhainā Moku retrieved most of its water from Kauaʻula stream; however, they also had a hose left on and placed in the ʻauwai system to supply extra water needed. She described this as near Charlie Palakiko's place, on the north edge of Launiupoko, close by where the 2018 fire happened.

She also described dikes in the stream from where the water comes out from. This water is colder since it's not as exposed to the sun. Along the Kauaʻula ʻauwai was shadier, so the water was able to stay cool; however, in Honokōhau, the stream doesnʻt have shade covering and the flow wasn't as consistent due to diversions, making the water warm. Ms. Paltin emphasized that kalo won't grow well in warm water.

Ms. Paltin shared that she had communicated with the kuleana landowners in Kahoma and Kauaʻula regarding the most recent fire because the County wanted to shut off their water again to fill up the reservoir. The reason behind this was so the helicopter could dip buckets of water out of the reservoir if a fire happened again. The plan included turning the water back on in the

dark when the helicopter wouldn't be flying. However, Ms. Paltin explained that it took a long time for the stream water to return because it takes time for the water to percolate down to the ʻauwai from the original source. She also shared that the kuleana landowners relied on the stream water to protect themselves in case the wind shifted during a fire. Ms. Paltin hopes that more communication with the fire department can clarify that from the time when they turn the water back on, it takes a few hours for it to reach the families and in that duration of time, they're solely reliant on the county to help with firefighting efforts.

When more water was released in Kahoma and Kauaʻula streams by the County, it took almost a couple of years for it to reach the ocean because the land was soaking it up. After a couple of years, it started to have like steady stream flow from mauka to makai. Then they started to see more fish in the muliwai area.

Kanoelani Steward was working with Uncle Skippy Hau in the Honokōhau, Kauaʻula, and Kahoma areas to assess stream life. Once the streamflow was restored, the two of them found different types of species of ʻoʻopu in the Kauaʻula and Kahoma streams, even though those species weren't present in those streams before. Ms. Paltin spoke to there being resiliency in the original, natural water systems allowing for this to happen, even though the streams had no direct connectivity to one another.

As a Maui County council member, Ms. Paltin shared that she did not vote for any developments in the Olowalu, Makila, or Launiupoko areas because she knows that water is a concern. She shared that she receives calls from the people who are living in these areas, explaining that they don't have sufficient water. The residents are placed on a watering schedule for agricultural use, either Monday-Wednesday-Friday, or Tuesday-Thursday-Saturday, and sometimes the water doesn't come through. Ms. Paltin shared concerns if the wells were developed at L-2 and L-3, then it would lead to more development.

Ms. Paltin shared that L-3 wouldn't be an ideal location for a well site since the transportation of water back to Kanahā Stream would be inefficient and costly. She also wondered if the water taken from these wells would have to be taken to the water treatment facility at Māhinahina to be treated prior to being put into Kanahā Stream.

Regarding the alternate well sites, H-1 and H-2, Ms. Paltin shared that there are a few other entities that have expressed interest in digging wells in the same areas in Kāʻanapali. With that in mind, she explained that it may be better to combine their resources to dig a well and divide the water distribution from one place. She also added that sites H-1 and H-2 have a more direct, and therefore efficient, path to the water treatment facility in Māhinahina.

Thinking about recommendations to best monitor the new well development if the project continues, Ms. Paltin shared that a public-private partnership with some of the families in the project site areas might be best to hold the county accountable for any impacts the wells will have on the land and resources. She also explained that some of the community members should

have access to these sites and could possibly assist with monitoring to the extent of involving students from Lahainaluna High School as a school project in the school year or over the summer.

Ms. Paltin recommended reaching out to Kekai Keahi, Mark Palakiko, Glen Kamaka, the Kaina family, Silla Kaina, and Kanoelani Steward for further consultation.

4.3 SITE VISITS

A total of two site visits were conducted with community members and with staff members of ʻĀina Archaeology- one to Kāʻanapali Moku and one to proposed well site L-3 in Lāhainā Moku. A description of attendees and a summary of each site visit are provided below.

4.3.1 Site Visit to Kāʻanapali - May 9, 2023

Community Attendees: Kaimaile Makekau, Kalai Kahookele, Lono Kahookele Paki, Cherlyn Tachera, Gerald Ponce, Lokahi Sylva, and David P. K. Makekau

ʻĀina Archaeology Staff Attendees: Tanya Lee-Greig and Kaiani Kiaha

The site visit on May 9, 2023 took place in the moku of Kāʻanapali, where the group was led by Kaimaile Makekau to various locations ma uka of Kapalua Airport. Ms. Makekau shared extensively about her experiences related to water diversions and erosion and their negative impact on stream life, such as ʻoʻopu (goby), ʻōpaenui (shrimp), and hīhīwai (gastropod), and the reefs and marine life in Honolua Bay where she frequently dives and fishes. She also shared her goals to farm on her lands in Mahinahina. Ms. Makekau emphasized the significance of Kihawahine, the moʻo and guardian of the fresh waters of West Maui, who lives and travels through the aquifers to various bodies of fresh water. Near the valleys of Waipuilani and Kaʻawaiki, Ms. Makekau pointed out various plant resources such as lychee, guava, and kukui (I) trees, ʻaʻaliʻi (*Dodonaea viscosa*), aloe, and ʻuhaloa (*Waltheria indica var. americana*). She expressed her concern that any additional water pumping for the proposed wells may impact the ability for these plants to grow. naturally.

Lastly, Ms. Makekau shared of a previous experience near Waipuilani where a well was drilled with food-grade lubricant; however, the lubricant runoff damaged the plants and natural resources it touched. Ms. Makekau questioned the lubricant's safety. She also recalled the bothersome noise from the drilling and shared that the noise of the proposed wells may also disturb residents in nearby areas.

Gerald Ponce shared that he was a frequent free diver in Honolua Bay near the river mouth. He recalled the abundance of fish in the brackish water near the river mouth including enenue (chub fish), moi (threadfish), and kala (surgeonfish). Overtime, he witnessed a steep decline in marine life, with schools of fish dwindling from hundreds to only dozens. Mr. Ponce attributed the decrease in fish popoulation to overfishing and the increase of tourism at Honolua.

Lono Kahookele Paki also expressed his concerns about overfishing, the selling of reef fish, and overpriced fish on the market. Although loli (sea cucumber) are now banned from fishing, he

recalled a time when loli were a traditional delicacy in his home, filling buckets to feed his family. Mr. Kahookele Paki also shared his observations of the high amount of freshwater pools at residences in the Kāʻanapali moku; notably, residences owned by people not originally from Hawaiʻi. He feels that the pools along the coastline and mauka regions are a waste of the natural resource of water. Mr. Ponce agreed that allocating fresh water to these pools are a waste. As an alternative, Mr. Kahookele Paki mentioned the idea of using saltwater in pools instead to save fresh water for residents' homes.

Regarding the proposed wells, Mr. Ponce and Mr. Kahookele Paki are concerned with the potential impacts of runoff, of diverting too much water that it prevents natural and cultural resources from thriving, and loss of natural water retention in the soil, especially when there is little to no rain. Mr. Ponce recommended regulating the amount of water pumped to match the levels of rain during periods of time. This would take into consideration rainfall, evaporation, and ensuring streamflow can still reach the ocean.

4.3.2 Site Visit to Proposed Well Site L-3 – May 7, 2024

Community Member Attendees: Keʻeaumoku Kapu, Uʻilani Kapu, and Suzette Felicilda

Project Team Attendees:
Tanya Lee-Greig and Kaiani Kiaha (ʻĀina Archaeology)
Sean Ogata (Fukumoto Engineering)
Thomas Ochwat (County of Maui Dept. Of Water Supply)
Derek Butler (SCS)

The site visit on May 7, 2024, specifically aimed to assess proposed well site L-3 and the potential traditional and cultural resources in the project area. Keʻeaumoku Kapu explained that the 2012 fire in the area of the well site exposed several petroglyphs and petroglyph rocks. Mr. Kapu shared a photo of one particularly large rock he had found in and near the L-3 site with dozens of petroglyphs; see Figure 4-1 for the photo he shared. During the site visit, Kaiani Kiaha of ʻĀina Archaeology pointed out a prominent rock located in the middle of the L-3 site with at least two distinct petroglyphs. The petroglyphs were originally noted by Bob Hobdy during a site visit with ʻĀina Archaeology and SCS in November 2022. All site visit attendees saw the petroglyphs and noted their significance, observing that the location of the rock in the middle of the proposed site might disqualify L-3 from being selected.

After visiting L-3, the group stopped at a well pump site closer to the Lāhainā Aquatic Center, which is currently owned by Pioneer Mill but is not operational. Mr. Kapu strongly recommended that the County consider purchasing this well in its current state instead of digging another well in the Launiupoko Aquifer. Utilizing the existing infrastructure of this well would address most of the concerns about damage to traditional and cultural resources from the proposed well sites.



Figure 4-1: The petroglyph-covered rock found by Keʻeaumoku Kapu near proposed well site L-3

5.0 TRADITIONAL CULTURAL PRACTICES

The typical arrangement of a Hawaiian ahupuaʻa extended from the upland forested areas to several fathoms out in the ocean, encompassing cultural and agricultural resources to be cultivated, stewarded, and shared by those within the district. In *Lāʻau Hawaiʻi*, Abbott explains further that: "A Hawaiian family belonged not to a village but rather to an ahupuaʻa, a land division usually extending from the mountain heights to the sea... [which] consisted of at least one valley and included the ridges on both sides of the valley as well as the offshore area to the depth of a man's chest or to the reef crest" (1992:11). Within this mauka to makai context, a wide variety of cultural practices and rights along with their associated resources could be found. Examples of those practices, rights, and resources have been gathered during the background research, as well as through the moʻolelo and information documented through consulation, as presented above. Although they have been heavily impacted by historical events, development, and the commodification of the biocultural landscape, these traditional customary practices, which rely heavily on the protection of water resources, continue today. Further discussion regarding specific aspects and resources identified through the consultation process is presented below with a focus on the traditional and customary practices that may potentially be affected by the proposed project.

5.1 TRADITIONAL MAUKA RESOURCES

Writing in Handy et al, Juliet Rice Wichman (1965:112), gives us a glimpse into Hawaiian agriculture:

> The Hawaiians were skilled agriculturists. Possessing only the crudest of tools, the oo, which was nothing more or less than a crooked stick, they tilled the soil and raised great and successful crops of taro, sweet potatoes, and yams. They developed systems of irrigating their wetland taro. They understood how to enrich the soil and how to treat it so that its value was not destroyed. They were industrious. They performed, with regularity and dependability, the heavy labor demanded by the crops they raised with the tools at their command. But the Hawaiians were something more than skillful farmers. Their agriculture was tied up with a body of religious beliefs and observances which are, by the unthinking, sometimes labelled as "supersitions." They suggest to the thoughtful that the Hawaiians who lived close to the world of nature may have glimpsed truths to which our eyes are blind. Certainly anything which works is not superstition, and the Hawaiian agricultural practices were most effective.

The testament by Wichman speaks to the testimonies for Great Māhele kuleana claims in the project areas which included loʻi kalo and kula ʻuala. Although limited, the lack of claims outlining agricultural practices does not preclude the absence of abundant mauka resources; it allows for greater contextualization through the archaeology and consultation to represent the traditional

agricultural practices that occurred. Through the interviews above, traditional mauka resources that have been collated included ʻaʻaliʻi (*Dodonaea viscosa*), ʻōhiʻa lehua (*Metrosideros polymorpha*), ʻiliahi (*Santalum ellipticum*), ʻilima (*Sida fallax*), laʻamia (*Cresentia cujete*), koaiʻa (*Acacia koaia*), koa (*Acacia koa*), milo (*Thespesia populnea*), ʻawa (*Piper methysticum*), kalo (*Colocasia esculenta*), uhiuhi (*Mezoneuron kavaiense*), uluhe (*Dicranopteris linearis*), ʻulu (*Artocarpus altilis*), and maile (*Alyxia stellata*).

As in most of Hawaiʻi, kalo is extremely prevalent and important to the people and biocultural landscape of Lāhainā. Kalo is a marsh plant and a canoe plant, a staple food crop brought with the original people who migrated across the Pacific to settle in Hawaiʻi. Meant to be grown in wet areas, kalo initially prescribed the locations where those early Polynesians established their villages and also lent to the architectural and technological advances that came along with growing human populations (Krauss 1993:6). Beyond being a food crop, however, kalo is also considered an ancestor to the Hawaiian people. In one moʻolelo regarding the connection between kalo and humankind, Wākea and his daughter by Papa, Hoʻohōkūkalani, have a stillborn child they name Hāloanakalaukapalili, who they bury near their home and from where the first kalo plant grew. Another child was born to the couple and this boy, named Hāloa, became the ancestor to all humans, connecting the kalo, his older brother, to the Hawaiian people, his descendants (Beckwith 1970:297-298; Krauss 1993:5).

Similar to kalo, ʻuala is also a canoe plant, a few types brought to Hawaiʻi, through natural hybridization or cross-pollenation, became more than seventy varieties, which, in comparison to the nearly 300 kalo types that proliferated after settlement, seems modest. However, due to its ability to grow in less favorable soil, ʻuala was able to be cultivated in arid areas like Niʻihau, which has little water and where kalo was not grown (Krauss 1993:8-9).

ʻUlu, part of the fig family and more widely known throughout the world as breadfruit, is illustrated in its vastness throughout the Lāhainā area through the poetic references of the malu (shade) it afforded to Lele (Lāhainā) since the time of Kakaʻalaneo (see Section 3.4.3). The mythology around ʻulu regarding Lāhainā links Lānaʻi with the region through Kaululāʻau (see Section 3.4.3) while other legends trace the origins of the tree to Kū, who sacrificed himself for his wife and children during a time of famine by turning himself into an ʻulu tree (Abbott 1992:35). The Hawaiian variety of ʻulu can only be grown through root suckers as it is without seeds (Abbott 1992:36; Krauss 1993:11; Lamb 1981:29). Primarily used as a staple food due to the large, starchy fruit it gives, ʻulu has also been used for sandpaper (using its leaves), alaia (short) surfboards, and a binding agent (gum) (Abbott 1992:36, 82, 129; Lamb 1981:29). The wood of both ʻulu and ʻōhiʻa lehua were used for ʻumeke lāʻau (wooden calabashes), musical instruments, house construction, and canoe building, however, ʻōhiʻa lehua was also used in lei, as hālau hula altar plants to the god Kūkāʻōhiʻa Laka, and carved kiʻi (sacred images) (Abbott 1992:68, 81-82, 87, 114, 117, 119, 127; Krauss 1993:50, 70, 80, 118-119; Lamb 1981:29).

Straddling the boundaries between food, medicine, and ceremony, ʻawa, brought by Polynesians in its stem form belongs to the pepper family and contains relaxant and sedative qualities (Abbott

1992; Krauss 1993). As a food, ʻawa relaxed the drinker, notably used by fishermen and planters, after a long day, as a means to sleep deeply and awake refreshed in the morning (Abbott 1992:43). Medicinally, according to Abbot (1992:99), ʻawa was the sixth most commonly used medicine traditionally used by Hawaiians. Beyond the other use as a drinkable relaxant, the dried root could be blended with other substances to relieve issues with headaches, sore muscles, urination, menstruation, and congestion, and the leaves were used to induce a miscarriage (Abbott 1992:101; Krauss 1993:102). In ceremony, the plant was again used in its drinkable form, often offered to the gods, it was used in rituals and consecrations and was even known to take the place of human sacrifice (Abbott 1992:17, 115).

Abundant throughout the Hawaiian Islands, ʻaʻaliʻi is a native plant that ranges from a one-foot high shrub to thirty-foot high trees (Krauss 1993:126) revered for its resiliency as noted in the following ʻōlelo noʻeau:

> He ʻaʻaliʻi kū makani mai au; ʻaʻohe makani nāna e kulaʻi.
> I am a wind-resisting ʻaʻaliʻi plant; no gale can push me over.
> A boast meaning "I can hold my own even in the face of difficulties." The ʻaʻaliʻi bush can stand the worst of gales, twisting and bending but seldom breaking off or falling over. (Pukui 1983, ʻŌlelo Noʻeau 507)

ʻAʻaliʻi is known as a "pioneer species," often being the first plant to grow after fires and on lava fields in dryer sites (Lamb 1981:78). Consultation with community members, Kawika Lopes and Richard Iaconetti (see Section 4.2.1), provided information about ʻaʻaliʻi being used to create lei that traditionally utilize the seed capsules (Krauss 1993:77); however, the shrub's uses, due to its hard wood characteristics and proliferation through the entire island chain, was varied. The capsules of the plant were also gathered to create a red dye that would be used on kapa (barkcloth) (Abbott 1992:65). As a medium-sized hardwood, ʻaʻaliʻi trunks were straight and perfectly sized for housing construction, usually as posts like the ʻōhiʻa lehua (Abbott 1992:68; Krauss 1993:56). Abbott notes: "Almost without exception, the trees used in house building were endemic species, and this use constituted the Hawaiians' heaviest reliance on the native flora – far heavier, for example, than their dependence on native plants for food, kapa, or cordage" (1992:68).

Once reserved for the aliʻi only, lei made from the ʻilima traditionally took a thousand flowers to craft and is still a prominent choice among lei makers today (Abbott 1992:127; Krauss 1993:78). Made in the kui pololei (straight pattern) method, ʻilima lei were strung straight through the center of the flower which were picked in the early morning when the blooms were still closed (Krauss 1993:78). A practice of using warmed seawater infused with ʻilima sap as an enema for physical therapy is noted in Krauss (1993:103), but it appears is no longer administered by lāʻau lapaʻau practitioners. Also used as an occassional mild, bitter laxative and in lei was the uluhe fern, which often developed along streams and pools, becoming the shade for dragonfly nymphs (Kepler 1998:59). Mr. Keahi's home in Hālona is related to lei making and is poetically known for

the small, white roses used in lei that grew there, along with palai, a type of fern, as recorded in the mele*, Lovely White Rose o Hālona,* by Lāhainā native, Hailama Farden:

ʻO Lovely White Rose o Hālona	Lovely White Rose of Hālona
Kaʻu e hāʻupu aʻe nei	Is what I fondly recall
ʻAʻala onaona kūpaoa	How imbuing is the scent
Sweet loke hone to mine heart	Of the sweet rose resounding in my heart
Koʻiawe i ka ua Paʻūpili	The Paʻūpili rain lightly showers
Nā pali kū wehi me ka palai	The cliffs adorned with palai ferns
A lana mālie ke ʻala	And thus is carried the fragrance
O kuʻu rose aloha o Hālona	Of my beloved rose of Hālona
	(Lum and Lum 2019:149)

Perhaps the most prized vine for lei making is the aromatic maile (Krauss 1993:77; Lamb 1981:119), which Lamb referred to as "a type of lei that conveys a feeling of respect by the maker for the recipient" (1981:119). As a perfume, the branches of maile were used to scent kapa after it was finished (Krauss 1993:70). The native shrubby vine can often be found twining through native forests in lower and middle mountain regions (Krauss 1993:224) and is often represented in moʻolelo as the covering chosen by storied people to adorn themselves such as Kalelealuaka, the adventurous, supernatural warrior of Oʻahu (Thrum 1912:95). Ceremonially, in connection with hālau hula, maile was presented at the kuahu (altar) as a representation of the four kupua (demigod) sisters, imbued with the fragrance of the four types of maile they are named for and who are associated with hula (Abbott 1992:117). Similar to ʻōlelo noʻeau, mele (songs) composed about specific areas are able to indicate resources, characterstics, and place names within an area or what Lum and Lum refer to as "a capsule of artfully compressed and embedded knowledge" (2019:xi). Ms. Steward referred to the the song, *Lei Nāhonoapiʻilani* by Mima Apo, mentioning maile; the specific verse is offered here:

E ka lehua o Līhau i ka wēkiu	O lehua blossoms of Līhau at the precipice
Me ka maile o Hālona e ʻaʻala nei	With the maile of Hālona imbuing its fragrance
E haliʻa i ka wai o Keʻekeʻehia	Remember fondly the water of Keʻekeʻehia
Hui pū mai me Nāhonoapiʻilani	Coming together with Nāhonoapiʻilani
	(Lum and Lum 2019:143)

Traditionally, ʻiliahi (sandalwood) was also used as a perfume for kapa through a powder derivative from its heartwood and its wood could be fashioned into musical instruments (Abbott 1992:58, 80; Krauss 1993:70). Research of the Lāhainā area briefly referenced the transient sandalwood trade with China (see Section 3.9.1) while consultation reinforced the continued prevalance of ʻiliahi in the area, especially where the two above mentioned plants, ʻaʻaliʻi and ʻilima, grow. During the reign of Kamehameha I the right to harvest ʻiliahi was delegated to the aliʻi, who, recognizing the fragrant wood as a highly sought after commodity, began to change the relationship between makaʻāinana (the common people reliant on subsistent agriculture) and

ʻāina (Abbott 1992:132; Hammatt 1999). The movement of time and effort away from food crops toward cash crops like ʻiliahi and sugar resulted in the types of famine mentioned by Judge Kahāʻulelio (see Section 3.9.6.1) (Hammatt 1999:xx).

Of the other resources mentioned, two of the four trees, uhiuhi and koaiʻa, are considered rare and endangered (Lamb 1981:47, 48), and like milo and koa, were used in various ways including weapons, fishhooks, calabashes, tools, and canoe paddles (Abbott 1992:68, 87-88, 110-111; Krauss 1993:25, 43, 52; Lamb 1981:46, 47, 48, 86). Old growth koa, which could measure up to two meters in diameter and 20 meters in height, (Abbott 1992:80) were used to craft canoes (Abbott 1992:80; Krauss 1993:48; Lamb 1981:46). Also made from koa were the alaia surfboards that were carved from ʻulu, as mentioned previously, which were approximately two meters in length (Abbott 1992:129; Krauss 1993:96). Later, when the preferred wiliwili became too scarce to find for crafting the longer olo surfboards, koa was used as a substitute (Abbott 1992:129). Abbott reported that she discovered one canoe made from milo amongst the many others crafted from koa, but most uses of this tree were as previously mentioned, although it was also utilized, through its flowers, as a yellow-green dye for kapa (Abbott 1992:80; Krauss 1993:66).

5.2 TRADITIONAL AQUATIC RESOURCES

Use of shoreline resources and preference for residency along the coastline from before Western contact to the present is evident in moʻolelo, archaeological findings (Barrera 1989; Griffin et al. 1976), and the continuous use of fishing traditions practiced by the contemporary community (see Section 4.2). Traditionally, nearly all members of the Hawaiian population regularly participated in some form of fishing (Kahāʻulelio 2006:2). Marine fishing practices like diving, pole fishing, spear fishing, basket trapping, laying net, hukilau, limu gathering, ʻopihi picking, crab hunting, and more have been occurring for generations in the coastal regions of the project areas (Kahāʻulelio 2006). Freshwater fishing along streams and in mountain pools was mainly the task of women using their hands, sticks, and small nets (Titcomb 1972:4). Various aquatic resources are identified as being present, harvested, and valued in shoreline, intertidal, and the nearshore environments of the two moku.

5.2.1 Marine Resources

In accordance with traditional aquaculture practices, the people of Kāʻanapali and Lāhainā moku engaged in natural resource management by taking only what they needed, which resulted in an abundant aquatic system that sustained the livelihoods of the many ʻohana that perpetuate traditional practices today. The stewardship of not only the aquatic life within the water, but the water itself, was integral to the bountiful resources they nurtured. With changes to the types of fishing, technological advances, commercialization, as well as the diversion of natural waterways, the aquatic resources also changed, as Thomas Maunupau speaks to in an excerpt regarding fishing kapu in Handy et al. (1965:110, 111):

> The Hawaiians had a kapu on alongshore fishing in certain places when deep sea fishing was open. The kapu places were marked with coconut leaves. In the case of inshore fishing, one

> place was kapu for a month; then this area was opened and the next was kapu. At certain times of the year, certain seaweeds were kapu, because when fish food was preserved by this means, the shore fishing was saved for the people. There used to be plenty fish in Hawaiian waters, but these have to a great extent disappeared because constant fishing has wiped them out. The fish are gone for good unless we have closed and open seasons for different kinds of fishing. The government is trying to place certain restrictions on fishing. If the ancient form of kapu used by the old-time Hawaiians could be revived in these new governmental restrictions, we should again have plenty of fish, provided the restrictions were observed as were the kapus in the old days.

As mentioned above by Kekai Keahi (see Section 4.2.3) and Maunupau, the restoration of traditional practices and thereby, water courses, leads to the restoration of species associated with those waters which, in the case of Mr. Keahi's father's claim to never have seen enenue in his lifetime at Māla, may have been dormant for generations. The nenue (*Kyphsosus spp*), known as sea chub or rudderfish, have extremely variable colorations but tend toward gray-brown with the rare fish being entirely yellow (Honebrink 2006:159; Titcomb 1972:113-114). They inhabit turbulent waters and feast on limu kala (*Sargassum echinocarpum*) (Titcomb 1972:114). The disappearance of this species may be attributed to their method of spawning, which for sea-going chubs is in the muliwai (estruary) of their birth which, in the case of Māla, had been dry due to water diversions further inland.

Other marine fish that rely on the muliwai that were mentioned during consultation were ʻanae (juvenile mullet, *Mugil cephalus*) and the āholehole (*Kuhlia sandwicensis*) (Honebrink 2006:137). Referred to as ʻamaʻama in its adult stage, mullet was once one of the most important brackish water fish in Hawaiʻi. They were caught during spawning and placed in nearby loko iʻa (fishponds) to ensure a constant supply for food (Titcomb 1972:64). The endemic shore fish, āholehole, as juveniles, school in the brackish waters of the muliwai and can be found in both fresh and salt water (Honebrink 2006:158; Titcomb 1972:59). Once they mature, the āholehole inhabit and school along the coral reef or in lava caverns (Titcomb 1972:59). Along with being eaten raw, broiled, dried, or salted, the āholehole was also used in ceremony, influenced by the meaning of its name as "hole" is "to strip away," hoping any evil influence would be prised away (Titcomb 1972:59-60). A further ceremonial use was during construction of new homes whereby the āholehole were placed, by kahuna, under the house posts to ward off trouble (Titcomb 1972:60).

Amongst the other marine resources mentioned above, the ʻōʻio (bone fish, *Albula vulpes*) , once caught by Judge Kahāʻulelio (see Section **Error! Reference source not found.**) in the Kāʻanapali r egion is still fished by those who informed the consultation process. A reef fish of bright iridescent silver, they are generally nocturnal and feed on crustaceans and smaller fish. As its common name, bonefish, illustrates, ʻōʻio is a bony fish often eaten raw while the bones are still supple; it is usually not cooked because those many bones then harden making the fish difficult to eat (Titcomb 1972:119). It was often eaten in a lomi with limu kohu (*Asparagopsis taxiformis*) and later used by Asian immigrants to make their fish cake (ibid).

Additional marine resources noted are limu (seaweed, algae), which has been mentioned alongside some of the resources above as a food source for fish and as a garnish to eat with prepared fish, and wana, long spined sea urchins. Collectively known as wana, there are actually three different long-spined sea urchins in Hawaiian waters. The longest spined is *Diadema paucispinum* and is found in more protected and deeper areas of the reef while the other two *Echinothrix diadema* and *Echinothrix calamaris* are found on reef flats and tidepools. Collection of these sea urchins usually involved using a stick to knock their long spines off and to turn them over to expose the shorter spines that do not cause deep puncture wounds when gathering them by hand (Titcomb et al. 1978:370-371). Wana are a seasonal delicacy because they are not edible without gonads. The timing of wana harvesting was indicated by its land based plant counterpart, the hala (pandanus) (ibid). Many Hawaiian resources were linked to each other through observed and correlated activities that gave indications between connected species, for example, the following Hawaiian proverb indicates the relationship between sea urchins and hala:

> Pala ka hala. Momona ka hāʻukeʻuke.
> When the hala flowers are ripe, the sea-eggs are fat.
> (Judd 1930:9, Proverb #24)

Another such correlative proverb linking marine and land resources is:

> Pua ke kō, ku mai ka heʻe.
> When the sugar cane is in bloom, the squids are plentiful.
> Sugarcane bloom is the sign of the time to go squidding.
> (Judd 1930:8, Proverb #15)

According to Titcomb et al (1978:371-372) there are various ways to prepare and eat wana as detailed in the following:

> To prepare wana for eating, the spines are removed, usually by knocking them off or rubbing them against stones. They are opened by crushing part of the test, or by putting salt on the mouth of the urchin and leaving it thus overnight, then making a little crack all around the mouth area and lifting it off. The five orange-colored tongues of gonads (elelo) clinging to the test may then be scooped out. This is the choice "meat" sought for, but the fluid, kai, is well liked too. It is always drained from the body cavity and the mouth parts. The kai and elelo combined make a relish that is well liked with poi or sweet potatoes. A little salt is added to the relish and it is ready to eat when the salt is dissolved. In large wana, the elelo are about 2 inches across and as thick as a child's tongue. The combination of crayfish and wana was a favorite; wana was also combined with raw fish or ʻopihi, and, in modern times, with salt salmon.

Referring back to limu, the Hawaiians categorized the fresh and salt water forms as fish as illustrated in the two ʻōlelo noʻeau below (Pukui 1983):

> Ka iʻa lauoho loloa o ke kai.

> The long-haired fish of the sea.
> Limu, or seaweed.
> (ʻŌlelo Noʻeau 1362:148)
>
> Ka iʻa māewa i ke kai.
> The fish that sways in the sea.
> The *limu* (seaweed), which sways with the movement of the sea.
> (ʻŌlelo Noʻeau 1368:149)

As presented by Abbott (1974), limu was important to a nutritionally balanced diet for Hawaiians along with iʻa (fish or meat) and poi (cooked and pounded kalo which is thinned with water), supplying not only relish and variety, but necessary vitamins and minerals. Although many of the names of the various limu have been lost to time, the limu that have been categorized have descriptive names based on their characteristics like color, what fish eat them, and their habitat. As earlier in the research illustrated, mele is helpful to pinpoint resources used in an area. In the mele by ʻIliahi Parades, *Nani Wale Paunau*, the haku mele (composer) refers to a specific type of limu in the project area in the line: *Ka limu ʻaʻala o Mokuhinia* ("The fragrance of the limu kala of Mokuhinia") (Lum and Lum 2019:203). Although normally utilized by consumption, this type of limu was also used medicinally as a poultice for open coral cuts. During times of family strife, the leaves were given to each member of a family during hoʻoponopono (putting right) and eaten after everything had been forgiven which gave the seaweed its name of kala or to forgive (Abbott and Williamson 1974). Malo also reported that kahuna used the limu kala in two rituals, one for cleansing that included sea water and turmeric (1898:132-133), and the other as another medicinal treatment paired with akua worship (1898:145).

The importance of the coral reef is conveyed above through habitat, shelter, and as a food source for marine fish, invertebrates, and limu. Further to that, coral reefs have been proven to protect the shoreline from wave energy and erosion (Pacific Coastal and Marine Science Center 2022). Coral reefs have also been an embattled field regarding whether they are a source or sink for CO_2 (Fagan and Mackenzie 2007) and how their current bleaching due to climate change may impact the ecosystems they are a part of (Bahr et al. 2017).

Regarding more traditional fishing methods used throughout the pae ʻāina, Kamakau in *Ruling Chiefs of Hawaii* notes some of the methods and materials used for fishing and voyaging during the rule of Kamehameha. Kamakau writes (1961:176-178):

> There were deep-sea nets for fishing (ʻaumaiewa), shallow-sea nets for fishing (laulele), nets for fishing by diving (ʻupena-luʻu), fishing by enticing into the net by means of a stick with a strong odor (lawaiʻa melomelo), aku trolling with mother-of-pearl hooks (lawaiʻa a-hi-aku), ahi trolling with hook and line (hi-ahi), net for flying fish (hano-malolo), trolling for kahala fish with hook and line (hi-kahala), and several other kinds. Mahi-luheluhe and I-ama he selected as head men over all fishermen. He used himself to take part in the work, no matter what kind it was. He helped in preparing the fishing gear or in drawing the catch

ashore, or he would go out himself to sea and take part in the labor. As soon as the catch was landed Ka-lani-moku would be sent for, and after the fish of the gods had been set aside, then would come the portion for the treasurer himself. After the remainder was divided amoung Kamehameha and his wives and children, the chiefs, the king's housemates, the warrior chiefs, and all the rest. Ka-lani-moku was the highest official in the kingdom to the time of his death.

Kamehameha also selected workers in the wood: makers of pololu, ihe, and laumeki spears, paddles and canoe floats. He chose kahunas who were makers of double canoes (waʻa kaulua), war canoes (waʻa peleleu), single canoes (waʻa kaukahi), sailing canoes (waʻa kialoa) – either one-masted canoes (kiakahi) or two-masted (kialua) ; and kahunas who were makers of holua sleds and surf boards (papa heʻe nalu). He appointed head men over these kinds of work. He also appointed kahunas as craftsmen to make wooden bowls (ipu laʻau), calabashes (ʻumeke), dishes (ipu kai), spittons (ipu kuha), slop bowls (ipu hanowa), flat dishes (kalai pa), hand basins (pa waiholoi lima), face basins (holoi maka), bath basins (ipu ʻauʻau), vessels in which meat for shark bait was left to decompose (ipu kupalu mano), vessels for dying tapas (ipu hoʻoluʻu kapa), or skirts (ipu hoʻoluʻu pa-ʻu), containers for valuable possessions (ipuhokeo), for the shell fishhook (ipu pa-hi-aku), for a little shell fishhook (ipu makau ea), for human bones (ipu makau iwi kanaka), for medicinal clays (ipu kapuna), for offerings to the gods (ipu o Lono), cord holders (ipu kuaʻaha), and for salt holders (ipu kuliʻu). Wai-pa he appointed at the head of all these crafts.

5.2.2 Freshwater Resources

Turning toward freshwater resources discussed in the consultations, it is necessary to highlight the ways in which freshwater technologies were traditionally utilized by Hawaiians to ensure mauka to makai (upland to seaward) connectivity that allowed those resources to thrive. In Hawaiian culture, water was more than just a resource, it was the very essence of life. Its flow from its source in the mountains, down to the kula (plains) which were watered through intricate ʻauwai (irrigation systems) that diverted and then returned the water to continue its flow down to estruaries or fishponds, defined not only agriculture, but even society itself. Words like *waiwai* for wealth and *kānāwai* for law echoed the undeniable truth: water was, and continues to be, the lifeblood of the Hawaiian world (Handy and Handy 1972:57).

Mr. Keahi speaks about the connection of the ʻauwai to create spaces for acquatic resources (see Section 4.2.3) and Ms. Paltin discusses various aspects of caring for and using ʻauwai in Maui Komohana (see Section 4.2.6). Handy and Handy defined an ʻauwai as "the artificial diversion of ʻa flow' of fresh water by means of a ditch or channel, for purposes of domestic use and irrigation" (1972:57). It is integral to note that the use of ʻauwai returned the diverted water back to the natural stream in order for downstream users to procure what they needed and did not completely block water usage to the rest of the ahupuaʻa.

Ms. Steward, in her capacity as an agent at the Nature Conservancy, was able to work directly within the fresh water courses of Maui Komohona and attested that all five species of ʻoʻopu, of which four are gobies and one is an eleotrid (HT Harvey & Associates 2015), were present in Kahoma stream, and surmised this may be due to restored stream flow (see Section 4.2.3). ʻOʻopu are amphidromous, spending part of their lives in fresh water streams and the other part in the ocean (Fitzsimons et al. 2007). Four are endemic and one is indigenous. The five fishes are: ʻoʻopu hiʻu kole (*Lentipes concolor*), also known as ʻoʻopu ʻalamoʻo, an endemic species with adult males exhibiting an orange tail, found in the upper stream due to its outstanding vertical climbing ability (HT Harvey & Associates 2015:7-382); ʻoʻopu nōpili (*Sicyopterus stimpsoni*) an endemic usually found in the middle stream reaches, preferring fast flowing water and able to cling (pili) to rocks using its mouth (HT Harvey & Associates 2015:7-385); the indigenous ʻoʻopu nākea (*Awaous guamensis*) is the largest of the four gobies and was traditionally known as a good food fish (McGregor 2007:109), most likely due to its size and its preferred habitat in the lower and middle stream reaches (Fitzsimons et al. 2007); the ʻoʻopu naniha (*Stenogobius hawaiiensis*) inhabits the muliwai and lower stream reaches, feeding on plant and animal matter, and although it inhabits the same parts of the stream as the ʻoʻopu ʻakupa (*Eleotris sandwicensis*), the two endemic fishes are usually not found together as the ʻoʻopu ʻakupa is a carnivore that feeds on invertebrates and other small fishes (Fitzsimons et al. 2007:13). According to the State of Hawaiʻi's Wildlife Action Plan from 2015, habitat degradation due to water diversion, stream channelization, and dams is one of the main threats to all of the ʻoʻopu in Hawaiian waters (HT Harvey & Associates 2015).

Consultation also indicated the presence of ʻōpae (shrimp) and hīhīwai (gastropod) in Kahoma Stream. Mr. Keahi stated that community members had transported the crustaceans and mollusks from East Maui to restock the stream, releasing them at two locations along the stream. Other interviewees mentioned that they witnessed the return of the freshwater resources when the water returned, as well. The crustaceans are two species of ʻōpae that are known to inhabit Hawaiʻi's streams; the ʻōpae kalaʻole (*Atyoida bisulcata*), also known as the ʻōpae kuahiwi, is found in the mountains, and the ʻōpae ʻoehaʻa (*Macrobrachium grandimanus*) is found in the lower reaches of the stream and estruaries (Oki et al. 2003:34).

Kamakau explains that ʻōpae and ʻoʻopu were sometimes found in loʻi kalo, which would function as fishponds not unlike the loko kuapā (shoreline ponds) and loko puʻuone (sand dune pond) that were stocked with fish from the ocean to ensure a constant supply of food (Kamakau 1976:49-50). ʻŌpae ʻoehaʻa can also be found in anchialine pools along with another type of endemic shrimp, ʻōpae ʻula (*Halocaridina rubra*) (HT Harvey & Associates 2015:7-393, 397-405). Anchialine pools are enclosed ponds with an underground connection to the ocean and surface water which mix to create a unique, brackish ecosystem. Although there are no indications on maps or in the historical research that there were anchialine pools in the project area, there is an ʻili named ʻŌpae ʻula in the ahupuaʻa of Panaʻewa on an 1884 registered map (Bishop) which provides some type of connection with the endemic shrimp.

The endemic gastropod, hīhīwai (*Neritina granosa*), holds a significant ecological presence in the freshwater habitats of Maui Komohana, playing a crucial role in the delicate balance of the region's aquatic ecosystems. The snails can habitate both fresh and brackish water. Their life cycle begins as eggs laid in streams before the larvae wash into the ocean and develop planktonically for a year when they move back upstream or to the muliwai (HT Harvey & Associates 2015:7-402). Hīhīwai, like ʻoʻopu and ʻōpae, are used as a food source for Hawaiians as noted by Titcomb et al in the following:

> Hīhīwai are eaten raw after the shells have been broken and the meat extracted and salted. They are a good accompaniment to poi. Formerly, they were cooked in ti leaf bundles or in a calabash with how stones; the flesh was them more easily removed from the shell.
> (1978:338)

One final freshwater source referred to during consultation was a pūnāwai (freshwater spring). Pūnāwai hold cultural and environmental significance as self-sustaining freshwater springs or artesian wells. The word itself is made up of the words pūnā meaning spring and wai meaning fresh water (Pukui and Elbert 1986). These natural springs are revered for their purity and life-sustaining properties, often considered sacred sites and another link in the life cycle of native biota. The concept of the sacredness of pūnāwai, and wai, as explained earlier, extends beyond its literal meaning, symbolizing the interconnectedness of the land, water, and people in the rich tapestry of Hawaiian traditions and beliefs. In Mailepai, one such pūnāwai has been mapped as USGS Feature ID 364136, Puʻuhewale, at 627 feet (United States Geological Survey) above Kaʻōpala Gulch.

5.3 TRADITIONAL HAWAIIAN SITES

According to previous archaeological studies and recent community outreach consultations, there are remnants of traditional cultural sites within the two moku. Specific sites discussed in the interviews mentioned kiʻi pōhaku (petroglyphs), Paʻupaʻu Heiau (most likely Kamohomoho Heiau), and pā pōhaku (dry stack rock walls). Kamohomoho, a Maui chief related to Kahekili, was the pilot for Vancouver, accompanying him to Oʻahu to bring to justice the murderers of two crew members from the store-ship, *Daedalus*, and to broker a peace between Kahekili and Kamehameha (Alexander 1899:137). According to Fornander (1919c:520), atop Paʻupaʻu in Kuʻia ahupuaʻa, Kamohomoho built a heiau to the male lizard god, Moʻo, who was extremely strong and had a stump tail (Brown 2022:188). The name Kamohomoho was still affiliated with Lāhainā as of the Great Māhele with LCA 6786 (see Table 3-3) being attributed to Kamohomoho in the Waineʻenui ahupuaʻa. Also atop Paʻupaʻu was a refuge where warriors fleeing battle could find safety and where Kahekili and his men escaped the wrath of Kamehameha after they lost the battle in Kauaʻula (Fornander 1919c:520). The pā pōhaku and kiʻi pōhaku are evidence of use or occupation in the areas they are located.

5.4 TRADITIONAL HAWAIIAN BURIALS

Iwi (bones) are the physical embodiment of a person's mana. Greer shares more concerning iwi in Hawaiian culture:

> The union of mana (divine power) that derived from the burial of ancestors brought physical and spiritual growth. Native Hawaiians believe that a person's mana was contained in the iwi (bone) even after death. Thus, the "bones of the dead were guarded, respected, treasured, venerated, loved or even deified by relatives; coveted and despoiled by enemies." The role of iwi as central to Native Hawaiian identity are embodied in the words kulāiwi (homeland) and ʻōiwi (native). In fact, the people's right to their homeland was customarily considered perpetual because their ancestors were buried within the land. (2012:34-35)

According to David Malo in Westervelt (1917), the process of interment in the earth occurred as follows:

> Two or three persons only, not a large number, take the body away secretly. This is done by night, not by day. Then a grave is dug – a round pit like the hole in which bananas are planted. The proper depth is just above the hips. The grave is made smooth and sloping. While digging they take the dirt away in a mat or dish, lest traces should be seen…. The natives think that if anyone knows the place the ones would be taken away and made into fish-hooks and the flesh be made food for a shark.

Consultation revealed that burials at Puʻu Paʻupaʻu, which include the grave of David Malo, are continuing to be cared for by certain community members. Mr. Kapu also mentioned known burials in the Keoihoiho area in Panaʻewa.

5.5 TRADITIONAL HAWAIIAN SPIRITUALITY AND CEREMONY

In the exploration of traditional Hawaiian spirituality and ceremony, it is important to once again explore the writings of David Malo. While Malo's contributions to the historical record are invaluable, it is crucial to approach his understanding of traditional Hawaiian religion with a nuanced perspective. Malo's insights must be contextualized within the unique time and space he occupied during the early 1800s, marked by the influence of Christian conversion. His seminal work, *Ka Moʻolelo Hawaiʻi*, provides a specific view of religiosity, spirituality, and ceremony, frequently highlighting the integral role of pule (prayer) and its connection with hoʻokupu (offerings). Malo's writings discuss the diverse ways in which pule was woven into various aspects of traditional Hawaiian religiosity and ceremony. Whether in the context of daily practices or special rituals, prayer formed an integral part of the spiritual fabric, emphasizing the symbiotic relationship between active prayer and other spiritual activities. This partnership continues to be prevalent in contemporary Hawaiian spiritual practices, underscoring the enduring significance of pule in the cultural landscape.

Two terms that were used during consultation were wao kele and wao akua. Wao kele refers to the domain of people, the areas of human habitation, and in the physical realm is the rain belt of upland forest (Pukui and Elbert 1986:382). In the context of spiritual practices, wao kele encompasses the earthly domain where daily life unfolds and rituals may be conducted. In contrast, wao akua designates the sphere of the gods and deities. It represents the sacred and divine aspects of the Hawaiian cosmology. The wao akua is associated with the spirital realm, where gods, ancestral spirits, and other supernatural entities reside, often an uninhabited area of wilderness (ibid). Traditional ceremonies could involve interactions with the wao akua, bridging the gap between the earthly and divine realms.

A component of Hawaiian ceremony and religious practice is the concept of hoʻokupu which, in this context, refers to offerings or gifts presented as a form of reverence and gratitude. These offerings symbolize the reciprocal relationship between humans and the spiritual entities inhabiting the wao akua (Kamakau 1987). Hoʻokupu can range from symbolic items to food, reflecting the spiritual interconnectedness and the belief in reciprocity within the Hawaiian worldview as illustrated through the wana that is collected by the haumāna of Mr. Kapu to be presented at the heiau and the ʻawa that they share at the burial of David Malo (see Section 4.2.1). The aforementioned examples convey the significance of these pronounced concepts. The interview conducted with Mrs. Kapu revealed the continuation of another traditional practice, gathering of wai from the piko (source) of the two streams, Kauaʻula and Kahoma (see Section 4.2.1). This water holds ceremonial importance and is utilized in various rituals by interviewees, highlighting the enduring relevance of ancient practices in the context of modern Hawaiian spirituality.

5.6 TRAILS AND ACCESS

Traditionally, trail networks served to connect the various settlements within and between the ahupuaʻa and districts of the Hawaiian Islands. The island of Maui is thought to have been the only mokupuni to have had a paved, delineated footpath that encircled the entire island around both the east and west ends. Built by Kihapiʻilani in about 1516, according to Handy and Handy it "formerly was clearly visible across the West Maui golf links, but was obliterated in the Lāhainā area and beyond by the cultivation of cane and pinaeapple" (1972:490). Also mentioned by Martha Fleming, there were overland trails that went over the top of Mauna Kukui to connect Lāhainā to Waiehu (Handy and Handy 1972:490-491). Mrs. Kapu shared the importance of retaining access for traditional gathering practices (see Section 4.2.1) and others shared that access to the sites should ensure that public access to trails that lead to the projects does not endanger cultural resources.

6.0 ANALYSIS AND RECOMMENDATIONS

The State of Hawaiʻi has a constitutional and statutory obligation to protect native Hawaiian customary and traditional gathering rights. We offer this introductory section to explain the basis and

substance of the state's obligations, as well as the impact of this protection upon traditional western private property rights and the role of private landowners in the necessary research and analysis of traditional and customary practices. To provide the appropriate historical context for such traditional and customary practices, an authoritative treatise on this subject state:

> *At the time of Western contact in 1778, Native Hawaiians "lived in a highly organized, self-sufficient, subsistent social system based on communal land tenure with a sophisticated language, culture, and religion." Access from one area to another—along the shore, between adjacent ahupuaʻa (land divisions [usually extending from the mountains to the sea along rational lines, such as ridges or other natural characteristics]), to the mountains and the sea, and to small plots of land cultivated or harvested by native tenants—was a necessary part of early Hawaiian life. Gathering activities supplemented everyday food and medicinal supplies, while cultural and religious practices sustained the people in a variety of ways.*
> *Prior to 1839, ancient Hawaiian custom and usage governed the islands. To ensure the political existence of the kingdom in the face of expanding foreign influence, Kamehameha III developed a system of codified laws that incorporated protections for ancient tradition, custom, and usage. In other words, the laws in force at the time of the Māhele in the mid-1800s and for some time thereafter recognized the importance of traditional and customary practices to the native people. Many of these laws survived later political transformations and continue to apply as background principles of private property law in the State of Hawaiʻi. (MacKenzie et al. 2015:1082).*

With respect to "laws [that] survived later political transformations", the present-day obligation of the State to protect native Hawaiian traditional and customary practices is based, first, upon the State Constitution and, in addition, upon the legislature's acts as codified in the Hawaiʻi Revised Statutes and the judiciary's interpretation of the state constitution and state statutes through case law. These authoritative sources of law, in essence, describe how the state seeks to integrate and protect native Hawaiian traditional and customary practices in a western system of private property ownership

Article XII, section 7 of the Hawaiʻi Constitution provides:

> *The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.*

Delegates to the 1978 Hawaiʻi Constitutional Convention explained:

> *The proposed new section reaffirms all rights customarily and traditionally held by ancient Hawaiians. . . . [B]esides fishing rights, other rights for sustenance, cultural and religious purposes exist. Hunting, gathering, access and water rights, while not provided for in the State Constitution, were nevertheless an integral part of the*

> *ancient Hawaiian civilization and are retained by its descendants." Hawaiian Affairs Comm., Standing Comm. Rep. No. 57, reprinted in 1 Proceedings of the Constitutional Convention of Hawai'i of 1978, at 637, 640 (1980).*

With respect to legislative acts, Section 7-1 of the HRS specifically protects the right to gather, although that right is limited in scope to the enumerated items that are primarily used for constructing a house or starting a fire. Section 1-1 of the HRS offers broader protection for the exercise of traditional and customary rights. By codifying "Hawaiian usage" as an exception to the common law of the state, this statutory provision provides "a vehicle for the continued existence of those customary rights which continued to be practiced" after November 25, 1892. *Kalipi v. Hawaiian Trust Co.,* 66 Haw. 1, 10, 656 P.2d 745, 750–51 (1982).

In a series of landmark cases beginning with *Kalipi*, the Hawai'i Supreme Court reaffirmed the customary and traditional gathering rights of *ahupua'a* tenants, particularly under article XII, section 7 of the Hawai'i Constitution *See Kalipi,* 66 Haw. at 10–12, 656 P.2d at 750–52; *Pele Defense Fund v. Paty*, 73 Haw. 578, 837 P.2d 1247 (1992), *cert. denied*, 507 U.S. 918 (1993); *Public Access Shoreline Haw. v. Haw. Cnty. Planning Comm'n*, 79 Hawai'i 425, 903 P.2d 1246 (1995), cert. denied, 517 U.S. 1163 (1996) (commonly known as "*PASH*"); *Ka Pa'akai O Ka 'Āina v. Land Use Com'n, State of Hawai'i*, 94 Hawai'i 31, 7P.3d 1068 (2000). Through this line of cases, the Supreme Court established the manner in which state agencies must apply constitutional protections of native Hawaiian gathering rights in the development of private real property.

In *Kalipi*, the Hawai'i Supreme Court ruled that "any argument for the extinguishing of traditional rights based simply upon the possible inconsistency of purported native rights with our modern system of land tenure must fail.". *Kalipi,* 66 Haw. at 4, 656 P.2d at 748. *In Pele Defense Fund v. Paty*, the Court held that "native Hawaiian rights protected by article XII, section 7 may extend beyond the *ahupua'a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner." *Pele Defense Fund v. Paty*, 73 Haw. at 620, 837 P.2d 1272. In the PASH case, the Court stated that "legitimate customary and traditional practices must be protected to the extent feasible in accordance with article XII, section 7." *PASH*, 79 Hawai'i at 451, 903 P.2d at 1272

The Court in PASH stated that the "State retains the ability to reconcile competing interests under article XII, section 7". *PASH*, 79 Hawai'i at 447, 903 P.2d at 1268. As part of this balance of interests, the Court stated: (a) "[although access is only guaranteed in connection with undeveloped lands, and article XII, section 7 does not require the preservation of such lands, the State does not have the unfettered discretion to regulate the rights of ahupua'a tenants out of existence", *id.* at 451, 903 P.2d at 1272, and (b) "the balance of interests and harms clearly favors a right of exclusion for private property owners as against persons pursuing non-traditional practices or exercising otherwise valid customary rights in an unreasonable manner", although, "[o]n the other hand, the reasonable exercise of ancient Hawaiian usage is entitled to protection under article XII, section 7", *id.* at 442, 903 P.2d at 1272.

In Ka Paʻakai O Ka ʻĀina, the Supreme Court provided further direction on the constitutional and statutory responsibility of state agencies to preserve and protect the rights of native Hawaiians to carry-out their traditional and customary practices to the extent feasible and, in so doing, "the Court introduced an analytical framework that governmental agencies must specifically consider when balancing their obligations to protect traditional and customary practices against private property (as well as competing public) interests." (MacKenzie et al. 2015:1109).

In *Ka Paʻakai O Ka ʻĀina*, 94 Haw. at 35, 7 P.3d at 1072, the Court held that the State Land Use Commission (LUC) failed to satisfy its constitutional and statutory obligations to preserve and protect customary and traditional rights of native Hawaiians (Belatti 2003). At issue was the LUC's grant of a petition to reclassify over 1,000 acres of land in the *ahupuaʻa* of Kaʻupulehu on Hawaiʻi Island from the State Land Use "Conservation District" to the State Land Use "Urban District" in order to allow the development of a new resort. The Court acknowledged a variety of traditional and customary rights asserted by the petitioners, who were comprised of a coalition of Native Hawaiian community organizations. These rights included "fishing [and] gathering salt, ʻopihi, limu, kūpeʻe (edible marine snails whose shells are used for ornaments; the rare ones by chiefs), Pele's Tears (tear drops made from pahoehoe lava), and hāʻukeʻuke (edible sea urchins)." *Ka Paʻakai O Ka ʻĀina*, 94 Haw. at 43 and nn.19-21, 7 P.3d at 1080 and nn. 19-21. The Court also recognized the "special religious significance" of an 1800-1801 lava flow to gather salt for subsistence and religious purposes. *Id.*

The petitioners further asserted that "the petition area is associated with important personages and events in Hawaiian history, contains well-known physical entities (such as the shoreline, Ka Lae Mano and the 1800-1801 lava flow) and remnants of the native tenants' lateral shoreline and mauka-makai trail system, living areas and burials." *Id*. at 43, 7 P.3d at 1080. Agreeing with the petitioners that their interests as native Hawaiians and as tenants of the *ahupuaʻa* of Kaʻupulehu would be impaired by the proposed development in relation to the use of ancient trails and the shoreline area to practice traditional and customary gathering rights, the Court held the LUC had failed to develop a proper record on such rights and consider and analyze the extent of Native Hawaiian practitioners' exercise of traditional and customary rights in the affected area. The Court stated that the LUC, as the reviewing state agency, must consider and make express findings of fact and conclusions of law regarding the cultural, historical, and natural resources of a subject property as they relate to Native Hawaiian rights when determining what restrictions should be placed on land use. *Ka Paʻakai O Ka ʻĀina* , 94 Haw. at 35, 7 P.3d at 1072.

The Court further held that the LUC, by directing the developer to work independently to protect cultural rights, impermissibly delegated the LUC's constitutional and statutory responsibility, as a State agency, to protect and preserve cultural resources and native Hawaiian rights. The Court vacated the LUC's grant of the developer's application for a land use boundary reclassification and remanded the case to the LUC to make findings of fact and conclusions of law relating to:

> *(1) the identity and scope of "valued cultural, historical, or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;*
> *(2) the extent to which those resources - including traditional and customary native Hawaiian rights - will be affected or impaired by the proposed action; and,*

> *(3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. Ka Paʻakai O Ka ʻĀina, 94 Haw. at 35, 7 P.3d at 1072.*

The Court's framework seeks "to effectuate the State's obligation to protect native Hawaiian customary and traditional practices while reasonably accommodating competing private [property] interests". *Id*. at 46-47, 7 P.3d at 1083-84. Beyond the directives to the LUC in this specific case, this three-part framework provides specific direction to state and county agencies when considering land use and development projects on previously undeveloped land and should provide guidance to developers with respect to the record that must be prepared for a discretionary land use authorization or permit.

In attempting to comply with the *PASH* and *Ka Paʻakai O Ka ʻĀina* cases, the LUC had to address the issue of who has the responsibility to identify (and place on the record) any pre-existing native Hawaiian gathering rights. In subsequent boundary amendment proceedings, the LUC directed the petitioner to consult with the Office of Hawaiian Affairs (OHA) and with *kūpuna* in the area regarding past and present practices. The Office of Planning (OP) also consults with OHA. The LUC does not do any independent investigation, rather relies on the record made by the petitioner and OP (and any intervenor) and determines whether that record is sufficient.

Once the rights have been identified and the impacts assessed, the LUC is faced with the difficult problem of reconciling the private property rights, particularly the right of exclusion, with the gathering rights of native Hawaiians, which of themselves can require a certain amount of privacy and seclusion. Following the Supreme Court's remand in *Ka Paʻakai O Ka ʻĀina* and in another case, *In the Matter of the Petition of Destination Villages Kauai*, Docket No. A00731 (2001) in which native Hawaiian gathering rights were shown to exist, the LUC put conditions on its approval of reclassification of property that in each case required the formation of a committee made of up a developer's representative and a representative from the local native Hawaiian community to develop a plan to ensure that the gathering rights are protected. The plans are subject to LUC approval; any controversy arising from the plan is to be resolved by the committee. In the event the committee members cannot agree, they must agree on a third person who then will break the tie.

The LUC chose the committee approach because it did not believe it had sufficient information on resource conservation and management for the area in either of the two cases to make the final decision and, as a practical matter, would not be able to create such a record within the statutorily-mandated (365-day) time frame for making a decision. Because the Supreme Court has forbidden the LUC to delegate its decision-making power over balancing the private property rights and native Hawaiian gathering rights, forming a committee with each party having an equal vote in the outcome and requiring that any plans be approved by the LUC ensured that both sides would have their interests adequately represented and that the LUC would be the final arbiter that the balance reached meets the requirements of the law.

For purposes of the present project, the following sections provide an analysis of potential effects to currently known traditional and customary practices within and adjacent to the proposed project footprint. Recommendations for managing potential impacts to on-going practices or protecting the

integrity of traditional cultural resources that may be present within and adjacent to the project area should traditional cultural practices that were once carried out in the area be re-established.

6.1 RECOMMENDATIONS

6.1.1 Assess Existing Wells for Viability

Consultation with community members speculated that there are more wells in areas adjacent to the project areas than what is documented (see Section 4.2.1). During the May 7, 2024 site visit to proposed well site L-3, the group also visited a well owned by Pioneer Mill; however, it is not operational (see Section 4.3.2). It is strongly recommended to explore any current unoperating and/or undocumented wells in the Launiupoko and Honolua Aquifers for alternative sites to the proposed wells.

6.1.2 Establish and Prioritize Community Involvement

The communities of Lāhainā and Kāʻanapali possess a deep understanding of the various project areas due to their longstanding history in these wahi (places). As a result, community members and cultural practitioners are strongly committed to ensuring opportunities for the people of these spaces to share their knowledge and concerns related to the short-term and long-term impacts of the proposed exploratory wells. Years of experiencing water restrictions, drought, and untamable wildfires due to the increasingly dry landscape in Maui Komohana (West Maui), residents to have a heightened interest and involvement in all projects related to freshwater. Recommended tactics for community consultation and partnership are outlined below:

- Coordinate an advisory board made up of Lāhainā and Kāʻanapali community leaders and residents of the Waineʻe, Panaʻewa, and Mailepai Ahupuaʻa to monitor the progress of the proposed exploratory well development and to facilitate community consultation. The board ensures that people of these areas, who have personal connection to these places and resources can work alongside project managers.
- Conduct public community meetings to gather and assess comments and concerns regarding the project.
- Consider establishing a public-private partnership between the County of Maui and the communities of the project areas to improve accountability for the impacts the wells may have on the land and its resources.

6.1.3 Protect Natural and Cultural Resources

As a public trust, wai, or freshwater, is in itself an essential natural resource to the livelihood of any individual and community. Wai is also crucial to the traditional cultural practices and resources found in the project areas. Any changes in the natural streamflow or in the distribution of wai will ultimately affect the practices in the ahupuaʻa and moku of the proposed wells. The changes in the landscape and the equipment necessary to explore these areas are subject to concern regarding their impact on the natural resources like plant and animal life.

Recommendations specific to the protection and preservation of these natural and cultural resources are detailed below:

- Outline and execute best management practices (BMPs) to minimize erosion and sediment or lubricant release from project activities into the streams and the ocean. BMPs should also address the threat of seeds of invasive plants being carried into project areas by vehicles and equipment. Vet the BMPs with the advisory board and implement them with ongoing monitoring throughout the project.
- Restore the native plants of the area by planting native lāʻau in the project area where able to increase access of gathering materials for cultural practices. Recommended plants include ʻōhiʻa, ʻaʻaliʻi, and ʻiliahi.

6.1.4 Ensure Kupaʻāina Access and Establish Security Measures

Access to the mauka regions of Panaʻewa, Waineʻe, and Mailepai have been a longtime concern for residents of these ahupuaʻa. Although the lands are primarly owned by the County, State, or large private landowners like Kamehameha Schools, there are little to no regulations upon trespassers. Ensuring security of the proposed project sites are essential to mitigating further negative impact to the natural resources, as well as the cultural sites in the vicinity. Extra measures considering the risk of fires should also be addressed. Recommendations for ensuring cultural access and security measures are outlined below:

- Ensure safe access is maintained for cultural practitioners who regularly partake in ceremony and spiritiual practices at the Paʻupaʻu Heiau and David Malo's grave, ma uka of the L-3 site area. Access should especially be concerning Ka Papa Kanaka o Paʻupaʻu Heiau, the group of people dedicated to maintaining Paʻupaʻu Heiau.
- Ensure that any access roads are kept secure with a locked gate to prevent trespassers such as the general public and dirt bike riders who contribute to the erosion of the natural environment.
- Due to the high risk of potential fires, create firebreaks and a plan to mitigate fire risks on an ongoing basis.

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Appendix A.

APPENDIX F-1

KA PA‘AKAI ANALYSIS

Ka Pa‘akai Analysis for the Planned Maui County Wells in the Launiupoko Aquifer System, Lahaina Aquifer Sector

Ahupua‘a of Pana‘ewa and Waine‘e, Lahaina Moku, Island of Maui

APRIL 2024

PREPARED FOR

County of Maui, Department of Water Supply

PREPARED BY

SWCA Environmental Consultants

KA PA‘AKAI ANALYSIS FOR PLANNED MAUI COUNTY WELLS IN THE LAUNIUPOKO AQUIFER SYSTEM, LAHAINA AQUIFER SECTOR

AHUPUA‘A OF PANA‘EWA AND WAINE‘E, LAHAINA MOKU, ISLAND OF MAUI

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EXECUTIVE SUMMARY

On behalf of the County of Maui, Department of Water Supply (MDWS), SWCA Environmental Consultants conducted a Ka Paʻakai Analysis in support of the water use permit application for the planned Launiupoko 1 (L1) and Launiupoko 3 (L3) wells in the *ahupuaʻa* (traditional land divisions) of Panaʻewa and Waineʻe, located within the Launiupoko Aquifer System, in the larger Lahaina Aquifer Sector.

In 2022, the State of Hawaiʻi, Department of Land and Natural Resources (DLNR), Commission on Water Resource Management (CWRM) designated the Lahaina Aquifer Sector as a Surface and Ground Water Management Area. This decision was made in accordance with Hawaiʻi Revised Statutes (HRS) Chapter 174C, the State Water Code, and Hawaiʻi Administrative Rules Title 13, Water Resources, Chapter 171, Designation and Regulation of Water Management Areas. As a result of this designation, the MDWS is required to submit water use permit applications to the CWRM for all of its existing and proposed water sources within the Lahaina Aquifer Sector.

As water use within the Lahaina Aquifer Sector has the potential to affect traditional and customary Native Hawaiian rights and practices, a required part of the CWRM water use permit application for each water use is the preparation of a Ka Paʻakai Analysis. These analyses follow the guidelines established by the 2000 Hawaiʻi Supreme Court decision in Ka Paʻakai O Ka ʻAina *v*. Land Use Commission. The following document serves as the Ka Paʻakai Analysis for the two planned wells within the Launiupoko Aquifer System. The MDWS has four existing wells within the Launiupoko Aquifer System that were addressed in a previous Ka Paʻakai Analysis (Luthy et al. 2023). These are the Kanahā 1 and 2 and Waipuka 1 and 2 wells located in the ahupuaʻa of Panaʻewa and Kuʻia.

Beginning on August 8, 2023, a series of wildfires engulfed parts of the island of Maui. The worst of the devastation fell on the historic town of Lahaina. Thousands of structures were destroyed, and many lives were lost. As of the latest reports, 115 fatalities have been confirmed, making it one of the deadliest fires in modern U.S. history. Considering the devasting impact of this wildfire on the Lahaina community, it was particularly challenging to engage in meaningful and culturally sensitive community consultation for this Ka Paʻakai Analysis, given the community's preoccupation with addressing immediate needs. For this reason, this Ka Paʻakai Analysis relies heavily upon previous, publicly available studies that involved consultation with members of the Lahaina community regarding water issues.

Using a combination of archival research, existing oral history interviews, public testimony from CWRM meetings, and the Instream Flow Standard Assessment Report (IFSAR) meetings, the following Ka Paʻakai Analysis report identifies and discusses the traditional and customary practices undertaken within the Lahaina Aquifer Sector, and more specifically within the Launiupoko Aquifer System, that are related to water use and could potentially be impacted by water use related to the planned Maui County wells. These traditional and customary practices include the cultivation of wetland *kalo* (taro, *Colocasia esculenta*), nearshore fishing, and the gathering of *limu* (marine and freshwater algae) and other plants. Additionally, Native Hawaiian led restoration efforts of the historic Mokuhinia fishpond hinge on the availability of fresh water. Current efforts by cultural practitioners to restore this fishpond, replenish populations of limu, increase the number of *loʻi kalo* (flooded taro terraces) under active cultivation, and teach *keiki* (children) and community members about *mauka* to *makai* (inland to coastal) stewardship require a sufficient availability of fresh water.

This Ka Paʻakai Analysis found that there are concerns among some Native Hawaiian cultural practitioners regarding the proposed Maui County wells. These individuals express apprehension that the new wells may impose an additional strain on the fresh water resources within the Launiupoko Aquifer System. It is their opinion that such strain could potentially exacerbate the scarcity of fresh water, thereby

impacting the vitality of ongoing traditional and customary Native Hawaiian practices. These cultural practitioners and community members hold the opinion that existing wells have reached their capacity, and they are worried that additional groundwater withdrawals could affect the streamflow of Kaua‘ula Stream, which in turn could impact several culturally significant natural resources and cultural practices reliant upon the stream. They also disagree with the sustainable yield limits set by the CWRM and observed by the MDWS.

During community consultation, specific concerns emerged regarding the location of the planned L1 and L3 wells. One informant noted that the location of the planned L3 well is near the existing Lahaina Shaft well, which they claim has pumped up brackish water. They expressed concern that this suggests, in their opinion, that current groundwater withdrawals in this area have already surpassed sustainable yield. The MDWS however has indicated that brackish quality in wells close to the shoreline is normal and does not indicate withdrawals exceeding sustainable yield. Additionally, spreading withdrawals rather than concentrated pumpage at the four existing MDWS wells in the Launiupoko Aquifer System may have a positive or neutral impact on freshwater discharge to the coast and streams. Another informant noted that the L1 well site is near a natural spring known to them. They are opposed to the location of the L1 well, as they are concerned that the planned well may have adverse effects on the spring and subsequent downstream water use.

The differing viewpoints between cultural practitioners and the MDWS underscore the importance of balancing a nuanced understanding and education regarding both the Native Hawaiian holistic perspective on water and watershed management and the hydrologically informed technical perspective of the MDWS rooted in public data and guidance from the CWRM.

Given the potential for additional water withdrawal from the Launiupoko aquifer, the MDWS has agreed to undertake a number of feasible actions to mitigate the potential impacts of new groundwater withdrawal from the planned L1 and L3 wells. These include employing a mauka-to-makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality; developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members. These measures aim to maintain and potentially increase the availability of fresh water for traditional and customary practices.

Many words in the Hawaiian language, ‘Ōlelo Hawai‘i, are used throughout this report. In adddition to being defined the first time that they are introduced in the report, all Hawaiian-language words are defined in the glossary (see Section 8 Glossary of Hawaiian Words Used in the Text).

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1 INTRODUCTION

On behalf of the County of Maui, Department of Water Supply (MDWS), SWCA Environmental Consultants (SWCA) has conducted this Ka Paʻakai Analysis in support of the water use permit application for the planned L1 and L3 wells located within the Launiupoko Aquifer System in the Lahaina Aquifer Sector.

1.1 Lahaina Water Management Area

In 2022, the State of Hawaiʻi, Department of Land and Natural Resources (DLNR), Commission on Water Resources Management (CWRM) designated the Lahaina Aquifer Sector as a Surface and Ground Water Management Area. This decision was made in accordance with HRS Chapter 174C, the State Water Code, and Hawaiʻi Administrative Rules (HAR) Title 13, Water Resources, Chapter 171, Designation and Regulation of Water Management Areas. As a result of this designation, the MDWS is required to submit water use permit applications to the CWRM for all of its existing and proposed water sources within the Lahaina Aquifer Sector.

The Lahaina Aquifer Sector includes the *moku* (districts) of Lahaina and Kāʻanapali, both within Maui Komohana (West Maui). The Lahaina Aquifer Management Area includes the Honokōhau, Honolua, Honokahua, Kahana, Honokōwai, Wahikuli, Kahoma, Kauaʻula, Launiupoko, Olowalu, and Ukumehame Surface Water Hydrologic Units and the Honokōhau, Honolua, Honokōwai, Launiupoko, Olowalu, and Ukumehame Groundwater Hydrologic Units. The Honolua, Honokōhau, Kahana, Honokōwai, and Wahikuli Hydrologic Units are in the Kāʻanapali Aquifer System, whereas the Launiupoko, Ukumehame, Olowalu, and Kauaʻula Hydrologic Units are within the Launiupoko Aquifer System (Figure 1). This report focuses on the Launiupoko Hydrologic Unit, on the leeward flanks of the West Maui Mountains (Figure 2). The Launiupoko Hydrologic Unit encompasses several *ahupuaʻa* (traditional land divisions). The proposed location of the L1 well is within Panaʻewa ahupuaʻa and the location of the proposed L3 well is in Waineʻe ahupuaʻa (see Figure 3).

In coming to its decision, the CWRM noted several concerns regarding the surface water and groundwater resources in the Lahaina Aquifer Sector:

- These resources could be threatened by existing or proposed withdrawals or diversions of water.
- There is the potential for saltwater intrusion to harm groundwater quantity and quality.
- There are serious historical and ongoing disputes over current and planned uses of water.
- There is climate uncertainty and potential drought and decline in rainfall and recharge.
- There is surface water and groundwater interaction and connection that should be managed in an integrated manner.

The MDWS currently operates two surface water treatment plants and eight well pumps within the Lahaina Aquifer Sector. These existing sources withdraw groundwater from the Honolua Aquifer System and the Launiupoko Aquifer System, and surface water from Honokōhau and Kanahā Streams.

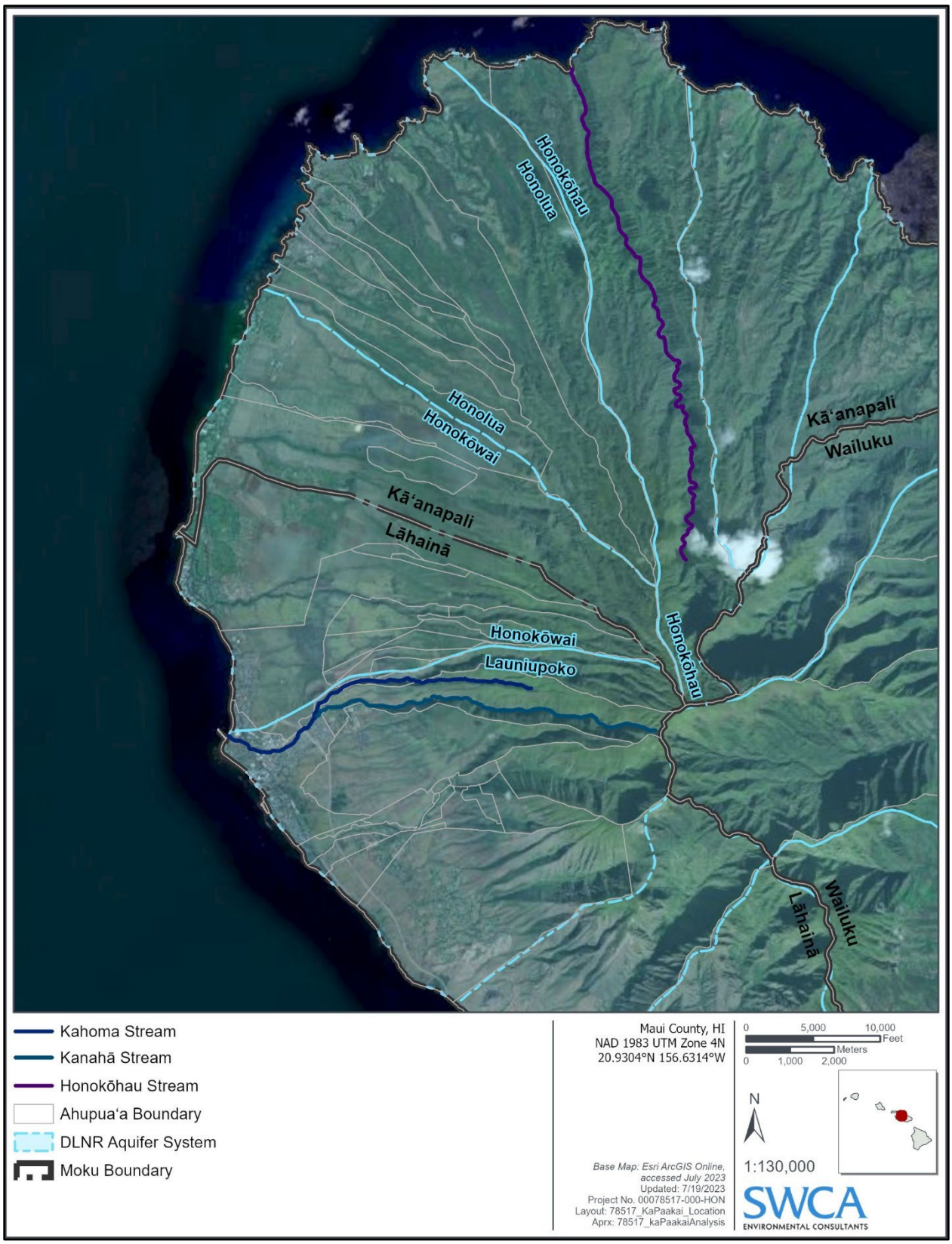

Figure 1. Map of aquifer systems within the Lahaina Aquifer Sector.

1.2 Launiupoko Aquifer System

County of Maui (County) water sources within the Launiupoko Aquifer System include surface water from Kanahā Stream and the existing wells of Kanahā 1 and 2 and Waipuka 1 and 2 (Figure 3). These sources provide water to the communities of Lahaina and Launiupoko. The Kanahā and Kahoma Streams flow within the Launiupoko Hydrologic Unit. The existing MDWS wells of Kanahā 1 and 2 are located in Panaʻewa ahupuaʻa slightly north of the Kanahā Stream before it merges with the Kahoma Stream. Waipuka 1 and 2 are just south of the Kanahā Stream in Kuʻia ahupuaʻa. The proposed L1 well is planned for the north side of Kahoma Stream, and the proposed L3 well is planned for the north side of Kauaʻula Stream. The proposed locations for these wells have been moved north out of the 100-year flood zone of the Kauaʻula Stream and the gulch, while still on State property.

1.3 Water Issues

The Maui Water Use and Development Plan (MDWS 2022) acknowledges that West Maui's water resources are constrained by climate change issues such as rising temperatures, increasingly erratic and decreasing rainfall, and other changes in weather patterns. In addition, the County must consider anthropogenic factors such as increasing population, urban growth, complicated legal processes, lack of capital to improve aging infrastructure, and tensions between the needs of various water users when determining water allocations. Existing plantation irrigation systems from Maui Land and Pineapple and Pioneer Mill Irrigation Systems in West Maui, for example, continue to deteriorate since the state transitioned away from pineapple and sugar cane, even though *kalo* (taro, *Colocasia esculenta*) farmers continue to rely on these systems (MDWS 2019:73). Many of these environmental and anthropogenic factors impact the health and vitality of traditional and customary practices taking place within the Lahaina Aquifer Sector.

1.4 Ka Paʻakai Framework

As water use within the Lahaina Aquifer Sector has the potential to affect traditional and customary Native Hawaiian rights and practices, a required part of the CWRM water use permit application for each water use is the preparation of a Ka Paʻakai Analysis. These analyses will follow the guidelines established by the 2000 Hawaiʻi Supreme Court decision in Ka Paʻakai O Ka ʻAina *v.* Land Use Commission. The Ka Paʻakai Analysis and consultation process is designed to identify Native Hawaiian cultural, historical, and natural resources and propose feasible actions to protect against potential impacts to Native Hawaiian customary and traditional rights.

The Hawaiʻi State Constitution was amended in 1978 to specifically recognize traditional and customary Hawaiian practices. Article XII Section 7 of the Constitution states that, "The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of Native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights."

Cultural practices are broadly defined as traditions, beliefs, practices, lifeways, and the societal history of a community and its traditions, arts, crafts, music, medicine, religion, and related institutions. Hawaiʻi State agencies have the responsibility to assess the potential impacts of proposed actions on environmental resources in the public trust in order to preserve and protect customary and traditional Native Hawaiian rights to the extent feasible.

The Hawaiʻi Supreme Court in Ka Paʻakai O Ka ʻAina *v.* Land Use Commission (2000) reaffirmed that "the State and its agencies are obligated to protect the reasonable exercise of customarily and traditionally

exercised rights of Hawaiians to the extent feasible." The Court provided an analytical framework "to effectuate the State's obligation to protect Native Hawaiian customary and traditional practices while reasonably accommodating competing private [property] interests." Under this framework, state and county agencies must independently assess the following when considering proposed actions, such as reviewing land use applications or, as in this case, water use permit applications:

- The identity and scope of "valued cultural and historical or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
- The extent to which those resources—including traditional and customary Native Hawaiian rights—will be affected or impaired by the proposed action; and
- The feasible action, if any, to be taken by the LUC [Land Use Commission, or any state agency] to reasonably protect native Hawaiian rights if they are found to exist. (Ka Pa‘akai O Ka ‘Aina *v.* Land Use Commission 94 Haw 31, Haw. 2000:25–26)

The Ka Pa‘akai Analysis and consultation process is intended to address each of these three elements.

1.4.1 Ka Pa‘akai Analysis

As part of the MDWS's water use permit application for its existing and proposed water uses within the Lahaina Aquifer Management Area, a Ka Pa‘akai Analysis is required for each application. This analysis is designed to identify the cultural/historical/natural resources and traditional and customary Native Hawaiian practices that may be affected by the permit action and to develop mitigation measures to protect these resources and rights.

The Ka Pa‘akai Analysis for the planned Maui County wells located within the Launiupoko Aquifer System follows the guidelines established by the 2000 Hawai`i Supreme Court decision and involves:

- The identification of cultural, historical, and natural resources of value to Native Hawaiians located within the water use permit area, and the extent to which traditional and customary Native Hawaiian rights are exercised in the area;
- The determination of the extent to which those resources, including traditional and customary Native Hawaiian rights, would be affected or impaired by actions associated with the planned water use; and
- If impacts are found to exist, the identification of actions that could be taken, as needed, to reasonably protect traditional and customary Hawaiian rights and practices within the permit area.

1.4.1.1 NATURAL RESOURCES AS CULTURAL RESOURCES WITHIN THE KA PA‘AKAI FRAMEWORK

The Ka Pa‘akai framework takes seriously the need to identify "valued cultural and historical or natural resources." The State and its agencies' obligation to protect natural resources for the exercise of traditional and customary practices was affirmed by the case Ka Pa‘akai O Ka ‘Aina *v.* Land Use Commission. This case specifically called out the rights of Native Hawaiians to access areas for "hiking, fishing, food gathering, camping, and other recreation" (Ka Pa‘akai O Ka ‘Aina *v.* Land Use Commission 94 Haw. 31, Haw. 2000:6). These areas were deemed essential for the exercise of traditional and customary practices related to subsistence and religious purposes, such as fishing, hunting for marine snails and other marine wildlife, gathering *limu* (marine and freshwater algae), and salt collection (Ka Pa‘akai O Ka ‘Aina *v.* Land Use Commission 94 Haw. 31, Haw. 2000:6, 14).

According to Dr. Davianna McGregor, Professor Emeritus in the Department of Ethnic Studies at the University of Hawaiʻi at Mānoa, the presence of natural resources should be taken as an indicator of ongoing cultural practices. Dr. McGregor further contends that natural resources, especially those used for subsistence practices, should be considered cultural resources as well because they are deeply intertwined with the traditional knowledge and cultural practices of an area and shape the identity and way of life for the local community. Some of the natural resources that are also considered cultural resources from a Kānaka Maoli worldview include native plants and their habitat, native fauna and their habitat, native marine species, native aquatic species, spawning areas, fish spotting areas, hunting areas, reefs, fishing areas, gathering areas, fishponds, and many others (McGregor 2024).

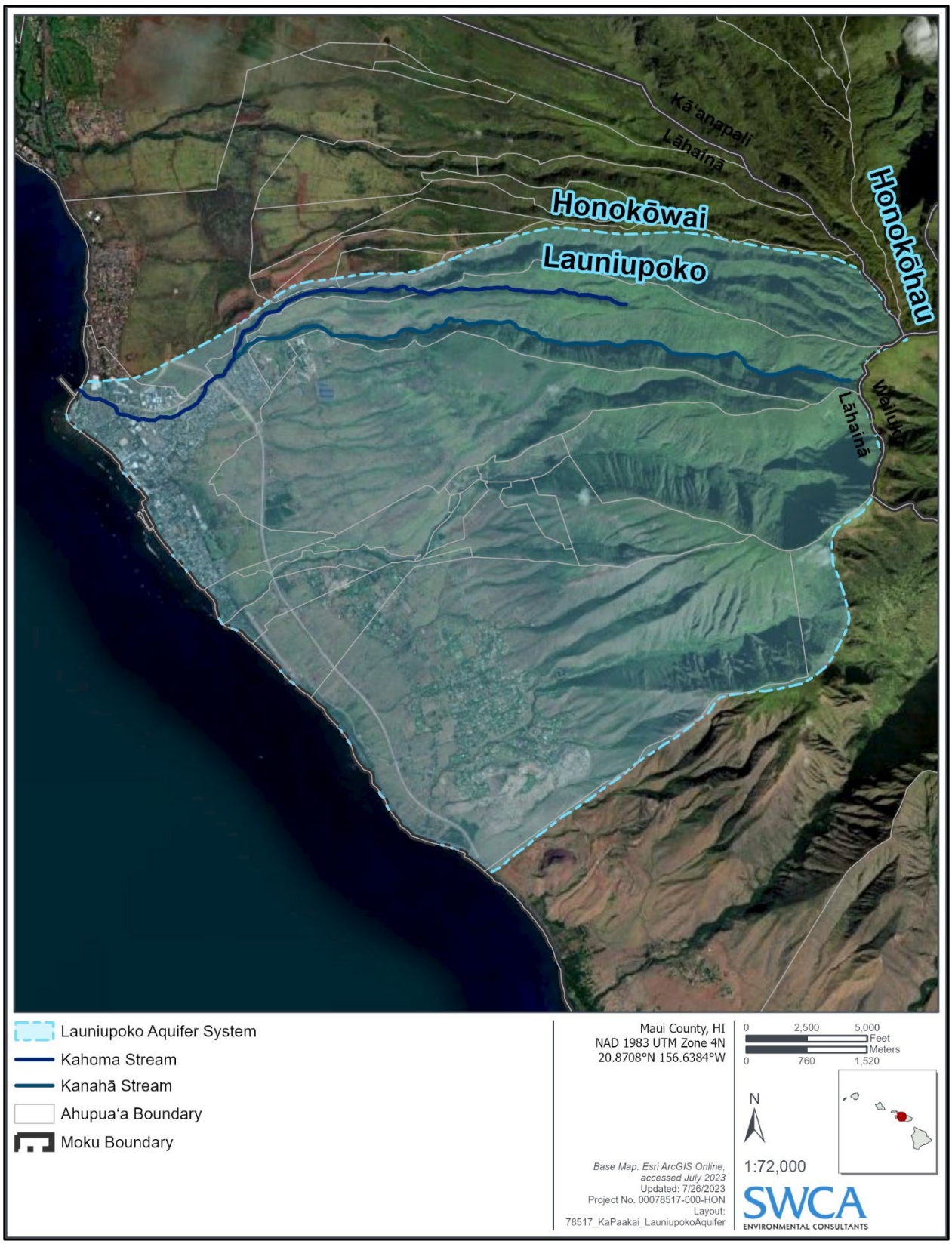

Figure 2. Map of the Launiupoko Aquifer System.



Figure 3. Location of the planned L1 and L3 wells.

2 CULTURAL AND HISTORIC BACKGROUND

This section presents the past and present historical and cultural significance of the permit area with a focus on water sources. This cultural and historic background also provides context to some of the historic and ongoing disputes over water use in the Lahaina Aquifer Sector Area. These disputes were among the concerns raised by the CWRM when the area was designated as a Surface and Ground Water Management Area. The following research is intended to help identify cultural, historical, and natural resources of value to Native Hawaiians located within the water use permit area and to assess potential impacts to traditional and customary Hawaiian rights and practices pertaining to water in the permit area to the extent appropriate for this Ka Pa‘akai Analysis.

2.1 A Brief Historic Context for Traditional Hawaiian Cultural Knowledge

In any sensitive discussion of Native Hawaiian culture, one must understand the role of colonization in eroding traditional cultural knowledge systems. Native Hawaiian culture—past and present—exists in close partnership with its natural environment. Changes in the traditional land tenure system and the adoption of Western concepts of land ownership in the nineteenth century had significant direct and indirect impacts on traditional and customary Hawaiian rights and practices tied to *‘āina* (land). The privatization of land resulted in the loss and destruction of many significant cultural resources and denied Native Hawaiian cultural practitioners access to lands previously used for traditional cultural purposes.

The loss of traditional Hawaiian cultural knowledge during the nineteenth and early twentieth centuries was further compounded by the devastating decline in the Native population resulting from the introduction of foreign diseases to which the Hawaiian people had no developed immunity. Changes in traditional lifeways resulting from the migration of younger people from the country districts to growing economic centers such as the port of Honolulu, as well as the shift from subsistence agriculture to the commercial cultivation of crops such as pineapple and sugar, contributed to a loss of cultural memory. With the passing of the last custodians of specialized cultural knowledge, that knowledge was lost forever.

Informants interviewed for this study have identified the effects of pineapple and sugar cane plantations, as well as the growth of tourism and luxury housing developments, as primary factors that have profoundly changed the environment of West Maui. The cumulative impacts of these industries on the environment have posed significant challenges for Native Hawaiians, hindering their ability to maintain certain traditional and customary practices reliant upon the health of the ‘āina.

Not until 1978 was the Hawai‘i Constitution amended to protect and preserve the traditional customary rights of Native Hawaiians, and not until 1995 did the Hawai‘i Supreme Court confirm Native Hawaiian rights to access undeveloped and under-developed private lands (State of Hawai‘i Environmental Council 1997:1). These actions came much too late to prevent irretrievable loss of traditional cultural knowledge. With this in mind, it is important to note that an absence of evidence is not evidence of absence. The authors of this Ka Pa‘akai Analysis recognize that the loss of Hawaiian traditional cultural knowledge likely applies to the current study area. There are probably place names whose meaning has been lost or which themselves have been forgotten, and traditions no longer passed on. We also recognize that, while we have made a good-faith effort to identify traditional and customary Hawaiian rights and practices associated with the study area, there may be place names missed, traditional history misinterpreted, or *kūpuna* (elder) voices not heard.

As this Ka Paʻakai Analysis shows, however, despite the enduring legacies of colonialism, many individuals possess cultural knowledge, and efforts to revitalize traditional and customary Hawaiian rights and practices are growing. For these cultural revitalization efforts to succeed, it is crucial to support the health of the environments that sustain Native Hawaiian cultural traditions and customs. At the core of ensuring the possibility of these cultural revitalization efforts lies the availability of clean water, which forms the foundation of healthy environments.

2.1.1 The Significance of Water in Hawaiian Culture

In *Native Planters in Old Hawaii*, E. S. Craighill Handy, Elizabeth Green Handy, and Mary Kawena Pukui explain that the significance of water in Hawaiian culture is reflected in the Hawaiian words for wealth and law.

> Water, which gave life to food plants as well as to all vegetation, symbolized bounty for the Hawaiian gardener for it irrigated his staff of life—taro. Therefore, the word for water reduplicated meant wealth in general, for a land or a people that had abundant water was wealthy.
>
> The word waiwai means wealth, prosperity, ownership, possession. Literally it is "water-water." A Hawaiian farmer who had all the water he needed for growing taro was indeed a prosperous man . . . .
>
> The word kānāwai, or law, also tied back to water. Ka-na-wai is literally "belonging-to-the-waters." With farms along the water system upon which all depended, a farmer took as much as he required and then closed the inlet so that the next farmer could get his share of water—and so it went until all had the water they needed. This became a fixed thing, the taking of one's share and looking after his neighbor's rights as well, without greed or selfishness.
>
> So a person's right to enjoy his privileges, and conceding the same right to his fellow man, gave the Hawaiians their word for law, kānāwai, or the equal sharing of water. (Handy et al. 1972:57–58)

The authors further explained how alien the Western conception of water as a commodity seemed to Native Hawaiians:

> Inalienable title to water rights in relation to land use is a conception that had no place in the Hawaiian way of thinking . . . . Water, whether for irrigation, for drinking, or other domestic purposes, was something that "belonged" to Kane-i-ka-wai-ola (Procreator-in-the-water-of-life), and came through the meteorological agency of Lono-makua the Rain-provider . . . .
> The paramount chief, born on the soil and hence born of the *makaʻainana* of a *moku* (island or district), was a medium in whom was vested divine power and authority . . . . But this investment . . . was instrumental in providing only a channeling of power and authority, not a vested right . . . . But this was not equivalent to our European concept of "divine right." The *aliʻi nui*, in old Hawaiian thinking and practice, did not exercise personal dominion, but channeled dominion. In other words, he was a trustee. The instances in which an *aliʻi nui* was rejected and even killed because of abuse of his role are sufficient proof that it was not personal authority by trusteeship that established right (*pono*). (Handy et al. 1972:65, cited in Scheuer and Isaki 2021:78–79)

Emma Nakuina, writing in the late 1800s, described how *ʻauwai* (irrigation ditches) were traditionally managed so that there was always sufficient freshwater flow to *all* individuals living downstream.

> No auwai was permitted to take more water than continued to flow in the stream below the dam. It was generally less, for there were those who were living makai or below the same stream, and drawing water from it, whose rights had to be regarded. Any dams made regardless of this well-recognized rule were leveled to bedrock by the water rights holder below, and at any rebuilding,

> delegates from each dam below were required to be present to see that a due propertion of water was left in the stream. (Nakuina 1893, cited in Scheuer and Isaki 2021:82)

2.1.2 Shoreline Traditional Hawaiian Practices in West Maui

Native Hawaiians were keen observers of native ecosystems. The ahupua‘a system was premised upon the interconnections between *mauka* (inland) and *makai* (coastal) ecosystems, and between *wai* (freshwater) and *kai* (ocean water or saltwater). Native Hawaiians understood that the health of important marine resources required freshwater discharge from mauka areas (Winter et al. 2018). Many prized species of fish rely upon *limu* (algae) as a food source; many species of nearshore limu thrive best in areas where both freshwater and ocean mix together (Abbott 1992). These ancient realizations about the parallels between healthy freshwater and ocean ecosystems were also clearly articulated by kūpuna during ethnographic interviews, community testimony, and existing oral history interviews cited in this report.

West Maui was known for its abundant marine resources. Inhabitants of West Maui relied heavily on fishing in the pre-Contact and early post-Contact periods. According to E.S. Craighill Handy:

> On the south side of western Maui the flat coastal plain all the way from Kihei and Maalaea to Honokahua, in old Hawaiian times, must have supported many fishing settlements and isolated fisherman’s houses, where sweet potatoes were grown in the sandy soil or red *lepo* near the shore. For fishing, this coast is the most favorable on Maui, and, although a considerable amount of taro was grown, I think it is reasonable to suppose that the large fishing population which presumably inhabited this leeward coast ate more sweet potatoes than taro with their fish.... (Handy 1940:159–160)

A.D. Kahaulelio discussed fishing lore in the area around the turn of the last century, including *‘ō‘io* (ladyfish/bonefish, *Albula vulpes*) fishing:

> The other division is the division called Mamali oio and is done just beyond the reef and places close to shore, from the steamer landing of Maalaea to the cape of Kunounou at Honokapohau, district of Lahaina. These are the places in which fishing is done by those of Olowalu, Lahaina, Kaanapali, Honolua, and Honokohau. (Kahaulelio May 2, 1902, cited in Sterling 1998:17)

2.1.3 Place Names

The *inoa* (names) of *wahi pana* (stories and legendary places, Pukui and Elbert 1986:376) are an integral part of Hawaiian culture as they often preserve valuable cultural, historical, and environmental insights. Place names can contain a plethora of information relating to the environmental features or characteristics of an area, its land use, political history, oral traditions, and much more. Place names can commemorate the actions of gods, demi-gods, or ali‘i. Place names can also contain *kaona*, hidden or dual meanings, discernable to those most knowledgeable of the intricacies of the Hawaiian language. Place names often provide valuable cultural insights into the history and significance of the area. Therefore place names are an appropriate starting point for archival research and investigation into place.

2.1.3.1 LAHAINA MOKU

Oral traditions surrounding the origins of the name Lahaina often describe a lack of rain, drought, and the intensity of the sun in the area. In their *Place Names of Hawai‘i*, Mary Kawena Pukui, Samuel Elbert, and Esther Mookini indicate that the old pronunciation of Lahaina was “Lā-hainā,” which literally translates as “cruel sin (said to be named for droughts)” (Pukui et al. 1974:127).

2.1.3.2 PANAʻEWA AHUPUAʻA

The ahupuaʻa of Panaʻewa is situated between the streams of Kahoma and Kanahā in the *kalana* (a land division smaller than a moku; a county) of Lahaina. The meaning of the ahupuaʻa name appears to be "to shoot crookedly." The Lahainaluna High School grounds are situated partially in this ahupuaʻa (Pata 2022:80).

2.1.3.3 WAINEʻE AHUPUAʻA

The name Waineʻe literally translates to "moving water." Waineenui is a variation of the place name cited in a few sources (Pata 2022:104). These waters traveled from the areas above Waineʻe, such as Kauaʻula Valley, flowing down to feed the sacred Mokuhinia fishpond. The Presbyterian church in Lahaina, which sat next to Mokuhinia and Mokuʻula, was named after Waineʻe. The Waineʻe Church cemetery became the resting place where many prominent aliʻi were reinterred from the royal mausoleum on Mokuʻula. This church was later rededicated as the Waiola Church (Anderson 2016:34–37).

2.1.4 Lahaina in the Traditional Period

Some idea of cultivation within Lahaina during the pre-Contact period can be obtained from early post-Contact descriptions of the area. In 1823, Lahaina was covered with groves of ʻ*ulu* (breadfruit, *Artocarpus altilis*), *kō* (sugar cane, *Sacchrarum officinarum*), kalo, *maiʻa* (banana, *Musa paradisiaca*), ʻ*uala* (sweet potato, *Ipomoea batatas*), *wauke* (paper mulberry, *Broussonetia papyrifera*), and melon patches, all watered by streams (Arago 1823:119–120; Fornander 1918–1919:540–541, cited in Handy et al. 1972:712–713). Lahaina was well known for breadfruit. *Mele* (songs) reference the area of Lahaina as *ka malu ulu o Lele,* "the breadfruit-shade of Lele [an old name for Lahaina]" (Handy et al. 1972:235). Hawaiian historian Samuel Mānaiakalani Kamakau also references Lahaina as a place of abundant fresh water flowing through the *pili* (bunchgrass, *Heteropogon contortus*): "Lahaina of the gurgling of the gushing waters among the pili grass" (Kamakau 1991:105).

2.1.4.1 LAHAINA AS THE SEAT OF POWER ON MAUI

Lahaina was described by Pukui et al. as the seat of power of Maui aliʻi (Pukui et al. 1974). Piʻilani established his chiefly residence in Lahaina in the sixteenth century (Kamakau 1961, 1991:49). The area was fed by the streams and flanked by rich nearshore fisheries, making it abundant with food sources to support the seat of the aliʻi (Handy et al. 1972:492). In *He Wahi Moʻolelo no Kauaʻula a me Kekāhi ʻĀina o Lahaina i Maui: A Collection of Traditions and Historical Accounts of Kauaʻula and Other Lands of Lahaina, Maui*, ethnographers Kepā Maly and Onaona Maly describe an area rich in resources. They describe how the *kula kahakai* (nearshore lands) were densely populated, with many chiefly residences and places of worship (Maly and Maly 2007:4). *Loko iʻa* (fishponds), *loʻi kalo* (taro pond fields), and groves of important trees dotted the landscape. The gently sloping flat lands known as *kula* (plain or open country) had both wet and dryland kalo (Maly and Maly 2007:4, 10). The Kahoma, Kanahā, and Kauaʻula valleys, fed by streams of the same name, all extended behind Lahaina (Maly and Maly 2007:4). Maly and Maly also describe how *ʻauwai* (irrigation channels) were constructed using natural stream flows to feed thousands of loʻi kalo (Maly and Maly 2007:10). They go on to write:

> At least two notable ʻauwai, which span several ahupuaʻa between Kauaʻula and Kahoma, are described in native lore, and are roughly datable by the chiefs associated with them. The earliest ʻauwai in the Lahainaluna vicinity, is known as ʻAuwaiawao, and is reportedly named for the Chiefess Wao, sister of Kaululäʻau, who ruled a portion of Maui in ca. 1390 (cf. Pualewa 1863, in this study).

> The second ʻauwai is known as ʻAuwai o Piʻilani, and is reportedly associated with the King, Piʻilani, who ruled Maui and the neighboring islands in ca. 1450 (both Piʻilani and his son Kiha-a-Piʻilani, are associated with many public works projects around Maui, that were of benefit to the larger population of the island). The ʻAuwai o Piʻilani has its headwaters in the Kauaʻula Stream and irrigated lands along both side of the stream, with waterways extending to at least the ʻili [traditional land division, smaller in size and next in importance to an ahupuaʻa, usually a subdivision of an ahupuaʻa] of Piʻilani in the ahupuaʻa of Paunau, below Lahainaluna. (Maly and Maly 2007:10)

Handy et al. (1972) offered the following comments:

> West Maui had two main centers of population concentrated in areas where the abundant streams from the deeply eroded central dome brought water to large loʻi systems. Of these two we take that on the southern coast as our Type Area, because there are better descriptions from early times.
>
> Lahaina District was a favorable place for the high chiefs of Maui and their entourage for a number of reasons: the abundance of food from both land and sea; its equable climate and its attractiveness as a place of residence; it had probably the largest concentration of population, with its adjoining areas of habitation; easy communication with the other heavily populated area of eastern and northeastern West Maui, "The Four Streams," and with the people living on the western, southwestern and southern slope of Haleakala; and its propinquity to Lanai and Molokai.
>
> Southeastward along the coast from the aliʻi settlement were a number of areas where dispersed populations grew taro, sweet potato, breadfruit, and coconut on slopes below and in the sides of valleys which had streams with constant flow. All this area, like that around and above Lahaina, is now sugar-cane land. Ukumehame had extensive terraces below its canyon, some of which were still planted with taro in 1934; these terrace systems used to extend well down below the canyon. ʻOlowalu, the largest and deepest valley on southwest Maui, had even more extensive loʻi lands both in the valley and below. Just at the mouth of the valley we found in 1934 a little settlement of five kauhale (family homes) surrounded by their flourishing loʻi. There are said to be abandoned loʻi far up in the valley. In and below the next valley, Launuipiko [Launiupoko], there were no evidences of loʻi, and the people of ʻOlowalu said there had never been any. But we think there must have been a few, although the land is, in general, dry and rough. Next beyond this, going along the coast toward Lahaina, is Kauaʻula Gulch above Waineʻe, and here in 1934 there were a few loʻi in which Hawaiians were still growing taro.
>
> Lahaina's main taro lands, on the lower slopes running up to the west side of Puʻu Kukui, were watered by two large streams, Kanaha and Kahoma, which run far back into deep valleys whose sides were too precipitous for terracing. (Handy et al. 1972:492)

The loʻi kalo of the area were of such strategic importance that they were targeted during an attack by Alapaʻi in 1738. Samuel Mānaiakalani Kamakau noted that Alapaʻi employed the "unusual tactic" of drying up the streams of Kauaʻula, Kanahā, and Kahoma to starve the forces of the Lahaina-based aliʻi Kaʻuhi. Alapaʻi's men also kept close watch over the various streams of Olowalu, Ukumehame, Wailuku, and Honokōwai (Kamakau 1961:75).

2.1.5 Moʻo of Lahaina

In Hawaiian tradition, fresh water is closely associated with *moʻo akua*. Moʻo are a class of water deities (*akua*) known to inhabit bodies of fresh water. Among some families, moʻo are considered to be *ʻaumakua* or family gods. Many moʻo have alternate body forms or *kinolau*. Four predominant kinolau of

moʻo include the moʻo (lizard), the *ʻīlio moʻo* (brindled dog), the *ʻoʻopu* (goby fish), and the *nananana/lanalana* (spider) (Brown 2022:66). There is an abundance of evidence that Native Hawaiians continue to observe traditional and customary practices associated with moʻo (see Marie Alohalani Brown's *Ka Poʻe Moʻo Akua: Hawaiian Reptilian Water Dieties* [2022:167–173]).

The following references, cited in *Ka Poʻe Moʻo Akua* (Brown 2022), document a variety of oral traditions related to moʻo inhabiting the Lahaina area. In 1861, T.W. Kaikuaana wrote of the near drowning of a child at the Mokuhinia pool in Lahaina and attributes the incident to the moʻo who lived in the pond (T.W. Kaikuaana to the editors of *Ka Hae Hawaiʻi*, cited in Brown 2022:167). As discussed below, this moʻo, who is the namesake of the Mokuhinia fishpond in Lahaina, was witnessed at the death of Kamehameha V (Brown 2022:188). Another reference mentions a female moʻo named Luaʻehu residing at Luaʻehu in Lahaina, characterized by her reddish hair (Brown 2022:186). A male moʻo associated with Mauna Paʻupaʻu, a hill overlooking Lahainaluna School, was honored with the construction of a *heiau* (traditional temple or shrine) by the aliʻi Kamohomoho (Brown 2022:188).

Several geographical features across the Hawaiian Islands are regarded as the remnants of moʻo, and thus these moʻo are memorialized in the ʻāina (Brown 2022:109). As an example of this, Keʻeaumoku Kapu describes one of the mountains above Kauaʻula Valley, called Mauna Kawahine, as a moʻo who gave birth to a moʻo-son who now resides at Rapa Nui in the form of a *moai* (the famous monoliths of Rapa Nui, also known as Easter Island). Kapu also describes a ridge overlooking Kauaʻula Valley by the name of Moʻo Ahia. He claims that this moʻo was a protector of the Lahaina area and indicated a connection between Moʻo Ahia and Mokuhinia Pond (Kapu 2008).

2.1.5.1 MOKUHINIA, THE MOʻO OF LOKO O MOKUHINIA

The fishpond Loko o Mokuhinia held great significance, as it housed the sacred island of Mokuʻula, where generations of Maui chiefs resided. This fishpond played a central role in the royal complex.

The fishpond is named for the guardian moʻo who resides there. The moʻo Mokuhinia is also known as Kihawahine, the deified princess and daughter of Piʻilani. Upon his victory over Maui, Kamehameha I adopted Mokuhinia as one of his protectors. Kamehameha I's son, Kauikeaouli, who resided at Mokuʻula, was a descendant of the Maui royal family through his mother, Keopuolani. Thus he shared a direct familial relationship with Mokuhinia through his ancestor Piʻilani (Fornander 1916–1917; Kamakau 1964:83, cited in National Park Service 1997)

Mokuhinia was said by Kamakau to have been seen at Kapunakea fishpond in Lahaina, as well as Paukūkalo and Kanahā fishponds at Wailuku, and also was seen at Kalepolepo fishpond when Kamehameha Kapuāiwa died. The author S.W. Nāʻiliʻili mentions this moʻo in *Ke Au Okoa* (Brown 2022:187–188). The moʻo Mokuhinia was also known to visit the fishpond of Kanahā in Wailuku and beyond:

> The moʻo Mokuhinia has been seen on Maui at Kapunakea, in Lahaina, and at Paukukalo and Kanaha in Wailuku; and she showed herself at Kalepolepo at the time that Kamehameha Kapuaiwa died. She has appeared before hundreds and thousands of people. At the close of the year 1838 she almost capsized Kekauluohi, who was going by canoe across the pond of Mokuhinia from Mokuʻula on her way to church at Waineʻe. Many people from Hawaii to Kauai have seen the terrible form of the moʻo. (Kamakau 1968:83)

2.1.6 Early Post-Contact Accounts of Lahaina

It is clear from early post-Contact accounts that the valleys irrigated by the Kanahā and Kahoma Streams were widely cultivated through careful management of the water from these streams in pre-Contact and early post-Contact times. According to Menzies:

> [Lahaina, 1793] … [We soon] entered the verge of the woods where we observed the rugged banks of a large rivulet that came out of the chasm cultivated and watered with great neatness and industry. Even the shelving cliffs of rock were planted with esculent roots, banked in and watered by aqueducts from the rivulet with as much art as if their level had been taken by the most ingenious engineer...The indefatigable labor in making these little fields in so rugged a situation, the care and industry with which they were transplanted, watered and kept in order, surpassed anything of the kind we had ever seen before … (1920:105, 112, cited in Handy 1940:104–106)

Arago also described Lahaina as an agriculturally productive area in the early 1800s:

> The environs of Lahaina are like a garden. It would be difficult to find a soil so fertile, or a people who can turn it to greater advantage; little pathways efficiently raised, and kept in excellent condition, serve as communications between different estates. These are frequently divided into trenches, through which a fresh and limpid stream flows tranquilly giving life to the plantations, the sole riches of the country. Hollow squares of depths of two, three, and sometimes four feet, nourish various sorts of vegetables and plants; amongst which we distinguish the Caribee-cabbage, named here taro; double rows of banana, bread-fruit, cocoa-nut, *palma-christi*, and paper-mulberry trees, intercept rays of the sun, and allow you to walk midday … (Arago 1823:119–120)

In contrast, Handy observed that lo‘i kalo were not cultivated in Launiupoko even in historic times.

> Although there is a sizable stream bed and deep valley here, there is no visible evidence of wet taro cultivation, and the Hawaiian planters at Olowalu say that lo‘i never existed in Launiupoko. It is possible that there may have been a few terraces on the level land at the base of the valley, but this is wholly arid now and covered with dense brush. (Handy 1940:103)

2.1.7 Lahaina as the Royal Residence

Eventually, Kauikeaouli, King Kamehameha III, settled in the Lahaina area and established his own royal residence there. Lahaina thus became the seat of the Kingdom of Hawai‘i from 1837 to 1845. The National Register of Historic Places nomination for King Kamehameha III’s Royal Residential Complex (also known as Moku‘ula/Loko Mokuhinia/Hale Piula, State Inventory of Historic Places [SIHP] site number 50-50-03-2967) describes the site thusly:

> King Kamehameha III’s royal residential complex in Lahaina, Maui … is the site of the home of the king of the Hawaiian Islands from 1837 to 1845 when the town was the capital of the kingdom. The site is a traditional home for Maui royalty, noted as being the site of King Pi'ilani's residence in the sixteenth century (cf. Kamakau 1991:49, 1961:342). Almost the entire site, which consisted of fishponds, freshwater springs, islands, causeways, retaining walls, beach berms, residential and mortuary buildings, is buried by coral and soil fill and is presently used as a County Park. Extensive architectural and artifactual remains exist underground, as was demonstrated in a recent archaeological survey (Klieger et al. 1995).

> Although most widely associated with the period of Kamehameha III, the site appears to be a place of traditional Native Hawaiian cultural significance. The islet of Moku'ula, located in the fishpond of Mokuhinia, was a sacred place protected by royal kapu (taboo). It was considered a grotto of a royal protector deity named Kihawahine or Mokuhinia, who traditionally swam through the surrounding fishpond of Mokuhinia in the form of a giant lizard (mo o) (Kamakau 1964:85; Manu 1884). The goddess was a deified princess, daughter of Maui king Pi'ilani of the sixteenth century, whose family resided at the site (Fornander 1916–1917 V[I]:176; I"V:242). Kamehameha I, upon his conquest of Maui in the late eighteenth century, adopted this deity. His sons and successors, Kamehameha n and III, were scions of the indigenous Maui royal family through their mother, Keopuolani. The lizard goddess Kihawahine ranked in no small part as the guardian of the succeeding Kamehameha dynasty that was in the process of unifying the archipelago (Kamakau 1964:54). A continuing association of religious function, as a shrine to Kihawahine, continued at this site from the days of Pi'ilani to the establishment of the royal residence here by Kamehameha III. Archaeological and historical investigations performed by Bishop Museum for Lahaina Restoration Foundation and County of Maui (Klieger 1993; Klieger et al. 1995) demonstrate that the surrounding Loko Mokuhinia pond was the site of indigenous Hawaiian aquaculture and pondfield agriculture, as determined from early land tenure documents (the Great Mahele of 1848) and eighteenth and early nineteenth-century ethnohistoric accounts. This traditional subsistence activity may have been much older at this site. (National Register of Historic Places 1997)

2.1.8 Infilling of Loko o Mokuhinia

In the post-Contact period, the health of Mokuhinia declined with the introduction of invasive species such as mosquitoes. The fishpond of Mokuhinia was eventually filled in and covered up by the Department of Health to prevent the spread of mosquito-borne illnesses. The sacred island of Moku‘ula was also covered up at that time. Prior to that, the mausoleum in which prominent ali‘i were buried was located on the island of Moku‘ula within the fishpond of Mokuhinia. The *iwi* (bones) of the ali‘i buried within the mausoleum of Moku‘ula were moved to Waiola Church during the reign of Kauikeaouli, Kamehameha III (Kapu 2008).

The Lahainaluna Seminary was eventually established in the area, displacing some of the Native tenants. Kamakau described the events in 1835 in which the Lahainaluna Schools took over important agricultural lands in the area:

> …When the high school at Lahainaluna was built the chiefs consented to the erecting of the schoolhouse and the houses for teachers and pupils, and to the pupils’ cultivating potatoes on the land of the school and on the hill, but the rich lands above and below the stream were for the natives of the places. In 1835 the missionaries at the yearly council appealed to the king and chiefs for more land, for the pupils often went hungry. The king consented and left it to Ulu-maheihei to give whatever land was right in his judgment. He gave, under protest of the natives who owned the land, the taro land by the stream of Kanaha on the side toward the sea to the taro land of Kelawea cutting the water taro patches of Kaukahoku, running straight down to Kumu‘ula [i.e., Kaua‘ula in original Hawaiian text] and down to the stream and rising and cutting the land of Ho‘olulu and ascending to the pali. This was the boundary toward the sea. The mauka boundary was the stone mauka of Rev. Lorrin Andrews’ place and straight down to the brook and running straight along and rising to the pali. All the taro cultivations were below Makaili‘i and adjoining Kukuikapu. And there were two cattle pastures: the plain of Ku‘ia to Kaua‘ula turning upward as far as Kāhili, and the plain of Pana‘ewa between Kanaha and Kahoma where is the plain of Pahalona. These were the lands given by Ulu-

> maheihei, and when the chiefs complained and said that these were their lands given by Kamehameha, and that all their taro land had been taken away and nothing left but a few breadfruit trees, Ulu-maheihei answered, “It is a fine thing; do not get excited about the land. Give your land to those who are seeking knowledge. This is the thing which will establish the government of your chiefs… Knowledge is fundamental to living as a chief.” When Elizabeth Kina‘u visited Lahainaluna in 1837 she gave more land extending to the creek of Wao7. (Kamakau 1961:355; Maly and Maly 2007:40–41)

2.1.9 Traditional Water Distribution System in Lahaina

The 1895 court case of Horner *v.* Kumuliili provides insight into how the water in the Lahaina area was used traditionally. At a time when most *maka‘āinana* (commoners) cultivated lo‘i kalo, it was essential that all lo‘i kalo had access to sufficient water to reduce conflict among community members and allow all families to flourish. The case was between kalo farmers within Kaua‘ula Valley were unable to irrigate their lo‘i kalo and the plaintiff, who was using water to irrigate large tracts of sugar cane. The following quote demonstrates how the *konohiki* (traditional land manager) historically ensured adequate irrigation of every lo‘i through an “eleven day system”:

> … the ancient method of dividing and distributing water of Kauaula stream was by length of time and use. Generally, the ahupuaas or ilis [*‘ili*, smaller traditional land division] of land of a certain name situated on the level land below or ‘makai‘ has land, mainly kalo patches, in the valley above or ‘mauka‘ bearing the same name. One or two lands makai have no counterpart mauka, and at least one land mauka has no counterpart makai. These mauka kalo patches are similar to the ‘leles’ or outlying portions of an ahupuaa, well known on other islands of this group as ‘leles‘ though as a rule they seem not to be so called in Lahaina. In order to irrigate these lands small ditches or auwais [ditch, canal] were dug in very ancient times, through which the waters led from the main stream on the lands. On the Kaanapali or western side there are three main auwais, the first one nearest to the head of the valley is ‘Piilani,’ then below is ‘Waimana,’ then ‘Puuhuliliole.” On the Olowalu or eastern side are, first, ‘Puupai,’ then ‘Muliwaikane.’
>
> There are numbers of other auwais of much lesser length which start from the stream, irrigate a few patches and then turn to the stream. The ahupuaas and ilis in this part of Lahaina were divided into two principal divisions each containing eleven lands. In order to make the division even, a few lesser ahupuaas were bracketed in pairs and treated as one land, and have one ‘water day.’ Division one, for example, had the water during the day, and Division two during the night, the day being from 5 o’clock a.m. to 5 o’clock p.m., and the night being the remainder of the twenty-four hours. While during eleven consecutive days the lands in Division one were having the water in rotation according to an arranged schedule during the day, the lands in Division two were having it at night. Then, when the last land in each division had been watered, a shift was made, beginning the list again, and Division two received the water in the daytime and Division one took it at night, and so in endless rotation.
>
> The ancient method of using water was this: When the ‘day’ of a certain ahupuaa, named “Kooka” for example, came around, the kalo patches belonging to it and bearing the same name, being mauka, had the water first run into them by the latera auwai until they were filled, then the water would be turned back into the main stream and then taken out on to the land below named “Kooka.”...
>
> The konohiki [land stewards] endeavored to secure equality of division and to avoid troublesome quarrels between tenants; and when the quantum of water in the stream was diminished through drought he saw to it that the quantity used by each was divided

> equally. The water from the auwai was subdivided among the various cultivators according to the amount of land cultivated and the needs of each. But one when kuleana seemed to need more water than the others at any particular time the konohiki would on request allow a constant small stream of water to continue to run in the particular auwai, after the patches were filled and while the main body of the land below was receiving its assigned supply. This is called “koii wai,” and witnesses say that when their patches were dry they would ask and obtain a little water from the konohiki and their own neighbors...
>
> The testimony of those familiar with the ‘eleven day’ system (and it was so found by the commission) that when the water day of a certain land came around all the water of the Kaua‘ula stream was entitled to be turned into the particular auwai leading the water to the said land...Campbell says that supplying kalo patches with water but once in eleven days is not now sufficient to keep the crop in good growing condition, and he attributes the success of the old eleven day system when he was a resident of Lahaina to the freshet or storm water which came down more then than now...
>
> It is evident from the testimony that the intent and spirit of the ingenious ‘eleven day’ system of water supply in this locality, elaborated from long experience by men whose aim was to secure equal rights to all and to avoid quarrels, was to give the mauka lands in rotation sufficient water for the successful growing of kalo. And it must be remembered that the mauka lands were to have their water first. (Sterling 1998:30–31)

2.1.10 Shoreline Traditional Practices in Lahaina Moku

Ethnohistoric research depicts Lahaina as a settlement rich in marine resources. The coastline of Lahaina was particularly abundant with *akule* (big-eyed or goggle-eyed scad, *Trachurops crumenophthalmus*) and *‘ōpelu* (mackerel scad, *Decapterus pinnulatus* and *D. maruadsi*) (MDWS 2019:15) However, akule and ‘ōpelu are far from the only species used by Native Hawaiians. Kahaulelio, writing in an article on fishing lore in the Hawaiian language newspaper *Ka Nupepa Kuokoa* (May 30, 1902) also discussed local practices for fishing for *lālākea* (whitetip shark, *Pterolamiops longimanus*) and hammerhead sharks (*Sphyrnidae* sp.) in the area:

> It was much practiced by old timers of this ahupuaa of Makila, and also by the people of upland of Kauaula since we were children...The kinds of sharks caught by the hoomoemoe method were the lalakea and hammerheads...Mr. Editor, the place where hoomoemoe fishing was done at Pahee, in Launiupoko, Lahaina. When you arrive at the little cape of Keahuiki and down the small incline, the first sandy stretch you come to extending over to the rocky beach and adjoining with the sand of the left side, that was the place where nets were laid. (Sterling 1998:27)

Kahaulelio also reported a large school of *nehu* (anchovies, *Encrasicholina purpureus*) coming to Launiupoko, Keonooko, and sometimes Māla (cited in Sterling 1998:27).

Several traditional fishponds were constructed along the shores of West Maui. In her 1992 book *Lā‘au Hawai‘i: Traditional Hawaiian Uses of Plants*, Isabella Abbott discusses how loko i‘a not only provided fish for the ali‘i, but also afforded habitat for a variety of different species of edible limu. She recounts a phrase that a limu gatherer repeated to her about the value of the limu that grows in loko i‘a: “Some for us, and some for the fish” (Abbott 1992). Some species, like *limu ‘ele‘ele* (*Enteromorpha prolifera*), grew in all types of fishponds, whether on offshore reef flats or inland sites such as estuaries, brackish pools, springs, or streams. Other edible species, like *limu manauea* (*Gracilaria coronopifolia*) and *limu huluhuluwaena* (*Grateloupia filicina*), preferred the seaward sides of fishponds in more saline areas. Other freshwater limu are only collected from upland sources such as lo‘i, ponds, and streams (Abbott 1992:46–48).

The subsistence use of abundant shoreline resources within Lahaina continued well into the twenty-first century. As recently as 2012, representatives of the Lahaina Civic Club noted that the shoreline between Launiupoko and Awalua "[c]ontains many resources which are critical for the continuance of traditional and customary native Hawaiian practices (pole fishing, diving, collecting limu, camping, etc.)" (personal communication, February 1, 2012, cited in McGerty and Spear 2012:15).

An even more detailed description of traditional and customary uses of marine resources in Lahaina comes from Kepā Maly and Isaac Harp's interview with Frank Harrison and Teresa Smith-Neizman on March 25, 2003. The interview was entitled "Recollections of Fisheries at Lāhainā and Māla, Maui; and Kaunolū Lānaʻi; and ʻŌpelu Fishing in the Present Day" (Maly and Maly 2003:1002). Fish were plentiful at the time of the interview. F. Harrison discussed fishing for several species of fish common to the area, including ʻōpelu, *ʻōpelu kala* (a kala fish staying with ʻōpelu schools, *Naso hexacanthus*), *ʻulua* (the adult stage of certain species in the family of Carangidae), *pāpio* (the youngest stage of ʻulua), *moelua/weke ʻula* (*Mulloidichthys vanicolensis*), *moano* (goatfish, *Parupeneus multifasciatus*), *moano hulu* (similar to weke ʻula but with a beard), and *ʻumiʻumi* (unknown, "whiskered") (Maly and Maly 2003:1012, 1016). They also discussed the types of limu common to the area.

At the time of the interview in 2003, T. Smith-Neizman described an area with plentiful limu easily available for gatherers. She specifically mentioned collecting *ogo* (*Gracilaria parvispora*), manauea, *līpoa* (*Dictyopteris plagiogramma* and *D. australis*), and *wāwaeʻiole* (*Codium edule*). It is worth contrasting Smith-Neizman's depiction of the shores of Lahaina as so abundant with limu that traditional gatherers could collect as much as they wanted, with the observations by Blossom Feiteira and Keʻeaumoku and Uʻilani Kapu recorded as part of the current study that indicate that all types of limu in Lahaina are disappearing (see Section 3.4.3, and Section 3.4.4). Smith-Neizman, however, also observed that runoff from swimming pool water or another source encouraged the growth of several kinds of inedible "pilau limu," including a variety of green, slimy, hair-like limu, that tangled up with the edible limu (Maly and Maly 2003:1014). This recollection may dovetail with the Kapus' belief that the installation of septic systems and leach systems in the early 2000s affected water quality, eventually causing a dramatic decline in limu populations (see Section 3.4.4).

2.1.11 Historic Properties within Panaʻewa

Two historic properties possessing SIHP numbers were recorded within the ahupuaʻa of Panaʻewa. These include SIHP Site 50-50-03-01776, the Haia Terrace Systems and SIHP Site 50-50-03-02483, the Kahoma Stream Agricultural/Habitation Complex (Office of Hawaiian Affairs [OHA] 2023a). Both of these sites provide further proof that the ahupuaʻa of Panaʻewa was heavily cultivated in *ka wā kahiko* (pre-Contact times).

These two sites are located downstream of the planned L1 well.

2.2 Māhele ʻĀina

A dramatic change that affected the lives of Hawaiians in the 1840s was the Māhele ʻĀina (land division, also known as the Great Māhele or simply the Māhele), which ended the traditional Hawaiian system of land tenure and ushered in private ownership of land. Under the traditional system, the *makaʻāinana* (common people) occupied and worked the land under the supervision of the aliʻi and their konohiki (land stewards). The chiefs in turn held the land in trust for the aliʻi nui, who held it in trust for the akua (the gods). The Māhele, instituted by Kamehameha III, legalized the private ownership of land along the Western model, legislating that the lands of the Hawaiian Kingdom were to be "divided into three parts—one to the Chiefs, one for the support of the Government, and a third for the King's personal use. These we know by the names of 'Konohiki,' 'Government' and 'Crown Lands'" (Indices of Awards 1929:vii).

It was principally from within the chief's "one-third of the Great Māhele that the common people, who were their tenants, received title to the small holdings which are known as 'Kuleanas.' These Kuleanas were areas which these tenants had improved and used for their own purposes" (Indices of Awards 1929:vii).

In December 1845, a Board of Commissioners to Quiet Land Titles (often referred to as the Land Board or Land Commission) was established to investigate land claims and make awards based on these claims and their supporting testimony. If a claim was approved by the Land Board, a Land Commission Award (LCA) was granted to the claimant. These LCA properties were known as *kuleana* lands. Each claim was assigned a *helu* (Land Commission Award number). Often a single kuleana claim consisted of several *ʻāpana* (land divisions within a helu). An index of these claims can be found in *Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands* prepared by the Office of the Commissioner of Public Lands of the Territory of Hawaiʻi in 1929 (Indices of Awards 1929).

2.2.1 Land Awards, Moku of Lahaina

In total, 603 Lands Awards, including Land Commission Awards, were recorded for the moku of Lahaina in the Kīpuka database (OHA 2023b). The large number of LCAs corresponds with the ethnohistoric research pointing to a large population in the area.

2.2.2 Land Awards, Ahupuaʻa of Panaʻewa

The Māhele land awards for the ahupuaʻa of Panaʻewa include 11 kuleana claimed by eight kuleana tenants, Kamehameha III claimed one piece of land, the Board of Education was granted one school lot, and the remaining lands were claimed by Mataio Kekuanaoa under the LCA number 11216:15 (OHA 2023b).

2.2.3 Land Awards, Ahupuaʻa of Waineʻe

In 1871, R. Kalaipaihala was granted LCA 5207:1, Royal Patent Grant 5660, which encompassed a large portion of the ahupuaʻa of Waineʻe. An additional 35 other LCAs were awarded to 22 other individuals (OHA 2023b).

2.3 Plantation History

During the late 1800s, Kanahā and Kahoma Streams were still full of abundant, flowing water:

> Before the building of the sugar mills in Lahaina, water was seen flowing through the streams of Kauaula, Kanaha and Kahoma. Taro was seen growing abundantly, and on the terrace banks, there was growing cabbage, bananas and such. The people of Lahaina were always seen planting taro. Thus it was known that the famines were set aside, and the abundance of the land made this clear … Thus it is right that the people of Lahaina, plant these foods, that they may end these famines … (Kahaulelio 1867:4, [Maly, translator], cited in Maly 2007:934)

In 1860, James Campbell started what would become known as the Pioneer Mill Company, a sugar plantation in Lahaina. As the years progressed, the company expanded its holdings by acquiring Lahaina Sugar Company and the West Maui Sugar Company. By 1885, Pioneer Mill Company was cultivating 600 acres out of the total 900 acres it owned at that time, and this number increased to 8,000 acres by 1910. In 1913, Pioneer Mill Company acquired the Olowalu Company, adding 1,200 acres of cane land to the plantation. By 1935, over 10,000 acres were producing cane for the Pioneer Mill. Approximately

1,000 acres of cane was flumed directly to the mill while the rest of the cane was transported by rail (Hawaiian Sugar Planters’ Association 2004).

Irrigation of Pioneer Mill Company’s fields, an area approximately 10 miles long and 1.5 miles wide with altitudes between 10 and 700 feet, was accomplished with water drawn from wells and water transported from the West Maui Mountains. The McCandless brothers drilled the first well on Maui specifically for Pioneer Mill Company in 1883. By 1935, substantial investments, totaling more than $3,000,000, were made in water development, including gravity systems and underground supplies (Hawaiian Sugar Planters’ Association 2004).

By the 1930s and 1940s, few families continued to farm in the valleys of Kaua‘ula, Kanahā, and Kahoma (Maly and Maly 2007:13). During the current study, the consultation meeting with ‘Aha Moku o Maui members Ke‘eaumoku Kapu and U‘ilani Kapu revealed that, even if many families ceased kalo cultivation by the 1940s, a handful of families still cultivated kalo in Kaua‘ula Valley and nearby areas up until the 1970s. They recalled the 1950s as a time with abundant water, before a significant amount of water in the Kahoma and Kanahā Streams was redirected.

2.3.1 Lahaina’s Plantation Ditches

It is clear from early accounts that the valleys irrigated by the Kanahā and Kahoma Streams in pre-Contact and early post-Contact times were widely cultivated through careful management of the water from these streams (Handy 1940:104–106, cited in Sterling 1998:36). The traditional “eleven day” water management system described above dramatically changed during the plantation era (see Section 2.1.9). Pioneer Mill Company was the plantation of most relevance for the current permit area. Pioneer Mill Company established a number of ditches of the same name as the streams that they tapped into or areas that they served. Pioneer Mill Company’s ditch systems named Kahoma, Kanahā, Kaua‘ula, Launiupoko, Olowalu, and Ukumehame are briefly described here. The Kanahā ditch supplied Maui County, the Lahainaluna ditch, and the Pioneer Mill Company factory (Wilcox 1997:134). According to Carol Wilcox, in her book *Sugar Water: Hawai‘i’s Plantation Ditches*, the two intakes of Kanahā ditch had a combined median of 3.68 million gallons a day (mgd). The County of Maui had rights to 0.5 mgd. Lahainaluna Schools, by way of the State, was entitled to flow for 4.5 hours a day after Maui County was served. The surplus was sold by Pioneer Mill Company to the County of Maui after the needs of the factory were satisifed. The overflow went back into the Lahainaluna ditch (Wilcox 1997:136–137).

Below is a short review of the flows of each ditch prior to Pioneer Mill Company’s closure in 1999.

- Kahoma ditch was reported to have an average flow of 3 mgd.
- Kanahā ditch was reported to have an average flow of 3.8 mgd.
- Kaua‘ula ditch, upgraded in 1929, was reported to have an average flow of 4.5 mgd. (Wilcox 1997:66)

2.3.2 The 1867 Famine in Lahaina

D. Kahaulelio published “No ka Wi [About the Famine]” in the Hawaiian language newspaper *Nupepa Kuokoa* on April 13, 1867. The article explains that in the early months of 1867, Lahaina faced a severe famine due to a significant decline in food resources. A committee comprising D. Kahaulelio, S.W. Nailiili, M. Ihihi, and D. Baldwin was formed to investigate the underlying causes of this scarcity. Their investigation revealed that 250 men were employed in the sugar mill in Lahaina. The lure of higher wages in the sugar cane plantations led to a shift away from farming, exacerbating the food shortage in the area. Moreover, the committee found that the sugar cane plantations were also responsible for water scarcity in the area:

Famines have been known throughout history around the earth… Here are the thoughts of this Committee on some of the reasons for the famine in the district of Lahaina.

1. The many sugar mills in Hawaii nei, there are 33. They do not farm, but instead, they burn up the food of the kalo lands. Such as Honokohau, Halawa, Waipio, &c.

2. In Lahaina, there were many loi and dryland sweet potato fields before, but in these days, they have been turned over to planting cane.

3. There was plenty of water gotten by the people who farmed before, but in this time, the water has all gone to the sugar cane; and the foreigners are now making great efforts in places formerly cultivated by the people who planted taro, sweet potatoes, bananas, gourds, and such.

4. The high price gotten for sugar cane, causes those who cultivate taro, sweet potatoes, and gourds to consider it a waste, because they want more money, but there is not ample food, and that is the mistake.

5. There are 250 men who work the sugar mill in Lahaina. They work strongly in this work, but not in farming, and these words apply as well to the lands cultivated in sugar cane throughout all Hawaii; there is burden and hardship.

6. There are also many idle young people who dwell in Hawaii, thus the farming is left to the elderly people.

7. On Hawaii and Maui, many of the strong people have gone off to the work of gathering pulu (tree fern down), pepeiao (forest mushrooms), and such, to earn money, not food.

8. There are many people to eat the food in this time, as in the time of Kamehameha III, but, beware, the number of people cultivating the food is decreasing.

9. God is not the reason for this lack, nor is it because there is a lack of rain—instead it is the lack of thought by men. Those of Lahaina are quick to judge, they think that in putting their land to sugar planting, that they shall have paiai (thick slabs of taro mash, into which water is added to make poi). So this is what the committee finds is the problem of famine in the district of Lahaina.

Committee

Rev. D. Baldwin,

M. Ihihi,

S.W. Nailiili

(and) D. Kahaulelio (Kahaulelio 1867, translation by Kepā Maly, cited in Maly 2024).

3 COMMUNITY CONSULTATION

3.1 Community Consultation Methodology

SWCA identified and consulted with individuals familiar with past and present cultural activities conducted in the permit areas, particularly those related to water. To initiate this process, SWCA compiled a list of cultural consultation contacts that included government agencies, Native Hawaiian Organizations (NHOs), community groups, and individuals identified as having a potential interest in water use activities in the Lahaina Aquifer Sector.

In compiling this list, SWCA included all NHOs listed on the U.S. Department of the Interior's *Native Hawaiian Organization Notification List* whose geographical purview is Maui Island and whose stated mission relates to environment and/or culture. The list also included select NHOs with a statewide purview whose stated mission relates to the environment and/or culture. SWCA prepared a request for consultation letter, a copy of which was sent out to each of the contacts on the cultural consultation contact list. The request for consultation letter delineated the area of the Lahaina Aquifer Sector, described the Ka Pa‘akai Analysis component of the water use permit application, and requested assistance in:

- Identifying *kama‘āina* (long-term residents), kūpuna, and other individuals who might be willing to share their cultural knowledge of the permit areas and their cultural resources.
- Information on present and past water use in the permit areas.
- Information on place names and cultural traditions associated with the permit areas.
- Information on cultural resources that may be impacted by water use activities by the MDWS.
- Knowledge of traditional gathering practices within the permit area, both past and ongoing.
- Information on any current cultural practices being carried out within the permit areas.
- Any other concerns the community might have related to cultural practices within or in the vicinity of the permit areas.

The text of the request for consultation letter is provided in Appendix A of this report.

Considering the devasting impact of the August 8, 2023, wildfire on the community of Lahaina, it was particularly challenging to engage in meaningful and culturally sensitive community consultation for this Ka Pa‘akai Analysis, given the community's preoccupation with addressing immediate needs. For this reason, this Ka Pa‘akai Analysis relies heavily upon previous, publicly available studies that involved consultation with members of the Lahaina community regarding water issues. Information provided by community members and cultural practitioners as part of these studies that have direct relevance to the issues addressed in this analysis has been included in the following sections. The results of individual interviews, both previous and current, are presented under the names of the individuals interviewed.

To solicit additional feedback from the community, SWCA published notices in the October 2023 issues of *Ka Wai Ola* and *The Maui News* (see Appendix B). SWCA also sat in on the September 19, 2023, and October 17, 2023, meetings of the CWRM, both of which facilitated hours of public testimony.

3.2 September 19 and October 24, 2023 Commission on Water Resource Management Public Meetings Oral and Written Testimony

On August 8, 2023, Lieutenant Governor Sylvia Luke signed the first emergency proclamation in response to the Lahaina wildfires, the “Proclamation Relating to Wildfires” (Office of the Governor 2023a). Later, on August 13, 2023, Governor Josh Green signed the Fifth Emergency Proclamation, which suspended Chapter 174C, HRS, the State Water Code, along with Chapter 6E, HRS, historic preservation (Office of the Governor 2023b). The suspension of the State Water Code, along with the reassignment of CWRM’s Deputy Director Kaleo Manuel, aroused anger on the part of many people in Maui Komohana (West Maui) (Tummons 2023). Soon thereafter, the governor signed the “Seventh Proclamation Related to Wildfires,” which reinstated the State Water Code and most historic preservation measures, effective October 8, 2023 (Office of the Governor 2023c). During this turbulent period, the community was left confused and uncertain about the fate of the Lahaina Water Management Area designation, with doubts about whether it would be retained. DLNR Director Dawn Chang clarified during the CRWM September and October meetings that the Governor reinstated the water code and the Water Management Area designation for the Lahaina Aquifer Sector would remain in place.

On September 19 and October 24, 2023, the CWRM held public meetings and provided an update on water resources in the Lahaina Aquifer Sector Area post-fires. The issues discussed during these two public meetings included wells in the fire-impacted area, Interim Instream Flow Standards, Water Use Permit applications, and water-resource alternatives. They also solicited public testimony on these non-action items.

These two meetings were the first CWRM meetings following the wildfires that devastated parts of Maui in early August. These meetings drew in hundreds of individuals, including several members of the West Maui community, eager to voice their opinions on the matters at hand through written and oral testimony. The testifiers were nearly unanimous on the following points:

1. The Water Commission should uphold the State Water Code to ensure public trust water resources are shared equally, especially for Native Hawaiian water rights.
2. The Water Commission should verify that West Maui Land Company is complying with instream flow standards and hold corporate interests accountable.
3. The Water Commission should re-center Maui kama‘āina in the decisions about their future.

During these meetings, some community members argued in favor of expanded allocation of water to the MDWS for domestic use. Many community members indicated that they felt that domestic use for local people should take precedence over usage by private water purveyors.

3.2.1 Uphold the Water Code, Water Management Area Designation, and Instream Flow Standards

Immediately following the fire, the State Water Code was suspended, leaving the community in a state of confusion and worry over the status of the Water Management Area designation. They feared that the decades spent advocating for the designation would be in vain. Although the water code was reinstated and the designation of Maui Komohana as a Water Management Area remains intact, many community members felt that CWRM should go further. Many community members referenced the need for more monitoring and enforcement of instream flow standards to ensure mauka to makai flow. Others urged CWRM to increase the instream flow standards.

For example, Karen Kanekoa stated that the stream had been diverted to feed the pockets of capitalist entrepreneurs for 150 years. She said that CWRM took a huge step forward in June 2022, when CWRM unanimously designated Maui Komohana as a groundwater and surface water management unit. Her *'ohana* has been working for the last year in hopes that their water rights will be protected, putting in their own water use applications a day before the fire. Then, the governor suspended the water code, which she believes gave greedy developers a chance to steal water while leaving their streams dry.

Archie Kalepa stated that one of the most important things that needs to be done is to maintain the Instream Flow Standards in perpetuity. He said that he personally witnessed the transformation of Kahoma Stream when the water returned and restored mauka to makai connectivity. The water was finally returned to the streams, and families with generational ties were able to restore their ancestral lands, including his family in Kahoma. Hāloa was finally able to thrive again. He recalls watching the riparian species becoming more abundant after more water went into Kahoma Stream.

Tiare Lawrence said now that the lifeblood of Maui Komohana is left flowing again, the people will return to cultivate the taro. She said that kalo farmers have diligently gone through the water permit application process, and that it would be heartbreaking for this process to go to waste considering that they are still reeling from tragedy.

3.2.2 Prioritize Community Water Needs Over Private Purveyors

Community members agreed that the tourism industry and luxury housing developments consume most of the water in West Maui, leaving little for kalo farmers and other cultural practitioners. Several argued that water is held for public trust to support domestic use of water, and kalo cultivation. Some pointed to the fact that several small-scale kalo farmers had been denied their water use permits. They wanted to see the permits of all kalo farmers granted.

Kekai Keahi reiterated that private purveyors control about 75 percent of the water in West Maui, none of whose systems are connected to MDWS. He questioned why local people were subject to drought restrictions and could receive fines for washing their cars or watering their lawns, meanwhile at the resorts pools were full and the landscaping green. He asked, "Why is it that if water is a public trust, we have to pay one hundred dollar fine if we use too much water, while the resorts and wealthy gentleman estates have plentiful water."

Nameaaea Hoshino also stated that their people have been fighting big corporations for access to water for over a century. He particularly called out West Maui Land and Launiupoko Irrigation. He says that their water usage puts a strain on his family, who produce kalo. They had to move because there was not enough water to grow kalo. He said that privileging private water purveyors is disastrous for generational kalo farmers.

Haele Kiapono wanted to see water access for working class citizens to be prioritized. He asserted that only 23 percent of the water used in West Maui goes to the County. He also wanted to see more enforcement of Instream Flow Standards and ecological restoration for forests and streams.

Another kalo farmer testified that traditionally, according to the kānāwai, you must put all the water that you used back into the stream in the same condition. He argued that the private water purveyors were not doing so.

Sesame Shim pointed to the infinity pools and well-irrigated gentleman's farms using large amounts of water. She recalled that Lahaina used to be a lush, shaded area full of 'ulu and kalo.

3.2.3 Restore Mokuhinia and Mokuʻula, the Piko of Maui Komohana

The cultural importance of restoring Mokuhinia and Mokuʻula emerged as a major theme of the September and October 2023 CWRM meetings with several community members speaking to its significance.

Keʻeaumoku Kapu stated, "words cannot express how important this *wahi pana* [storied place] is....Maui's highest ranking *aliʻi* [chief] were laid to rest and still are there today. Like many sacred places, it was drained by Pioneer Mill...Today Mokuhinia and Mokuʻula are entombed in sediment."

Uʻilani Kapu testified on behalf of the importance of sufficient water for Mokuʻula and Mokuhinia. The Kapu family wants to restore Mokuʻula for the future generations and to do so restoring mauka to makai flow of water is necessary. She believes that restoring mauka to makai flow is necessary for the spiritual healing of Maui Komohana, Mokuhinia, Mokuʻula, and the moʻo Kihawahine. Uʻilani Kapu also articulated that Mokuʻula is one of the most sacred places on the island. She said that Mokuʻula had been a hub for traditional cultural practices. It is also the site where Kihawahine, the daughter of Piʻilani, was made an ʻaumakua. She has served as a protective gaurdian of the people of Lahaina since that time, up through today. She said of Mokuʻula, "Mokuʻula is everything. It is our wai, it is our protector. We need to establish our *piko*. This is why everything is going crazy . . . . Our ʻāina is crying for help."

A number of other community members discussed Kihawahine, the *moʻo* (water deity) of Mokuhinia. For example, Kaleo Kauhane of Lahaina said that his grandmother told stories of their ʻaumakua, Kihawahine. She said that the moʻo would come over the people at night time in the form of a cloud to protect the people. As the sun came up the cloud dissapeared, and at night it rained. The land was fertile enough to support an ʻulu band at that time. He said that it is nuts that today Kauaʻula is dry.

Uʻilani Tevana also referred Kihawahine, who carried the people of Lahaina and inhabited its sacred places. She urged the CWRM to think more from the feminine principles of life-giving and healing, rather than following the masculine, colonized, acquisitive spirit which always seeks more. She wants to see the waters flowing again from Kauaʻula Stream into Mokuhinia, the piko of Maui Komohana.

Tiare Lawrence testified on behalf of her nonprofit organization Ka Malu o Kāhālawai, a Maui Komohana nonprofit organization committed to environmental stewardship in West Maui. Her kuleana to Mokuʻula and Mokuhinia was passed down from mother and Aunty Blossom Feteira, who were involved with Friends of Mokuʻula. She expressed concern that groundwater withdrawals from wells could impact streamflow to Mokuʻula. When T. Lawrence was asked about potential impacts from additional groundwater withdrawal via the planned L1 and L3 wells in Launiupoko Aquifer System, she said that any water withdrawn from the wells was less water available for restoring Mokuhinia. She said, "if they pump groundwater, how are the springs supposed to come back at Mokuʻula?"

Kapali Keahi argued that Native Hawaiians must be involved in decision making for water resource allocation if Mokuʻula is to be restored. He said that he has noticed water coming back into Kauaʻula Stream ever since the wells in the area were damaged. He feels that this demonstrates that the wells adversely affect streamflow in Kauaʻula, which feeds Mokuʻula. He also said that "it is well within our rights as kānaka maoli to worship that area, to worship the moʻo (of Mokuʻula)."

Aunty Blossom Feteira said that she is a staunch water rights advocate. She wanted to provide some historical context about development plans from the 1960s that focused solely on economic development at the expense of Mokuʻula. She said, "we should have full flow for Kauaʻula and Kahoma streams which feed Mokuʻula. Without that, there is no chance for the restoration of the Mokuhinia complex."

Finally, Candace Fujikane, a professor at the University of Hawaiʻi at Mānoa, testified that restoring Mokuʻula is also an important step towards restoring the native ecosystem, which would also reduce the likelihood of human-induced wildfires in the area.

3.2.4 Explore Water Use Alternatives Such as R-1 for Agricultural Purposes

Mahesh Cleveland, an attorney with Earth Justice, testified regarding the Lahaina Wastewater Reclamation Facility. According to Cleveland, this facility produces 3 to 5 million gallons of R-1 water (filtered and disinfected recycled water) every day, which is supplied to resort properties in Kāʻanapali. He also stated that there is an additional 5 million gallons of water at the top of the County's Honokōhau tract. He believes that this is a viable source of water that the County already has access to. He asserts that currently this water is dumped into injections wells and flows into the ocean and kills the reef. He argued that the County should reutilize 100 percent of its R-1 water for agricultural purposes, since the nitrogen that kills the reef is good for land plants.

At the October 24, 2023, CWRM meeting, Kekai Keahi encouraged the CWRM to explore infrastructure investments, suggesting the implementation of a dual-system water line. One line would supply R-1 water, while the other would be exclusively for drinking water.

3.2.5 Include Community Members in Decision Making

Community members unanimously agreed that inclusion and transparency in decision making are essential to restore the community's trust in government agencies. Professor Ty Kawika Tengan demanded that the CWRM acknowledge the leadership and wisdom of the local community, emphasizing the importance of listening to their concerns regarding the impacts to their moʻo (descendants). John Cardi urged policymakers to prioritize Native Hawaiian wisdom and traditional ecological knowledge in their decision making.

3.2.6 Protect Streamflow for Native Riparian Species

Several community members emphasized the importance of protecting native riparian species such as ʻoʻopu, hīhīwai, and ʻopae.

Lauren Palakiko said that Lahaina was once a wetland, yet today, due to mismanagement, it is dry. She stated that Launiupoko Irrigation Company cut their water, causing their loʻi kalo to run dry and their kalo to rot. They saw their *muliwai* (river mouth) run bone dry, creating an "oʻopu graveyard." She pointed to the potential for continued natural disasters with water mismanagement.

Kekai Keahi reminded the CWRM that Honokōhau is home to hīhīwai and ʻopae found nowhere else in West Maui today. These species all depend on the water. He further stated in the fight for water, if the muliwai has water, if instream flow standards are met, then the kalo famers also have enough water. Traditionally, kalo farmers always get the water last, not first. The stream life comes first. As long as they get enough water, kalo farmers also get enough water. Not only for the sake of the kalo farmers, but for the hihiwai and the ʻopae, it is imperative that the instream flow standards be maintained.

Archie Kalepa also pointed to the importance of freshwater stream flow for the coral reefs. He said that he has personally witnessed the change in the Kahoma Stream as the mauka to makai flow has been restored. He said we must fight for the ʻoʻopu, the ʻopae, and the hīhīwai, which do not have a voice. He said we must fight for them because they are part of the life of the island.

Mia Lisa Otis also argued that protecting water protects the wildlife, the riparian species, and the entire ecosystem.

3.2.7 Protect Streamflow for Native Ecosystem Resilience

Hiʻialo Palakiko, a kalo farmer from Kauaʻula, expressed sorrow that her ʻohana cannot open all of their loʻi because there is not enough water. She expressed outrage at the number of times her 2-year-old son has seen Kauaʻula run completely dry because of private water conveyors shutting off flow to their loʻi. She recalled a time one year ago when Kauaʻula ran dry. Her ʻohana ran out with buckets and flashlights to save as much native stream life as they could. At the age of 2 her own keiki jumped in to save the stream life because "the bad guys cut off the water." She is worried that there will be nothing left for the future generation to mālama if something doesn't change. She poignantly stated that without wai, there is no ʻāina; and without ʻāina, there is nothing for the kānaka. She wants mauka to makai streamflow to be restored so they can also focus their efforts on restoration.

Danny Palakiko stated that the Palakiko property in Kauaʻula is green and verdant because of the streamflow, whereas everything 10 feet to the right or left is yellow and dry. He is concerned that this dessicated vegetation provides fuel for a future wildfire. He cited a 2017 study about natural climate solutions. He then said: "Since we are in Hawaii, it would be kānaka maoli solutions. Those are the natural solutions in the *pae ʻāina* [the Hawaiian archipelago]." He then went on to discuss how kānaka were no strangers to drought in the past, even in Lahaina. He said that even during droughts, Lahaina had so much greenery and vegetation that wildfires were not an issue. He wants to see more investment in the environmental restoration of wetlands, forests, and coral reefs. He also stated that creating a canopy of native trees would create a "sponge effect" which would cause more rainfall in Lahaina overall.

Janette Iʻi emphasized that mauka to makai streamflow is essential for culturally important species. She stated: "You will not smell limu without wai flowing into the ocean. You will not see the beautiful colors of our reef without mauka to makai streamflow. You will not see the fishponds or fish in the ocean without mauka to makai streamflow. You will not see the ʻulu trees grow back without wai. You will not see our future if you do not root for our wai... Return the water to Mokuhinia so we can return Kihawahine back to her ʻāina."

Lauren Palakiko, a kalo farmer in Kauaʻula Valley, wanted to see all water users prioritize public trust purposes. She said that the IIFS for Kauaula helped bring back the ʻoʻopu, ʻōpae, and hīhīiwai in their stream, but they die when Kauaʻula dries up. She looks forward to the time when the stream animals and the kalo farmers can all thrive together.

3.3 Public Comments for the Instream Flow Standards Assessment Reports

In 2017 and 2019, the State of Hawaiʻi, CWRM held consultation meetings to gather public comments for the Instream Flow Standard Assessment Reports (IFSARs) for the Lahaina Aquifer Sector. The public comments given during the meeting for Ukumehame, Olowalu, Launiupoko, and Kauaʻula are applicable to the current Ka Paʻakai Analysis and are presented here to enhance and supplement the community consultation effort for this Ka Paʻakai Analysis.

Note that this testimony was years before the August 2023 fires that devastated Lahaina. However, many of the same issues mentioned in the September and October 2023 CWRM meetings were echoed previously for the IFSAR testimony.

3.3.1 Public Comments for the Ukumehame, Olowalu, Launiupoko, and Kaua‘ula Instream Flow Standard Assessment Reports

The Maui Water Use Draft Plan references a meeting conducted on March 8, 2017, during which community members submitted testimony that the DLNR should "...refrain from issuing any more water permits before Native Hawaiian water rights are restored to practice traditional and cultural uses" (MDWS 2019:20). These concerns were evident during two separate consultation meetings while developing the IFSAR for the Lahaina Aquifer Sector. The CWRM held a consultation meeting for the Hydrologic Unit of Ukumehame, Olowalu, Launiupoko, and Kaua‘ula. As part of this study, the comments from the community were reviewed to determine what sorts of traditional and customary practices were carried out in the area, and what sorts of potential mitigation measures were recommended by these community members. A total of 13 people testified in person during the meeting for Ukumehame, Olowalu, Launiupoko, and Kaua‘ula. The following section discusses the most relevant comments for this report.

The public comments for Ukumehame, Olowalu, Launiupoko, and Kaua‘ula revealed community concerns about sufficient water to irrigate existing and future lo‘i, the need for land stewards to maintain the ditches to ensure continuous water flow, enforcement of existing water allocations, and the need to protect and monitor populations of native stream species. The most relevant comments for this analysis have been broken down by theme.

3.3.1.1 INSUFFICIENT MONITORING AND ENFORCEMENT OF CURRENT WATER SUPPLIES

Rose Marie Duey spoke on behalf of the Olowalu Cultural Preserve, emphasizing the need for adequate water to preserve, protect, and perpetuate cultural practices like farming lo‘i kalo. She also references significant cultural, archaeological, and burial sites in the Olowalu Cultural Reserve:

> Olowalu Cultural Reserve has 74 acres of leases lands for 99 years from Olowalu Elua Associates. These lands are the significant cultural and archaeological burial sites, and most of its kuleanas. The mission of Olowalu Cultural Reserve is to preserve, perpetuate and educate the practices of our kanaka maoli [*kānaka maoli*, Native Hawaiians] by rebuilding what has been lost through years of plantation's disturbances... There are 40 kuleana with an acreage of 100 plus, which were partly in kalo and mahiai [*mahia‘ai*, farming]. Please ensure that we will have wai to continue our traditional and customary practices from the Olowalu River. (DLNR CWRM 2018:1)

Several people called out the need for enforcement of existing water allocations. Albert Perez opined:

> … I think the only way is to make a presumption that the water is supposed to be in the stream for instream uses, for kalo farmers, for the ecosystem, the native fish. And then for every diversion that you have, you … need a gauge. You need a meter. Before the diversion and after the diversion, so that you know exactly how much water is being taken … (DLNR CWRM 2018:9–10)

Jonathan Scheuer, with the Department of Hawaiian Homelands, and John Duey felt that the IFSAR report radically underestimated the amount of water required for lo‘i kalo. Scheuer also argued that CWRM must consider the impacts of climate change on stream flows in coming decades when allocating water for future generations of kalo farmers:

> On the reports, you guys have buried in there, a suggestion that using the Water Commission's irrigation standard program that lo'i kalo needs 6600 gallons per acre per day. At least in the Ukumehame report. Maybe a zero was dropped off. It's radically

> undercounting of how much water, even by USGS reports that the Water Commission has relied on previously which have said, at a conservative minimum, 150,000 gallons per acre per day is what loʻi kalo need.... But, to do this for all, almost 400 streams in the State, we're talking like my grandchildren's time by the time you've set instream flow standards, at which time climate change and other driving factors are going to create even more problems... But as near as I can understand, you're trying to say, okay, we're supposed to protect instream flows and there's all sorts of things associated with instream flow standards like recreational uses, kalo growing, traditional and customary access, all these things...the burden is never supposed to be on public trust uses of water... I'm sorry, it's supposed to be the private diverters who are coming up and saying, yeah, we are proving that we're not affecting native Hawaiian rights, we're not affecting streamflow, we're not affecting anybody's kuleana rights, in order to take this amount of water we want for development. (DLNR CWRM 2018:3)

Kekai Keahi recalls being the only kalo farmer in Lahaina growing up, and not realizing until later that the reasons for this had to do with access to land and water:

> … Looking at that, and then I look at the river in Lahaina, except for Ukumehame after they went stop the plantation, I looking at the rivers in Lahaina. Ho, 100 percent dry. So where was the protection, where's this protection, for all these things that is stated in the law and that's supposed to be protected. Nobody protecting 'em... Skippy and Kanoe went into the streams, and you'd be shocked to see if you give life one chance, how fast she come back. Because in that stream, it's pretty hard to walk around without almost stepping on one fish. It's serious, yeah...The instream flow standard, interim instream flow, you was saying to me that at any point that can be amended, the flow, based on usage, in case we get more people return to the valley, then more water is needed for the valley as far as kuleanas and what not. So, I can see plenty guys going home, you just gotta give them one chance. Just like the fish, give them water, the people going come home... (DLNR CWRM 2018:7–9)

He also mentions the need for enforcement, especially for large landowners like Kamehameha Schools and West Maui Land who use much of the water in Kahoma Stream.

Several people called for enough water access that would allow future generations of Kānaka Maoli to return to farming kalo. For example, Foster Ampong stated:

> I would like to see the Commission address each stream and the amount of water each valley will need to raise taro. Because these taro patches are ancient. They were here thousands of years, literally, before any of the development that you see today. And so the water that has been drawn from the rivers, from these kahawai, has been drawn by the taro farmer for millenniums, from time immemorial... And so, I would like to see the Commission address and look at how much water each taro farmer would need based upon the taro patches that's in the stream. So if you have one family that's using one or two patches, you can't say that, OK, that's all he's going to need. When in his whole ʻiliʻaina, or his kuleanas, he may have 23, 25, 30 patches. So, the determination should be based upon that … (DLNR CWRM 2018:9)

Jessica Kailani Ross expressed a similar statement:

> Many people have been displaced from their land for 150, 100 years or more, and we're finding our way back to our kuleanas, our land commission awards, and we're rediscovering how to live in a sustainable way … We don't have our land base. And as we return to our land base, we will return to loʻi kalo and we will need the water. So you

> need to keep that in mind and put a significant amount aside for reopening loʻi kalo and returning, rehabilitating the people. (DLNR CWRM 2018:2)

3.3.1.2 NEED TO MANAGE WATER USING AN AHUPUAʻA-BASED APPROACH

Uʻilani Kapu, from Kauaʻula, expressed concern that water from one ahupuaʻa should not be diverted to another:

> I'm here because this private water company transfers water to Launiupoko. [Under traditional Hawaiian water management] the transfer of ahupuaʻa to ahupuaʻa was never taken up. It shouldn't be. It shouldn't be done now, because one ahupuaʻa sustains itself by its own water resources. And the other ahupuaʻa is supposed to do the same. Kauaula water is for Kauaula, for all the kuleanas that live there. We have over, I would say, 50 to 75 people within that area now. All the families have come home, and we depend on this. We depend on it for our household. We depend on it for our farming. We depend on it for everything … (DLNR CWRM 2018:1–2)

3.3.1.3 NEED FOR MONITORING OF CULTURALLY IMPORTANT STREAM SPECIES

Charlie Palakiko emphasized the ecological benefits of maintaining the ʻauwai (ditch, canal) and revitalizing stream flows in the Waimana ʻauwai, which he began cleaning up in 2002 to irrigate his loʻi. By 2015, this initiative had not only enabled fresh water to reach the ocean in Kauaʻula but also facilitated the return of native species such as ʻoʻopu, crayfish, and clams. Palakiko noted that by restoring a small section of a previously dry stream, a significant revival of aquatic life occurred, including ʻōpae and various ʻoʻopu species, proving the area's potential for protection due to its riparian, aquatic, cultural, and recreational resources. Additionally, Kanoelani Steward, working with Uncle Skippy Hau and The Nature Conservancy, documented the presence of multiple species, including ʻōpae ʻoehaʻa (*Macrobrachium grandimamus*); hīhīwai or wī (*Neritina granosa*); hapawai (*Theodoxus vespertinus*); ʻoʻopu naniha (*Stenogobius hawaiiensis*); ʻoʻopu ʻakupa (*Eleotris sandwicensis*); ʻoʻopu nākea (*Awaous guamensis*); ʻoʻopu nōpili (*Sicyopterus stimpsoni*); and ʻoʻopu ʻalamoʻo (*Lentipes concolor*) across multiple locations like Ukumehame, Olowalu, and Kauaʻula. These efforts highlight the significant biodiversity and the critical need for ongoing conservation in these ecosystems.

3.4 Oral History Interviews

The following sections include the results of oral history interviews with community members and cultural practitioners from the Lahaina area.

3.4.1 Harold "Hale" Kaniho

Some information about fishing for ʻoʻopu and ʻōpae in the Panaʻewa area came from an oral history interview with Harold "Hale" Kaniho in Olowalu conducted for the 2008 documentary "Lahaina – Waves of Change" (Kaniho 2008). H. Kaniho's interview reveals that Panaʻewa was abundant with oʻopu, ʻōpae, and other fish when he was young:

> When we were young … [the area of Panaʻewa] was sacred to us. There were some places I remember [my dad] telling us stories about places and what we needed to do. And be very respectable in that area. He didn't trust us too much when we were young … he would say you guys stay close to the sea … he was telling us … you do certain things … But when we were ready to come home, that was the time we would get the oʻopu and

> ʻōpae because it was easy … and it didn't take much to get and take home what we wanted … my dad used to bring it down to the cave and we used to tie it across the river and we didn't used to understand why he used to do that but later on, we found that the cool water from the river would go into the meat and keep it fresh underneath. You know? And it was exciting. In there three days four days we would be ready to go home, we would pack all our things and go home. But we learned something why he did those things and how to preserve the food and stuff like that … (Kaniho 2008)

He also discussed farming in the area of Ukumehame when he was young:

> [T]here was taro and there were people who used to live there also … it was really beautiful … all this taro fields and came all the way to, there were two stream inside that area, and there were oranges, Hawaiian oranges, you don't see Hawaiian oranges today like how they have in the valley. And all kinds of things was growing in there … (Kaniho 2008)

3.4.2 Keʻeaumoku Kapu

An oral history interview with Keʻeaumoku Kapu provided a wealth of information about the area of Kauaʻula and its connections to the sacred island of Mokuʻula. The oral history interview with Keʻeaumoku Kapu conducted for the 2008 documentary "Lahaina – Waves of Change" (Kapu 2008). He connects the burials of prominent aliʻi on Mokuʻula with the sacredness of the Kauaʻula area. The interview was transcribed by Tamara Luthy for this report. He traced connections between Kauaʻula, Mokuʻula, and the fishpond of Mokuhinia with Mauna Kawahine and ʻĪao valley. He identified the only east-facing moai on the island of Rapa Nui as the moʻo born of Mauna Kawahine. He also discusses the navigational importance of Kahoʻolawe for journeys to Kahiki (Tahiti). The following sections of the interview have been abridged and edited for clarity.

3.4.2.1 PRESENCE OF LARGE NUMBERS OF IWI KŪPUNA

K. Kapu stated that over 200 chiefly and ancestral burials (*iwi kūpuna*) are in this area, including those of many important aliʻi. He mentions that the historical site of Hale Kumu Ka Lano at Puhapuhaiki Ridge was where Kahekili met with his chiefs prior to battling Kahahana on Oʻahu. He also discussed the connection between Kauaʻula and the island of Mokuʻula, where Keopuolani, Nahienaena, and Kaumualiʻi were buried. When the Department of Health covered up this island in 1914 to stop the spread of mosquito-related diseases, the iwi of these aliʻi were said to have been moved to Waiola Church. He discusses the possibility that the sacred queen Keopuolani's iwi may not actually lie in Waiola Church. He also mentions that the *ʻohana* (family) that were traditional curators of these lands placed *koʻa* (coral) from the original mausoleum on Mokuʻula on burials that were *pili ʻohana* (close family) to them in Kauaʻula.

3.4.2.2 THE SACRED LANDSCAPE OF LAHAINA AND ITS PLACE IN THE BROADER PACIFIC

K. Kapu's oral history interview provides a unique window onto the geographical connections between sites in the Kauaʻula Valley to the broader Pacific. He describes the sacred landscape of the area as follows:

> This general area we in right now is called Koʻoka. This is part of the ahupuaʻa of Waineʻe. We are right in the heart of Kauaʻula valley that extends all the way down makai to the sacred island called Mokuʻula. Up here on the tops there's a mountain that's called Mauna Kawahine. In the east is ʻĪao which means "the dawning"...from the rising

> of the sun to the setting of the sun. From the rising you have ʻĪao...The sun sets in the west is Mauna Kawahine...between the rising and the setting...Above Puʻu Kukui is the mountains of Ka Halawai, where the waters meet. And its right up above this one mountain called Moʻo Ahia. Right between ʻĪao and Mauna Kawahine is the sacredness of dualities, "kaua" meaning you and I, "ula," anything that is red is sacred. So we are in the heart of the walewale, the walewale is like the afterbirth. And in this general area, in this ʻāina where we are now, is the area where a lot of our chiefly ancestral burials are.
>
> The inside where the sun rises, the internment of Kahekili's father Kekaulike 1732. They were kanu'ing in there. What separates the ridge of ʻĪao and Mauna Kawahine is Puʻu Kāhili. Puʻu Kāhili is the royal standard of our people. The kāhili represented the physical, spiritual embodiment of a person, yeah? So every time you see the kāhilis walk in the old days, the kāhili had the iwi of our kūpuna upon it. So why is that ridge so important to be called Puʻu Kāhili? And its even more fearful for us now that because of the encroachment of development that we have to get the story out. To say that this place needs to be saved, this place needs to have just as much attention as Mokuʻula...
>
> ...And the names upon the stones that have been etched and the stones up here are families and chiefly burials that once dictated the hinterlands of Lahaina. Lahaina was the major stomping grounds of our past. I mean, you have Kahoʻolawe, you have Lānaʻi, you have Molokaʻi, that was the kingdom there. This is the piko, this is the hiapo…This is the general area pertaining to when from Kahiki to here is this is where our kupunas came from. And we migrated back and forth. It talks about Kahoʻolawe...this is our navigational points. Upon Kahoʻolawe the smallest fin that you see on the top is Moaʻula, the navigational seat. Upon the point of Puʻu Pehe, between Puʻu Pehe and Moaula that's the roadways to Tāhiti and Hoku Pā, the star that is above, that is our celestial navigation, that is our genealogy. Navigation *moʻokūʻauhau* (geneaology) – the ridge that is in our background is called Moʻo Ahia...Moʻo Ahia was the mythical dragon or the mythical protector of Lahiana. Moʻo Ahia the lizard. [The fishpond] Mokuhinia – Moʻoku Hinia – fat abundant moʻo lizard....The puna – the wai, the sacred water, Mokuʻula...this place has so much importance and so little time to share, all because there are because there are bigger plans for this area. Mauna Kawahine...there was a moʻo that was born from Mauna Kawahine and it shot out from the bossom of Mauna Kawahine and sailed into the south Pacific. The umbilical cord detached it fell in the middle of the ocean forming the island called Te Pito o te Henua, and that island is Rapanui...What is the significance of Te Pito o te Henua– there is a moai 18 feet tall. All of the rest of the moais in eastern island is basically west, there is only one facing east to Hawaiʻi that is sitting on its knees. And that one is still here where it was born from Mauna Kawahine... (Kapu 2008)

3.4.2.3 MOKUHINIA AND MOKUʻULA: SACRED PLACES IN NEED OF CARE

K. Kapu also described the fate of Mokuhinia pond and the sacred island of Mokuʻula after the pond became infested with mosquitoes. He expresses anguish at the loss of connection to Hawaiian identity and culture that occurred when this area was covered over in the 1920s.

> When the island because of pestilence, because of mosquito infestation, and things like that, the kingdom felt it necessary to move the kingdom of Hawaii to Oʻahu and that's were it is still, in ʻIolani Palace. Before that the ponds of Mokuhinia and the place of Maluʻulu-u-Lele where the ʻulu trees sprang forth that area upon that area Mokuʻula, the island of Mokuʻula, was basically covered because the Health Department felt that it was because of the infestation of mosquitoes and diseases they felt it was important that they should bury the island. So when they covered the island they basically covered the identity and character of our people... (Kapu 2008)

3.4.2.4 KALO FARMING AS THE ESSENCE OF CULTURAL SURVIVAL

As expressed frequently by other ethnographic interviews and existing oral histories, K. Kapu describes a relationship to farming that is deeply entwined with physical and cultural vitality. He discusses the benefits of cultivating kalo, *ʻawa* (kava, *Piper methysticum*), *maiʻa* (bananas, *Musa paradisiaca*), and other crops for kūpuna in poor health. He suggests that the disconnection of Hawaiian people from the abiliy to grow kalo is akin to cultural genocide:

> [The taro that we grow] is mainly for our kūpuna. None of this style, none of the food that comes from this area is for profit or for sale. It is all to feed our people. It is like in the past, when the kingdom once existed...If people need ʻawa for ʻōmaʻi [weakness, illness] when they are are sick, we share that. If people need mea ʻai we have kalo, we have maiʻa, we have ʻuala [sweet potato, *Ipomea batatas*], we have some papaya, we can provide. Our kūpuna, they are living kinda unhealthy today. All because diabetes you know all those type things, smoking, those are bad too, asthma, heart problems. It is all about bringing back the kuleana, the responsibilties. Bringing back the legacy of this place, and how to make people even more, wake them up and say, this is one of the areas that really needs some protection because it is being depleted from a greater power. And that the families that are still living in these areas, that still are the original families from the time of the kingdom, are now facing that genocide that our kūpuna was afraid that we would face. So and there is our old saying and it is a western saying that liquor is for drinking and water is for fighting... (Kapu 2008)

3.4.3 Blossom Feiteira

As part of the Ka Paʻakai Analysis consultation process for MDWS existing and proposed water use permit applications, SWCA anthropologist Wainani Traub interviewed Blossom Feiteira on June 16, 2023. Blossom Feiteira, a Lahaina native, has deep familial ties to West Maui. Her grandmother was born in Lahaina and her grandfather is from Honokōwai. She can trace her genealogy 17 generations in West Maui. Blossom spent her childhood playing in the waterways of Lahaina and Kaʻānapali and learned traditional gathering practices from her kupuna. Her grandmother's father Albert Kaaiawahia was a *hanawai* (irrigation) man for Pioneer Mill, responsible for monitoring the diversion of waterways from Honokōhau to Kaʻānapali. Feiteira first started to notice environmental impacts to shoreline and stream cultural resources when she was a teenager in the 1970s.

3.4.3.1 OCEAN RESOURCES

B. Feiteira recalls the abundance of ocean resources when she was growing up in the 1960s. She describes limu such as *wāwaeʻiole* (*Codium edule*), *kohu* (*Asparagopsis taxiformis*), and *līpoa* (*Dictyopteris plagiogramma*). She also describes an abundance of fish including *manini* (*Acanthurus triostegus*), *kole* (surgeonfish, *Ctenochaetus strigosus*), *owama/oama* (young weke or goatfish; *Mullidea* sp.), *halalu* (young akule; *Trachurops crumenophthalmus*), *kūmū* (*Parupeneus porphyreus*), weke, and *manō* (sharks). She also described several edible marine invertebrates such as *kūpeʻe* (edible marine snails; *Nerita polita*), *ʻōpihi* (*Cellana* sp.), *hāʻukeʻuke* (*Colobocentrotus atratus*), *wana* (long-spined sea urchins; possibly *Diadema paucispinum* or *Echinothrix diadema*), and *heʻe* (octopus).

> We had—besides the manuea we had choke waiole [sic wāwaeʻiole], we had kohu, lipoa, we had the limu that we called the ʻōpihi limu. And they were all abundant and they were all within the area that we recognize as the muliwai. And the fish was—we had all varieties we had the manini, we had kole—when the migration happened with the owama/oama and the halalu; it was amazing. Kūmū, weke, we even had sharks—baby sharks would be found along the shoreline and their birthing areas. We had kūpeʻe,

> ʻōpihi, hāʻuiʻui [hāʻukeʻuke], wana, we had heʻe. The shoreline abounded with you know so abundant that there was never any issue about that we couldn't get any food out of the ocean. (Feiteira 2023)

B. Feiteira describes environmental changes she noticed beginning in about the 1970s. She noticed deteriorating environmental conditions which she linked to golf courses and tourist accomodations. She particularly mentions that limu began to dissapear at this time. She also notes that the water at the shoreline was saltier than before.

> Kupuna started telling us that we couldn't lay our nets in a certain places cause nevah had enough fish. The kupuna could tell something was wrong. Limu was deteriorating, the beds were slowly dying, the water was rougher than normal, and we noticed that the water was saltier at the shoreline… This was in the 70s. I was in high school. When this was starting to really really be more visible. And around that time was the significant development of the resort area. And so we had these massive golf courses coming on. Nice green grass. Tourists were getting awesome water. But for us as kanaka [Native Hawaiians] we weren't getting the benefit of that. And even back in those days we began to notice what that kind of development was doing to our shoreline. (Feiteira 2023)

B. Feiteira describes the change in the limu on the shoreline.

> As the muliwai began to shrink and the runoff started impacting that's when we began to notice all these limu started to disappear. We couldn't even walk on the reef because it became so slimy and we saw limu that we never saw before and we didn't know if we could eat it. And the reefs became so slimy that if we tried to walk on it we would slip and fall. Our nets, within a couple of hours of putting our nets out there some kind of algae would already be stuck to our nets. And it was very difficult to clean. Kupuna said no touch already it's too dangerous there's not enough. Even the limu was getting coated with this slimy brown gunky stuff. Kupuna said don't eat that cause we don't know what that is… (Feiteira 2023)

3.4.3.2 SHORELINE FRESHWATER SPRINGS

B. Feiteira describes the various shoreline places where freshwater springs are found and explains that these springs used to give out more water.

> There were a couple of places. In Pakala it's actually right in front of Mokuʻula and Mokuhinia pond. So we know in that area there were underground springs where people could gather fresh water. And then in Wahikuli on the Lahaina side of the beach there was freshwater underground springs. Polanui also in Lahaina closer to the Launiupoko side there was a couple of them that you could go gather water from. It permeates out of the sand so forcefully that you could actually gather fresh water out of those areas. So we know there's underground springs but—we also know that the amount of water that was coming out of the ground was way less than what was when we were kids. If the ʻāina doesn't have the ability to capture water to recharge—that's what will happen. To be honest with you people have asked many times if there's any underground freshwater springs along the shoreline and we would tell them no not anymore. So those of us that know—like I haven't gathered any kind of freshwater from those areas for about 20 years now. But I know about 3 or 4 of the families that continue to do so. And they maintain the confidentiality of that place. (Feiteira 2023)

3.4.3.3 HUKILAU

B. Feiteira's family had a tradition of conducting *hukilau*, a fishing technique involving a group of people using a long net to circle and entrap fish. The Feiteira family would conduct hukilau under the guidance of kupuna who would direct them to specific locations to perform a hukilau. The purpose of the hukilau was not solely for fishing; hukilau was used as a means to manage fish populations in certain areas that were becoming too abundant. Hukilau played an essential role in maintaining a balanced ocean ecosystem.

B. Feiteira shared that beginning in about the 1970s, she started to notice changes occurring on the land that were affecting the shoreline. It was around this time that kupuna instructed people not to fish in certain places where they noticed declines in the fish populations. They also observed changes in the limu or algae. It was not as abundant as it once was.

3.4.3.4 STREAMS

B. Feiteria described the deleterious effects of the stream diversions on ʻōpae, hīhīwai, and ʻoʻopu due to pineapple and sugar cane cultivation.

> And so being able to access mauka we began to see the effects of the diversion. So as more and more water was being diverted from the natural streamflow our native plants were slowly shrinking away diminishing and as a result of that the marine life in the streams were also diminishing and deteriorating.
>
> I remember kupuna taking us all the way down to the ocean to the shoreline to gather the ʻōpae, the hīhīwai, the larva and walking um up in buckets to the streams and building cascades so that the ʻoʻopu could go up. And there was so little water available that we saw less and less stream life at the shoreline. Because we all played up there we also began to notice that water in the streams was so significantly depleted but the ditch systems were full. And that's when I realized that all of it was going either towards the pineapple plantation or the sugar cane. (Feiteira 2023)

3.4.3.5 MEDICINAL PLANTS AND MAUKA GATHERING

She also observed an overall dessication of the areas mauka of the stream diversions, leading to a decline in the presence and abundance of medicinal and edible plants such as *ʻuhaloa* (*Waltheria indica*), *mamaki* (*Pipturus* sp.), white *hala* (*Pandanus tectorius*), and *ʻōhia ʻai* (*Eugenia malaccensis*). The decline in these plants was so pronounced that her kūpuna told her not to gather them anymore.

> We used to go mauka with kupuna so they could teach us how to properly gather the lāʻau. We had a couple of practitioners in our community and as they got older the kuleana became ours—the young people. To go up mauka and gather on their behalf. And we began to see that even those areas were slowly but surely diminishing. And we were seeing more invasives coming in. And it was just getting more and more difficult to try and maintain those areas. I don't know if there's any medicinal native plants left up mauka in Lahaina. Cause when I moved out of Lahaina in my senior year kupuna told us "no go" we have to let it go and hope that things will be able to regenerate. Cause when we used to go up sometimes we didn't gather. What we did is we observed as the plants and the flowers began to bloom it was a signal for us to monitor. So when we started to see we would gather the seeds and we would replant the seeds to try and maintain that area. But it got to the point where that was no longer feasible for us. And kupuna would say it's because they are taking all the water. There was nothing from the ʻāina to use to regenerate itself.

> We used to have a grove of white hala. —When I was about 31 or 32 I went up mauka because a kupuna wanted hala. I found one tree left of the grove. Just one. I was heartbroken.
>
> We used to get ʻuhaloa. Mamake [sic māmaki]. ʻUhaloa was pretty prevalent because as the plantation increased activity we began to see a lot incidences of asthma happening in our community. So kupuna would resort to making sure that their yard was well maintained and there was no dirt or dust. But as the plantation did their harvesting and planting all that dust would permeate all the houses. So ʻuhaloa actually was used as well as—and this is really funny because where my grandma lived there are about, I want to say like 15 or 16 houses on the street where she lived. Every house had a mountain apple tree. An ʻōhiʻa ʻai tree and the reason why is because they used the flower and the bark to make tea for the asthmatics. (Feiteira 2023)

B. Feiteira draws the connection between water scarcity up mauka and the loss of medicinal plants for cultural practitioners to prepare medicines, emphasizing the broad impacts of water scarcity on all aspects of life. Furthermore, Feiteira highlights the challenges Native Hawaiians face in passing cultural knowledge onto future generations who have inherited drastically different environmental conditions.

> For kupuna it was really a disappointing and sad time because they firmly believed that these plants that grow in the wild are much more consistent and the strength of the lāʻau makes for better medicine. And so it's difficult to replicate the environment up mauka in the wild in your backyard. And so not having sufficient water available for our lāʻau to grow also led to additional impacts in our community. It isn't just about growing food, it's about the level of impact that water has in all aspects of our life. And growing up with these kupuna I learned that. And you know taking that manaʻo [thoughts] today and trying to pass that knowledge onto my grandchildren has become a very difficult process because there is no water for them to really understand the impact. A lot of the streams have very little water or no water. And so how do you tell your grandkid that in order for you to have a sound and healthy environment you have to be able to access water. The streams need to be flowing. The muliwai needs to be wide reaching so that you have the kind of food you want to eat from the ocean. (Feiteira 2023)

3.4.3.6 OTHER COMMENTS

B. Feiteira recalls the quality of the tap water when she was a child:

> I remember growing up in Lahaina we could take water out of the tap and if you let the container sit for just a few minutes there was condensation on the container. The water was that cold. And the water was sweet tasting. So as we began to notice the depletion of water in the streams. The taste of the water changed. And the water was much warmer. For us, it didn't feel healthy enough for us. And even to use it for watering our garden in the backyard for the *ti* leaf [(*Cordyline fruticosa*)] we began to notice the plants weren't growing as healthy as they used to. (Feiteira 2023)

B. Feiteira expressed the personal discontent of her grandmother's father when pressured to divert additional water for Pioneer Mill Company:

> My grandmother's father was a hanawai [irrigation] man from Pioneer Mill. So he maintained all of the ditches, monitored all of the streams. And my grandma would tell me that one time her father would come home and be very very unhappy with the situation at Pioneer Mill because he was being instructed to divert more water. My grandmother's father grew up in Kaupō on the ranch. So he noticed a significant difference in the way water flowed from the stream—including when it rains up mauka

> and the way it lays on the ʻāina and the recharge into the aquifers. That was significantly changing. (Feiteira 2023)

B. Feiteira articulates the significance that stream restoration would have on contemporary Native Hawaiian cultural revitalization efforts:

> Having those streams restored provides an opportunity for kanaka in West Maui to be able to see a restoration process take place where we can once again see ʻoʻopu, ʻōpae, hīhīwai, all of that eco life be slowly brought back into those streams. And it's not just for food but also for kuleana purposes. Having that living breathing entity alive and well means that kupuna have the tools necessary to pass knowledge on. It's stuff that you just cannot learn about reading a book. And if you can regenerate the forest restoring its natural elements. The forest will regenerate and restore itself. And so having that ability to do that fortunately for us on Maui—you know we have this major Axis deer challenge. So the deer have not appeared in West Maui yet. And so we still have that opportunity to be more makaʻala about the forests in West Maui and be able to work on not just preserving it but actively starting to restore it. But it begins with the availability of water. So if we can do work—more work in the restoration of our watershed areas. We know that more water will come but you gotta do the work. So the county can work with DLNR to begin that process there are groups and organizations in West Maui that can lend their expertise in getting this work done. But there has to be a solid and long-term commitment in terms of funding in order to see that kind of stuff happen. So it's going to be a long process but we have to start someplace. And we know that once we can get the watershed functioning the way its supposed to—and the stream flows—proper amount of water in the streams that goes all the way to makai we're going to start to see the shoreline start to repair itself as well. (Feiteira 2023)

3.4.3.7 RECOMMENDATIONS

When asked if she has recommendations for the MDWS, B. Feiteira responded with, "Ideally, the most radical would be to shut down the ditches and allow the water to return to the streams":

> That would be the most auspicious activity is to start to rebuild the watershed from up mauka. Coupled with many things. We're not seeing as much of a devastation as we could be but we do know that Puʻu Kukui has gotten less than about only 50% of water in the past few years. It used to be up to 400 inches of rain per year. They're now getting between 200 and 250 inches a year. And so the need to start to restore those upland forests will play a crucial role in bringing back a lot of the water because fortunately the cloud cover still sits on the mauna up there. There's just not anything up there to capture that.
>
> And the drier it is in West Maui, the more prevalent the brushfires are. And already you know, some of the fires have already hit the base of the mountain. So we know that a lot of the restorative opportunities in those areas have significantly impacted the ability of the ʻāina to catch the water. Cause now it turns into runoff and it ends up in the ocean. (Feiteira 2023)

3.4.4 ʻAha Moku o Maui, Inc., Consultation Meeting

On July 6, 2023, SWCA arranged a consultation meeting between MDWS staff and Uʻilani and Keʻeaumoku Kapu from the Lahaina section of ʻAha Moku o Maui, Inc. K. Kapu and U. Kapu not only live in mauka areas, but also work alongside the shoreline. Therefore, they have seen firsthand the

impacts to traditional and customary practices coming from stream diversions, excessive pumping of water, leach fields, and septic systems in the area.

3.4.4.1 REDUCED GROUNDWATER AND SURFACE WATER FLOW

3.4.4.1.1 Insufficient Monitoring and Enforcement of Current Water Supplies

K. Kapu and U. Kapu are very concerned about "collateral damage" to kuleana rights, such as sufficient access to fresh water to irrigate kalo crops and support culturally important natural resources such as ʻoʻopu and various species of limu. K. Kapu and U. Kapu are involved in restoring and taking care of the historic Mokuhinia fishpond and are eager to begin potential projects there soon. However, restoration of this fishpond (now covered by Maluʻuluolele Park) requires sufficient fresh water, which is difficult to achieve with the amount of water being pumped from the existing skimming well. K. Kapu noticed several cascading effects from insufficient water for the fishpond, including increased populations of mosquitoes and accumulation of silt.

> Within the Kuʻia area, there's an area called Waineʻe. Waineʻe is within the same area where we are located, along the bottom at Mokuhinia. So Waineʻe means "creeping water," and the water which used to fill Mokuhinia pond which came from a karst system. Now if that skimming well or any other potential wells adversely affect that genealogy of Waineʻe which we can see evidently is now, the potential of bringing back historic properties is negligent. It ain't gonna happen because of what is happening now. …[Current pumping levels in the skimming well is] definitely going to be more of an impact now, and this we've seen maybe in the last two and a half, three months. Slowly, gradually emptying out, and right now it is probably only ponds near the ocean, but there is a lot of silt. One of the county workers came and utilized our canal for gathering guppies so they can take them on the other side of town because the mosquito infestation that is happening throughout town. When there is droughts, there's ponds, and when there's ponds, there's mosquito habitats. We don't have any guppies in our waterways over here, so potentially the risk of those invasive species like mosquitoes is gonna make – they will be back if we don't get that streamflow going. Like I said, that A and B well is impacting us. (Kapu and Kapu 2023)

U. Kapu and K. Kapu both expressed concern that Maui County's water sources could contribute to cumulative impacts in Kauaʻula, which already has reduced surface water availability due to water being diverted to Launiupoko. U. Kapu noticed that the proposed L3 well is in very close proximity to the existing Lahaina Shaft Pumps A and B. K. Kapu noted that the L1 and L3 wells are located near the Kuʻia Chocolate Farm well and a newly drilled Kamehameha Schools well. They were both concerned about the cumulative impact of reduced freshwater flow on the availability of water for farming kalo as well as harming limu populations in the area in front of Mokuhinia fishpond. K. Kapu observed that the existing Lahaina Shaft Pumps A and B are being pumped 24 hours a day, with adverse effects on the canal in front of their property at 505 Front Street.

> I am just looking at the geographic stuff in this whole area and where L3 is, is basically within the same geographics especially where Kuʻia Chocolate Farm well is, they can't even run it. The same as – because its new use not existing use, but they can't even pump. But what's to say, how is it that A&B well can pump 100% right now in spite of it being existing use? But you still gotta go through the Water Use Commission so the Commission can enact to tell them they are pumping too much. Right now, the deadline is in August, they are pumping full volume and it is already…our building is dry over here. It basically doesn't make sense how the Commission is reacting towards this kind of adverse effect, where we may even have to trigger some way of getting some kind of resource in there, maybe calling Earth Justice or something right now, until the

> Commission says you are pumping too much water. You gotta lessen the pumpage to maybe 100,000 gallons of water a day. Enough to suffice whatever the water is being used for, and they are diverting all of that water outside of Lahaina. None of that water is being utilized for any of the community uses, any of the agricultural uses, its not staying in that area. All that water is being pumped to Launiupoko. So in that alone, I dunno, I am just hoping maybe the County can trigger something maybe in this report to maybe require them to lessen their pumpage and bring it to an equal level to make sure everyone has enough water. But right now the water is being pumped out of town and it is already creating an adverse effect to our [unclear] My concern is, is this L3 and Kuʻia wells related in any way that would worsen the situation that we are in right now with [Lahaina Shaft A nd B pumps]?
>
> [There is] a pump that runs in the parking lot of 505 [Front Street, their property in front of Mokuhinia fishpond] 24 hours … Um, the last I checked is about a month ago. There's minimal flow, which the water used to be gushing out from 505 … So that's an adverse effect. Ah, less water going to the ocean, that's a trigger … That whole area, if you look at the at the geographics of the area, Ka Limu a Piʻilani, that exist from Waineʻe, that goes from the outskirts of Kuʻia, Kahoma, and Kauaʻula, that core system all trickled down to that one area, Mokuhinia. So that's our trigger, and its, its, its, you know, you don't have to be one scientist to figure it out. Especially I dive in that area. I dive for limu. My ʻohana dives for limu. The Kaʻaʻane family, the Hussey family. There's only about three, maybe four people that still cultivate [limu] in the area, but we are seeing that adverse effect. (Kapu and Kapu 2023)

He was also concerned that his own water use permit for Mokuhinia fishpond might be hampered by what he perceived to be profligate water usage by existing water use permit holders.

> I am right now going through the process of reviewing our water use permit application for our building, because of aquaponics and because we are also responsible for the management and careship of Mokuʻula Mokuhinia Pond. So we have potential projects in the near future but if they exceed the existing use, of all the potential wells out there that are existing, if they exceed the use, then…what's the possibility of all other projects that we going to need the water, does it qualify for new usage? You know, that is my fear, because of what is being pumped right now and CWRM has no clue on how they are gonna require them to pump less until they submit their water use application in August. Right now, we are dealing with a lot. I mean, this is not even drought, manmade triggers that are happening that are diverting water outside of Lahaina...So bringing this awareness to you guys knowing that your potential wells and other existing wells in the area might create an adverse effect...We see it already. (Kapu and Kapu 2023)

K. Kapu says that his ʻohana and another family use that same stream water for kalo. He expressed concern that CWRM is looking to lower Instream Flow Standards to get a mauka to makai flow. However, he feels that the real problem is not the existing Instream Flow Standard, but that water is being diverted away midstream to supply the water needs for Launiupoko.

> You would think that Kauaʻula would be easy to have the mauka to makai flow, but it doesn't. So that is a trigger for us saying that the water can't make it from the mauka to the makai all the way from the top to the bottom, then what is the problem in between the middle? And why isn't West Maui or Makila Land Company not being compliant to the use – uh Instream Flow Standards set by the Commission, gee I don't know how many years ago, 3.4 million gallons, now they wanna lessen it to 2 million gallons of water? I mean, that's good for recharging the aquifer but at the halfway point, I don't see the mathematics on why CWRM is allowing these things to happen knowing that they have a

> huge population in Launiupoko that Mahanaluanui and potential development even towards Olowalu...But how much of that water is going back to the ocean now that they are going to lessen the Instream Flow Standard? That doesn't make sense. So where is all that water going if they are requiring the owners of Launiupoko to do the full system? (Kapu and Kapu 2023)

They had clearly observed within their own lifetimes the impacts of first Pioneer Mill Company's, and later West Maui Land's, water usage on the ability to farm kalo. They recalled that in the 1950s, water was abundant. However, they knew that the Keahi family ceased taro cultivation in the 1970s at the time when Pioneer Mill was pumping water at full capacity. The Kalepo and Keahi families were only able to recultivate kalo when Kamehameha Schools redirected a significant amount of water back into the stream.

According to K. Kapu, the current Instream Flow Standards state that 2 mgd should be flowing through Kahoma and Kanahā. K. Kapu and U. Kapu expressed frustration at the lack of enforcement of existing Instream Flow Standards. They urged CWRM to do more frequent monitoring to see if Instream Flow Standards in Kanahā and Kahoma Streams are being met:

> All of these adverse [sic] that is happening, we see it happening periodically all the time, but we gotta do our own monitoring. We gotta monitor the river flow. We gotta monitor what is going into the pipes system to provide for kuleana and Kamehameha schools. So how to mitigate the impact of what is going on is…I think CWRM has really gotta be a little bit more proactive towards mandating to make sure that the existing stays where existing water should be especially for the instream flow standards set already. Once the Instream Flow Standard was set for all these valleys – Olowalu, Launiupoko, Kauaʻula and Kahoma – that's all set, but if that was set on the total amount of volume that the state said they got this much volume, let's put two million gallons back [unclear] If you do the mauka to makai monitoring, you're not getting the two million gallons of water. I don't know whether or not because of saturation, but Kahoma wouldn't be a problem because that river is hardened from, um, I would say, the mouth of the valley all the way down to the river. Because of the canal that they put in. Kauaʻula is a different story but seeing that Kauaʻula had more volume where the commission said 3.34 million gallons used to sustain the river, you're not even getting periodically that mauka to makai flow, or enough of that mauka to makai flow...So, it is not efficiently working its way down to the bottom, which gives us a trigger. (Kapu and Kapu 2023)

K. Kapu stated that the monitoring stations set up by CWRM are not being checked regularly. He added that his son monitors the amount of water coming out from intake to the hydro plant and monitors the surface water from Kauaʻula reservoir.

Ke'eaumoku urged CWRM to scrutinize the Ka Paʻakai Analysis for Launiupoko Irrigation Company, LLC's, existing water use permits. He admitted that they had previously filed an injunction against Launiupoko Irrigation Company, LLC, for diverting water from Kauaʻula Valley to Launiupoko:

> I mean, I did see a notice out there soliciting from the greater community on a Ka Paʻakai analysis. They know the people that they gotta come to. But they been in litigation so long that I don't think they wanna come to us. But a lot of our points are valid. If they gonna do a Ka Paʻakai Analysis, then they should step it up. Or the Commission should require them, especially on the A and B Wells. They pumping 800,000 gallons of water which is dryin' up our system over here and adversely affecting our shoreline, then I think the Commission on Water Resource Management should mandate that they only draw X amount, a certain amount, because the potential risk of the County wells are not being inoperable and new uses all being challenged by an existing use well, which is only

> used for the cultivation of sugarcane now being used for ranch lots, gated community, mansions. That is what they drawing right now. So, I mean, when you talk about the private sector vs. the residents of the general community, ha! We know how that is going to end up, basically. (Kapu and Kapu 2023)

He expressed concern over the proximity of the proposed site for the L3 well to the existing skimming well, which is already drawing brackish water.

> Yeah, and I think the [existing Lahaina Shaft A and B Pumps are] too big, if anything. They are drawing too much. It was historically known in the past that Pioneer Mill needed to shut that well down or pump it at a lesser capacity because of the impact to historic property which is Mokuʻula. And that is historically written down so if that could be noted here in this Ka Paʻakai Analysis that it is already creating an environmental impact to our, our surface water on how much water they are drawing. I, I got notes saying they are already pulling up brackish water because of the size of the pump so what's happening is happening in an existing well. How more are these other wells gonna impact in the same, especially when you're talking about these wells gonna be drilled from the same aquifer. Its already creating an impact to our, to our --- no but L3 potentially may be another risk factor. (Kapu and Kapu 2023)

3.4.4.2 REDUCED WATER QUALITY

K. Kapu shared that within the Kuʻia area, there is an area called Waineʻe. Waineʻe means "creeping water." He stated that the water that used to fill Mokuhinia fishpond came from a karst system. He worried that the wells may affect the geology of Waineʻe in a way that limits the water flowing into Mokuhinia. He stated that there is potential of bringing back historic properties like Mokuhinia, but that it is not going to happen because of what is happening now to upstream water sources:

> West Maui Land Company diverted 100% of the water to Launiupoko in exchange for Launiupoko to build all those homes up there on a leach field system, where a lot of the water did go back to the ocean, but it was dirty water. That's why we have that major adverse effect that impacted the families up there in the area which utilized the water not just for domestic use but taking care of a lotta the cultivation that they were growing around the house like food crops... Where there is no flow in the river, and where there's no flow in the river, we get ponds full of ʻoʻopu that eventually will die if they don't restore the waterflow again. So, the trigger is literally us, that we seen an adverse effects throughout for as long as we been there and how worsened its getting, especially now when they get...projects pending in the Launiupoko area … [W]e stepped in and fought for about seven years for Launiupoko to…for it to be agriculture and not homes. And you know, we were at LUC for that long, trying to fight that, because we knew the adverse effects that would happen, but unfortunately, we have ranch homes. [laughs] Well, not ranch homes; mansions and swimming pools. Where is their swimming pool water going? That is the next questions. You know, all of these pools that is being built, where is that water going? What kind of that adverse effect is that water doing to our ocean? (Kapu and Kapu 2023)

U. Kapu directly linked the installation of leach fields to the loss of limu populations in Lahaina:

> And you could, you could smell the līpoa as you drive through Lahaina and now you cannot...When Launiupoko was being built, that's when our limu started disappearing. That's when they started using...the septic stuff, leach fields. They were using the leach fields. The leach fields were contaminating our water. (Kapu and Kapu 2023)

U. Kapu observed that the reduced streamflow also manifests itself in warmer water, which in turn causes the kalo to rot. The warmer spring temperature affects the crops of 12 or 13 families in the area of Kanaha and Kahoma.

> So, our ʻohana has our loʻis in Kanahā and Waipuka. There has been…warmer water temperature in the stream coming from that and affecting some of the loʻis that have been giving them rottage in their kalo. And our fear is when West Maui Land Company starts building all their houses or whatever they are going to be doing in that area above that, might be a much bigger adverse effect. Um, so I dunno if they are going to be applying for water. I doubt it because they never do. They just drill their wells and just do it. That is another concern for the families in Kanahā that are doing their loʻi kalo, is they are already seeing the temperature turning warm and rottage in their taro. That is what I wanted to share on that one. Plenty patches over there. There are about 12 or 13 families that have patches over there in Kanahā and Kahoma. (Kapu and Kapu 2023)

3.4.4.3 NEED TO MANAGE WATER USING AN AHUPUAʻA-BASED APPROACH

3.4.4.3.1 Mauka: Need for Reforestation and Invasive Species Control to Improve Watershed Health

A major impact observed by K. Kapu and U. Kapu is increased fire risk. The more water gets diverted from the stream, the higher the fire risk. Decreased forest cover mauka causes less freshwater runoff into the makai fisheries. U. Kapu stated:

> Plus, too, Lahaina is so dry that everybody pumping all this well out, this water out. We see fire hazards. ʻCuz drought is not being – the water is not there for the ground. It is drying it up so bad that, you know, that's a fire hazard for sure. (Kapu and Kapu 2023)

They noted that three fires had occurred in the area since 2007, and that the last fire went almost into the *wao akua* (the highest elevation of mountain ranges; the realm of the gods and spirits). Once the fire burned that high, they noticed that the clouds stayed in the valley, leading to reduced water makai of the area. She described three fires that had ravaged the forests from 2007. Everything from Paʻupaʻu to Launiupoko was burned during the most recent fire. K. Kapu then went on to discuss the efforts of Kamehameha Schools to reforest the areas damaged by the wildfires near Paʻupaʻu:

> [E]ven da kine morning dew in the valley doesn't exist anymore really because of the forestry. So once the fire burned the top of the "L" area and it started climbing, all that reforestation, that forestation that we had up there, that's no longer there, so the clouds stay in the valley. They don't come out...And Kamehameha Schools just right now looking at reforestation of the Paʻupaʻu Kuʻia mauka areas, we are involved in that reforestation project. See if we can get something planted up there to bring the clouds outside of the valley. So, we can, so we can slowly have the potential of that morning dew that we used to have. [The reforestation is at] 1,400 foot elevation. So, everything from Paʻupaʻu all the way across to Launiupoko area, everything burned. There is no longer any tall trees like they had. They had Eucalyptus tree forests. [unclear] Paʻupaʻu. All of that is gone. And because it is gone, all that is hot up there. It's in the working stages right now, but Kamehameha Schools is looking at a long-time lease of 11,000 acres. Hopefully we can be involved in the reforestation project or what they are doing over there. (Kapu and Kapu 2023)

They would like to see the County continue its efforts to support reforestation in Kahoma Valley in coordination with Kamehameha Schools and other community groups. Kamehameha Schools is working

with their geologist and community partners to get more water down to Kuʻia through restoring the forests around Paʻupaʻu. Keʼeaumoku says that if they can bring water back to Kuʻi and Kahoma Valley, then it can bring back the clouds and the rain.

3.4.4.4 NEED FOR MONITORING CULTURALLY IMPORTANT SPECIES

K. Kapu and U. Kapu also observed that hīhīwai and ʻoʻopu do not exist in Kauaʻula Valley anymore. According to them, Kahoma and Kanahā Streams still have big ʻoʻopu and hīhīwai, but Kahoma and Kanahā Streams no longer have limu coming from upstream. U. Kapu described how even some of the more common varieties of limu are scarce in Lahaina.

> And then the adverse effects also for Kauaʻula is um the hīhīwai and the ʻoʻopu. They don't exist in there anymore. Our limu is gone from our mouth area from where we used to gather our limu...And then for Kahoma and Kanahā, their ʻoʻopu is big, they have no problems with the ʻoʻopu. ʻOʻopu, hīhīwai, but the limu that goes to the ocean is not there. So we are trying to figure that out on how come the limu has all, all disappeared from Lahaina. So that's an adverse effect culturally. (Kapu and Kapu 2023)

U. Kapu informed us that the area around Mokuhinia known as Ka Limu a Piʻilani no longer has abundant limu, although there were once 11 species of limu there. They still see limu kohu, līpoa, and līpeʻe, but they can no longer find manauea, ʻeleʻele, or wāwaeʻiole. K. Kapu then explained that a number of like-minded people are attempting to cultivate limu around Ka Limu a Piʻilani using limu gathered from Pohakupule. They assist with summer programs to educate students about limu cultivation and collection. However, they observed that kūpuna who used to gather limu around the areas of Māla are no longer able to, even though previously every household relied on limu they gathered from the shoreline. K. Kapu went on to describe how current efforts to restore limu populations in the area are hampered by the lack of mauka to makai flow of fresh water.

> [There is an area on the shoreline] known as Ka Limu a Piʻilani. So that was once a highly concentrated of almost 11, 11 species of limu...Twenty-three from Launiupoko to Māla. So, because of that, our summer programs included limu cultivation to try to check out where the hot spots are. We don't even have our... the potential for a lot of our kūpuna that used to comb the areas of Māla. Māla was high potential for manauea, uh, all those different types. Over here in front of 505 Front Street which is Lahaina town, in front of Mokuhinia, we probably get kohu, līpoa, lipepe, um no manauea, no līpeʻe, no ʻeleʻele, but the prominent limu that we had once upon a time doesn't exist anymore. So, we went out to Pohakupule, which is Windmills, to get mama clusters to try to recultivate the area over here.
>
> But the, the sad part of this whole thing here is a lot of our limu harvesters or cultivators [unclear] two at the most, prominently in the 70s and 80s, you had every household that was reliant on this limu here. From that, I can honestly say, this is an adverse because you don't have the freshwater mingling with the saltwater to breed back that limu cultivation that we once had. Possibility of bringing that back. It's possible. But we just gotta mandate make sure we have enough, and I think that's why the instream flow standards was set. To make sure there's an equilibrium so we have that consistent cultivation of kalo growing along the shoreline which would bring the fish, which would bring the lawaiʻa fisherman, the gatherers, the shoreline people, because a lot of the fish, a lot of the fish stay out of the reef because there is no limu along the shoreline...The kalo cultivation of all that, the koʻe [worms], the cleaning of the limu, goes into the river that goes into the ocean also feeds that historic property here. Because we don't have that mauka to makai flow, the balance is upset. (Kapu and Kapu 2023)

She and K. Kapu agreed that streamflow and the mixing of the groundwater flow were required to sustain healthy populations of limu.

3.4.5 Kekai Keahi

On October 24, 2023, SWCA anthropologist Wainani Traub spoke with Kekai Keahi at the CWRM public meeting. Keahi informed Traub of the presence of a spring near the designated location for the planned L1 well. Keahi asserts that drilling the L1 well at the planned location could have adverse effects on the spring and subsequent downstream water uses. Consequently, Keahi is firmly against drilling the L1 well at the present planned location. Keahi did not provide any further information regarding the spring’s location.

Additionally, Keahi shared his concern about the present overutilization of water resources in Launiupoko and Honokōwai and is apprehensive about drilling additional wells in those areas.

> The problem with all these wells in the Launiupoko sector and the Honokōwai sector is that those areas are already at capacity as far as the sustainable yield. The sustainable yield was I think maybe late 1980s or 1990s when they redid them which we have a lot less rain now so sustainable yield could be a lot lower. Some guys saying 5 million gallons a day which kinda makes sense because a lot of the wells people digging right now are pulling up saltwater (Keahi 2023).

Kekai Keahi and other community members hold the opinion that existing wells have reached their capacity, and they disagree with the sustainable yield limits set by the CWRM. MDWS wells do not exceed sustainable yield based on the current limits set by the CWRM.

4 CULTURAL, HISTORICAL, AND NATURAL RESOURCES

The following is a short overview of cultural, historical, and natural resources of value to Native Hawaiians within the vicinity of the permit areas. This overview is the result of archival research and interviews with individuals knowledgeable about contemporary traditional and customary Native Hawaiian rights and practices undertaken within the permit areas or associated with freshwater resources. These cultural resources are needed for Native Hawaiians to have the ability to conduct cultural practices and perpetuate Indigenous knowledge.

Cultural practitioners do not always feel comfortable sharing details about cultural practices. Dr. Mehanna Blaich Vaughan, a professor at the University of Hawaiʻi at Mānoa Department of Natural Resources and Environmental Management, stated that even though the Ka Paʻakai Analysis process is intended to engage communities, in practice many cultural practitioners are wary of divulging information about ongoing cultural practices. Community members may not offer comments at all if they feel that offering comments signals tacit consent to a project, particularly when trust has not been established with the project proponents (Vaughan 2024).

4.1 Culturally Significant Natural Resources

As discussed in Section 1.4.1, Davianna McGregor argues that the existence of cultural and natural resources serves as a continuous indication of traditional and customary practices, even when cultural practitioners do not come forward to identify them during the Ka Paʻakai Analysis process. Dr. McGregor further contends that natural resources, especially those used for subsistence practices, should be considered cultural resources since they provide the basis for life for Kanaka Maoli. Therefore, where there are culturally significant natural resources, one should assume the existence of traditional and customary practices (McGregor 2024). According to SWCA's interviews and archival research, the following natural resources support ongoing traditional and customary practices in the vicinity of the planned wells. Any potential adverse effects on these resources must be taken into consideration under the Ka Paʻakai framework.

4.1.1 Limu

Native Hawaiians use freshwater and marine limu as a relish or condiment to season food. While the marine varieties of limu are known for their more pronounced taste, the freshwater limu found on rocks in streams is also collected and enjoyed as part of the diet (Krauss 1993:16). Many species of nearshore limu thrive best in areas with both fresh water and ocean mixing (Abbott 1992).

B. Feiteira remembered that the shores of West Maui were home to abundant limu varieties in the 1960s, especially manuea, kohu, wailoe, lipoa, and ʻōpihi limu. Limu ʻeleʻele, limu kohu, limu līpeʻe, limu līpoa, limu manauea, and limu wāwaeʻiole also emerged as culturally significant species previously abundant in the area before the 1970s.

4.1.2 Freshwater Stream Species

Excluding insects and other invertebrates, there are nine native species found in Hawaiʻi's streams. These consist of five types of fish, two types of crustaceans, and two types of mollusks. All of these species exhibit amphidromous behavior, which means they migrate between freshwater habitats and the ocean. Eight of these species are endemic to Hawaiʻi. Native Hawaiians called the fish *ʻo ʻopu* (goby fish, in the families Eleotridae, Gobiidae, and Blennidae), the crustaceans *ʻōpae* (endemic shrimp), and the mollusks *hīhīwai* (or *wī*) (*Neritinu granosa*) and *hapawai* (*Theodoxus vespertinus*). While there are several more Hawaiian names to describe regional variations and physical differences of these creatures, these are the

most common names by which they are known. Several *ʻōlelo noʻeau* (traditional Hawaiian proverbs and poetical sayings) and *moʻolelo* (oral histories; myths, legends, or stories) demonstrate that Native Hawaiians were observant of these creatures and understood their life cycles, behaviors, and habitats well. These native freshwater fish, crustaceans, and mollusks were an important food source for Native Hawaiians (Miike 2004:14–18). Cultural informants interviewed for this study noted a decline in ʻoʻopu, ʻōpae, hīhīwai, hapawai, limu, and nearshore fish has occurred since the 1970s.

Oral history interviews and public testimony from H. Kaniho, K. Kapu, C. Palakiko, K. Steward, and others reveal that culturally important freshwater stream species such as ʻoʻopu ʻakupa, ʻoʻopu ʻalamoʻo, ʻoʻopu nākea, ʻoʻopu naniha, ʻoʻopu nōpili, *ʻōpae kuahiwi/kalaʻole* (*Atyoida bisulcata*), ʻōpae ʻoehaʻa, hapawai, and hīhīwai/wī used to be abundant in the Kahoma and Kanahā Streams.

4.1.3 Loʻi Kalo Farming

The cultural importance of kalo cultivation arose in nearly every interview and segment of public testimony presented in this report. Kalo farming emerged as perhaps the most important traditional and customary cultural practice taking place in the vicinity of the permit areas.

4.1.4 Native Plant Resources, Lāʻau Lapaʻau

B. Feiteira's interview described how she and her kūpuna used to gather lāʻau from the upland areas of West Maui. The plants she observed when she was younger, such as mamaki, ʻuhaloa, ʻōhiʻa ʻai, and hala, have diminished over time. She recalls a grove of white lauhala which today contains only a single tree. Her kupuna advised her and others to gather seeds from these plants and replant them to encourage the plants to regenerate and flourish. She mentions that there is no longer sufficient rainfall and groundwater to support the abundance of culturally important plant species that she observed in her youth. She also observed a dramatic increase of invasive plant species in the areas where native plant species used to flourish. According to Feiteira, the plants that grow in their native habitat possess greater potency compared to those cultivated in one's garden. Therefore, *lāʻau lapaʻau* (medicinal plant) practitioners prefer to use wild-grown plants for their medicines.

4.2 Cultural and Historical Sites

The area of Lahaina was the seat of power for many generations of aliʻi, beginning in at least the sixteenth century with Piʻilani. King Kamehameha III, Kauikeaouli, also established his royal court near Mokuhinia. This site, King Kamehameha III's Royal Residential Complex (also known as Mokuʻula/Loko Mokuhinia/Hale Piula), is listed on the National Register of Historic Places (SIHP Site 50-50-03-2967).

Other sites are listed in the Kīpuka database for the moku of Lahaina include Mokuhinia fishpond and the island of Mokuʻula.

4.2.1 Mokuhinia and Mokuʻula

Mokuhinia fishpond and the sacred island of Mokuʻula in Lahaina stand out as sites that community members wish to see revitalized. B. Feiteira, U. Kapu, and K. Kapu all mentioned cultural revitalization efforts to revive the fishpond. Mokuʻula was considered to be a sacred island and, at one time, was the location of the royal mausoleum before the royal iwi kūpuna were moved to Waiola Church. This fishpond provided sustenance for ruling aliʻi since the reign of Piʻilani in the sixteenth century, and possibly even earlier. Mokuhinia was also the residence of a moʻo of the same name believed to be Kihawahine, the daughter of Piʻilani. There is an abundance of evidence that Native Hawaiians continue

to observe traditional and customary practices associated with moʻo (Brown 2022:167–173). Accordingly, Mokuhinia is still believed to be a protector of Lahaina.

4.3 Coastal Fishing and Gathering

The nearshore marine environment of Lahaina has supplied the people of the area for centuries. The coast off of Lahaina was known for its rich fisheries since at least the time when Piʻilani established Lahaina as his seat of power. Kahaulelio's (1902a, 1902b) accounts revealed the area to be rich in marine resources, including nehu and several species of sharks.

B. Feiteira also recalled healthy populations of fish such as kole, owama/oamao, manini, halalu, kūmū, weke, and sharks, in addition to other marine species such as kūpeʻe, *ʻopihi* (limpets; *Cellana talcosa*, *C. sandwicensis*, *C. exarate*, and *C. melanostoma*), hāʻukeʻuke, wana, and heʻe. B. Feiteira's discussion revealed that fish populations decreased so noticeably during the 1970s that her kūpuna advised her that certain sections of ocean should no longer be fished.

Existing oral history interviews conducted with F. Harrison and T. Smith-Neizman also reveal the importance of fishing to the local community. They describe the presence of ʻōpelu, ʻulua, ʻōpelu kala, pāpio, weke ʻula, moano, moano hulu, and ʻumiʻumi (see Maly and Maly 2003).

4.4 Pūnāwai

B. Feiteira recounted how she used to gather water from freshwater springs in front of Mokuʻula and Mokuhinia fishpond when she was younger. She also recalled underground freshwater streams in Wahikuli and Polanui that flowed into the ocean. She recalled that the water gushed out from these springs so forcefully in the past that you could easily collect fresh water there, but today there is no longer sufficient flow to allow for this kind of fresh water gathering.

4.5 Iwi Kūpuna

K. Kapu's (2007) interview revealed that ʻohana within Kauaʻula are aware of over 200 burials in the valley, including aliʻi burials. The area of Waiuli, mauka of Honokōhau, Honolua, and Honokahua, was known for freshwater burials of makaʻāinana (*hoʻoilina kupapaʻu*) in pre-Contact and early post-Contact times (Kamakau 1968: Loc. 1194). The interview with K. Kapu also indicated that the areas of Kauaʻula and Mokuʻula are known as areas where important aliʻi were buried.

5 ASSESSMENT OF POTENTIAL IMPACTS

A primary purpose of this Ka Paʻakai Analysis is to identify "the extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action" (Ka Paʻakai O Ka ʻAina 2000). This section presents the assessment of potential impacts to traditional and customary Native Hawaiian rights and practices as a result of the proposed MDWS wells Launiupoko 1 (L1) and Launiupoko 3 (L3) within the Launiupoko Aquifer System.

5.1 Types of Traditional and Customary Rights Referenced Under the State Water Code

The following provision on Native Hawaiian water rights outlined in the State Water Code, HRS §174C-101, defines the types of traditional and customary water rights of Native Hawaiians:

> (c) Traditional and customary rights of ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778 shall not be abridged or denied by this chapter. Such traditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one's own kuleana and the gathering of hīhīwai, ʻōpae, ʻoʻopu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes. (2019:15)

It is notable that kalo, hīhīwai, ʻōpae, oʻopu, limu, and medicinal plants are specifically identified here.

5.2 Approach to Assessing Impacts

Using the information gathered through ethnohistoric research, existing oral history interviews, and public testimony from the September and October 2023 CWRM meetings and the IFSAR meetings, SWCA identified cultural resources, including traditional and customary Native Hawaiian practices, within the permit areas of the planned L1 and L3 wells. This study also determined the extent to which these resources and practices may be affected or impaired by the proposed MDWS wells.

The potential impacts to traditional and customary practices extend beyond the immediate vicinity of the planned wells mentioned above. Activities such as loʻi kalo farming; subsistence gathering of stream and nearshore ocean species, and the gathering of lāʻau lapaʻau from areas mauka of the planned wells could all be impacted by changes in freshwater availability due to the planned wells. Fresh water availability also impacts efforts to restore cultural properties such as the Mokuhinia fishpond and revitalize ecosystems through propagating native plants and limu.

Given the geographic extent of the Launiupoko Aquifer System, this report cannot definitively identify and address the full breadth of potential impacts to all cultural resources and traditional and customary practices in the areas near the planned L1 and L3 wells. Nevertheless, our research reveals that existing pressure on freshwater resources already endangers the traditional and customary practices described above, so additional groundwater withdrawals could further exacerbate these issues. Community members expressed fears that diminished streamflow could further threaten the survival of these cultural practices.

5.3 Community Concerns

Based upon information from our ethnographic interviews, existing oral history interviews, and region-specific public testimony from the IFSAR meetings, we identified the following community concerns

pertaining to freshwater quality and access and subsequent impacts to cultural practices in the planned well permit areas.

5.3.1 Ahupuaʻa-Based Approach

The community expressed that water needs to be managed holistically and should employ an ahupuaʻa-wide approach.

5.3.1.1 CONCERNS REGARDING FOREST AND WATERSHED HEALTH

- T. Lawrence and Kapali Keahi both worry that additional groundwater withdrawals will impact freshwater availability in Kauaʻula Stream, making restoration efforts at Mokuʻula even more difficult.
- K. Kapu observed that the location of the planned L3 well is close to the existing Lahaina Shaft well, which he claims is pumping brackish water. He believes this indicates that existing groundwater withdrawals in this area have, in his opinion, exceeded sustainable yield.
- The protection of watersheds from mauka to makai emerged as a common concern of community members.
- The most common concern voiced by community members was the need to restore and protect streamflow to irrigate loʻi kalo.
- According to several individuals, adequate fresh water is needed to ensure the growth and regeneration of native species.
- Several community members personally observed changes in the presence and abundance of culturally important freshwater species under different stream conditions. They would like to see MDWS monitor and protect populations of culturally important native species found in streams. These include the five types of ʻoʻopu fish, the two types of crustaceans or ʻōpae, and the two types of mollusks, hīhīwai (or wī) and hapawai.
- Members of the ʻAha Moku specifically called out the need to ensure ecosystem resilience against fire hazards and climate change by protecting native forests and water resources.

5.3.1.2 CONCERNS REGARDING NEARSHORE AND OCEAN RESOURCES

- A few community members personally observed changes in the presence and abundance of culturally important saltwater species under different stream conditions. They would like to see MDWS monitor and protect populations of culturally important limu species such as limu ʻeleʻele, limu kohu, limu līpeʻe, limu līpoa, manauea, and limu wāwaeʻiole. Other culturally important marine vertebrate species in the area include: kole, owama/oama, manini, halalu, kūmū, weke, and *manō* (sharks), in addition to invertebrate species such as kūpeʻe, ʻopihi, hāʻukeʻuke, wana, and heʻe.
- Informants noted that insufficient freshwater mauka to makai flow allows mosquitoes to breed in Mokuhinia and other coastal ponds.

5.3.2 Abundance and Quality of Freshwater Flow

5.3.2.1 INSUFFICIENT MONITORING AND ENFORCEMENT OF CURRENT WATER SUPPLIES

- Kekai Keahi expressed concern that a spring is close to the planned L1 well site. He is opposed to the location of the L1 well, as he is concerned about adverse effects on the spring and subsequent downstream water use. He also felt that groundwater withdrawals already exceed sustainable yields.
- Several individuals claim that their observations of the streamflow do not align with established instream flow standards and that they would like to see CWRM monitor actual instream flow.
- A common sentiment within the IFSAR testimony is that kalo farmers would like to see all streams restored to 100 percent flow. Community members called out the fact that decreasing freshwater flow resulted in increasing water temperatures, causing kalo crops to rot.
- Another frequent concern was the lack of enforcement of existing water allocations, particularly for large landowners who are perceived to receive preferential water access over kalo farmers.

5.3.2.2 AGING AND BROKEN INFRASTRUCTURE

- Aging and broken infrastructure, such as dams, gages, stream diversions, etc., came up as a major cause for concern in the community. Kalo farmers want to see responsible parties repair and maintain existing ditch infrastructure to ensure consistent streamflow.
- Several individuals also expressed frustration that the burden for clearing debris from the ditches and ‘auwais all too often falls onto individual kalo farmers.

5.3.2.3 LACK OF VIABLE ALTERNATIVE WATER SUPPLIES

- Numerous community members expressed an interest in greater use of R1 water for non-potable uses.

5.3.3 Reduced Water Quality

- Members of the ‘Aha Moku observed adverse effects from runoff and sedimentation on both streams and the nearshore environment, particularly impacting culturally important species of limu.
- Reduced water quality, particularly from runoff, directly impacts community members’ restoration efforts at Mokuhinia fishpond.
- Certain coastal freshwater springs are also much more saline now than they were in the past, meaning community members cannot gather fresh water from them for subsistence or cultural practices.

5.3.4 Need for Additional Community Input for Current and Future Projects

- K. Kapu’s (2008) interviews discussed the high concentration of iwi kūpuna in Kaua‘ula Valley.
- Potential undocumented kuleana uses may exist within the permit areas that did not emerge during this research. These undocumented kuleana uses could be identified through additional community input.

- Community members may also wish to maintain access to lands for gathering, hunting, fishing, and other Native Hawaiian traditional and customary practices.

5.3.5 Wildfire Risk

Several community members fear that additional groundwater withdrawals will cause vegetation to dry up, rendering the area more prone to wildfire risk.

6 PROPOSED ACTIONS TO PROTECT TRADITIONAL AND CUSTOMARY NATIVE HAWAIIAN RIGHTS

Following the assessment of potential impacts associated with the proposed permit activity, SWCA and the MDWS identified a series of feasible actions that could be taken to mitigate these impacts and serve to reasonably protect and revitalize Native Hawaiian rights, traditions, and customs associated with the permit areas. The feasible actions suggested here are intended to address community concerns expressed in ethnographic interviews, oral history interviews, and community consultation and testimony from the IFSAR meetings.

6.1 Apply an Ahupuaʻa-Based Approach to All Water Use Decisions

Upon analyzing the findings of the community consultation, public testimony from the IFSAR meetings, and oral history interviews, a mauka to makai approach is essential for revitalizing Native Hawaiian traditional and customary practices. The health of the upland forests directly impacts streams and aquifers, which in turn affects the nearshore environment.

In making decisions regarding water use within the Launiupoko aquifer system, the MDWS will employ an ahupuaʻa-based approach. This involves not only taking into account the potential impacts to the lands in the immediate vicinity of the permit activity but considering the effect of the project on the entire watershed, from the uplands to the nearshore waters, as well as the cultural practices currently being carried out within the ahupuaʻa.

As part of its community outreach efforts, the MDWS will seek to raise public awareness of ahupuaʻa management practices and foster partnerships for use and management of water sources with existing community and school-based ahupuaʻa restoration efforts.

As part of this ahupuaʻa-based approach to water planning and management, the MDWS will work with the local community and cultural practitioners to monitor and protect both the upland watershed and the coastal marine resources.

6.1.1 Mauka: Reforestation and Invasive Species Control to Improve Watershed Health

The retreat and reduction of forested slopes impacts cloud coverage and resulting rainfall. This, in turn, effects the amount of available groundwater. A lack of rainfall also renders both the uplands and the lower slopes vulnerable to wildfires. Invasive species, which often outcompete native species, potentially use up more water than native vegetation, further reducing the water table and increasing fire risk. Invasive grasses are particularlly vulnerable to wildfires.

To combat this cycle, MDWS intends to support reforestation effort within the Lahaina Water Management Area. Maui County will continue financial support for watershed management partnerships designed to improve groundwater recharge, reduce fire hazards, and prevent erosion through native species reforestation, invasive species control, fencing, and weed eradication efforts.

The MDWS will support watershed partnerships' outreach to West Maui schools to develop service-learning experiences that allow students to assist with invasive species control and the planting of native species.

6.1.2 Makai: Monitoring Culturally Important Aquatic Species

A number of community members observed local declines in culturally important stream, nearshore, and marine species since the 1970s, when the County begin to drill wells and also when Pioneer Mill Company sold its water management infrastructure to West Maui Land.

CWRM and the University of Hawai‘i Water Resources Research Center should consider developing, coordinating, and funding a region-wide system for inventorying and monitoring culturally important native aquatic species such as fish, limu, mollusks, and shrimp that may be affected by and are indicators of changing water supply. They should partner with community organizations like Kamehameha Schools, ‘Aha Moku o Maui, Inc., cultural practitioners, and other relevant NHOs in these endeavors.

The MDWS will support and fund the inventorying and monitoring of culturally important native species conducted by watershed partnerships in watersheds directly impacted by the MDWS’s existing and proposed water sources.

6.2 Protect and Recharge Groundwater and Surface Water Flow

6.2.1 Maintaining and Monitoring Current Water Supplies

The availability of fresh water to irrigate lo‘i kalo and revitalize fishponds emerged as the most common concern among community members when discussing surface water issues. To ensure sufficient streamflow to irrigate kalo and feed fishponds, the MDWS will:

Work with the State CWRM to ensure that existing instream flow standards are being met. In those cases where existing instream flow standards are not feasible due to the limitations of existing wells, the MDWS will work with CWRM to develop alternate strategies to ensure adequate water supplies.

Monitor and enforce current water use restrictions imposed on MDWS customers in a water shortage.

Use U.S. Geological Survey water studies to determine the most sustainable ways for the County to manage and develop groundwater withdrawals.

Install a monitoring well for Launiupoko to aid in understanding changes to water levels over time.

6.2.2 Alternative Water Source Strategies

Many community members expressed interest in alternative water strategies, such as recycling graywater (R-1) to be used for sewage, landscaping, agriculture, and other uses. To this end, the MDWS will:

Support capital improvement program funding for recycled water projects and needed infrastructure expansion in the Launiupoko Aquifer System to offset potable water to the maximum extent feasible.

Support exploration and permitting of graywater systems to offset potable water use.

Explore desalination of seawater and brackish water as alternative water supply for West Maui demand.

Explore the implementation of a dual-system water line for Lahaina town.

MDWS will support the increased utilization of R1 water from the Lahaina Wastewater Reclamation Facility for agricultural purposes, rather than directing it into injection wells.

6.3 Support Water Quality

Several community members noticed that a decline in water quality impacts limu populations. They observed also that the runoff from leach fields and/or septic systems potentially impacted restoration efforts at Mokuhinia fishpond and contributed to the loss of key limu species prized by gatherers. To combat water quality issues, the MDWS will:

Encourage the State Department of Health and Maui County to focus cesspool upgrades on areas impacting the nearshore marine environment and prioritize expanding sewer lines into residential areas that are currently unsewered, to reduce the amount of wastewater entering the aquifer and nearshore environment.

6.4 Require Archaeological and Cultural Monitoring for New Well Construction

Community members have expressed concern that, due to the number of known traditional and historic burials within the Launiupoko area, the potential exists for iwi kūpuna to be disturbed during the construction of new well sites.

In order to protect iwi kūpuna and historic properties, and to satisfy regulatory requirements, MDWS will submit plans and descriptions for all proposed well site projects to the State Historic Preservation Division (SHPD) for historic preservation review under HRS 6E-8, “Review of Effect of Proposed State Projects.” The MDWS will follow the SHPD’s recommendations regarding the need for an archaeological survey to determine if historic properties are present, as per HAR 13-275, “Rules Governing Procedures for Historic Preservation Review for Government Projects Covered Under 6E-7 and 6E-8.” The SHPD may request that an archaeological monitoring plan be prepared, and an archaeological monitor be present during all ground-disturbing activities. If there is a possibility that iwi kūpuna may be encountered during construction, SHPD may recommend that a cultural monitor should also be present.

All construction plans for new well sites will include instructions for the contractor to immediately halt all ground-disturbing activity in the event that iwi kūpuna are encountered. The contractor will then follow the steps outlined in HAR Section 13-300-40, “Inadvertent Discovery of Human Remains,” by notifying the MDWS, the SHPD, the Maui County Police Department, and the medical examiner/coroner to assess the situation. If the human remains are determined to be 50 years old or older, the MDWS shall follow whatever further instructions SHPD provides.

6.5 Solicit Ongoing Community Input for Current and Future Projects

Members of ‘Aha Moku stated that many community members have a stake in water use decisions, and recommend regular venues for them to share their *mana‘o*. Therefore, the MDWS should:

Hold annual meetings with community groups, cultural practitioners, lineal and cultural descendants of the area, and other interested community members to discuss current and planned water uses and to encourage ongoing cooperation and consultation regarding MDWS projects.

Consult with ‘Aha Moku regarding new water development projects in the subject moku so as to obtain information and feedback on impacts to Native Hawaiian traditional and customary uses and advice on proper actions.

Promote existing MDWS grant programs by proactively advertising in venues such as social media, the Office of Hawaiian Affair’s *Ka Wai Ola* magazine, and in local newspapers.

7 SUMMARY

The Native Hawaiian perspective on water resource management recognizes the need for a comprehensive and unified approach that underscores the interconnected nature of the water cycle. It is not enough to ensure the *survival* of Native Hawaiian traditional and customary practices in the planned permit areas; instead, all feasible efforts should be made to support cultural practitioners in their efforts to ensure that traditional and customary practices are able to *thrive*. For cultural practitioners to continue to pass on their traditions to future generations, it is crucial that the natural and cultural resources foundational to these practices are kept healthy and vibrant.

On behalf of the County of Maui, Department of Water Supply, SWCA Environmental Consultants conducted this Ka Paʻakai Analysis in support of the water use permit application for the planned L1 and L3 wells in the ahupuaʻa of Panaʻewa and Waineʻe, within the Launiupoko Aquifer System. Using a combination of ethnohistoric research, existing oral history interviews, public testimony from the September and October 2023 CWRM meetings, and the IFSAR meetings, this Ka Paʻakai Analysis has identified several important traditional and cultural practices in the areas surrounding the planned MDWS L1 and L3 wells. These cultural practices are loʻi kalo farming, nearshore subsistence fishing, gathering of marine resources, gathering of limu and lāʻau lapaʻau, and cultural revitalization efforts at the historic fishpond of Mokuhinia. These are important ongoing cultural practices that could potentially be impacted by water use associated with the proposed Maui County L1 and L3 wells.

This Ka Paʻakai Analysis found that there are concerns among some Native Hawaiian cultural practitioners regarding the proposed Maui County wells. These individuals express apprehension that the new wells may impose an additional strain on the fresh water resources within the Launiupoko Aquifer System. It is their opinion that such strain could potentially exacerbate the scarcity of fresh water, thereby impacting the vitality of ongoing traditional and customary Native Hawaiian practices. These cultural practitioners and community members hold the opinion that existing wells have reached their capacity, and they are worried that additional groundwater withdrawals could affect the streamflow of Kauaʻula Stream, which in turn could impact several culturally significant natural resources and cultural practices reliant upon the stream. They also disagree with the sustainable yield limits set by the CWRM and observed by the MDWS.

During community consultation, specific concerns emerged regarding the location of the planned L1 and L3 wells. One informant noted that the location of the planned L3 well is near the existing Lahaina Shaft well, which they claim has pumped up brackish water. They expressed concern that this suggests, in their opinion, that current groundwater withdrawals in this area have already surpassed sustainable yield. The MDWS however has indicated that brackish quality in wells close to the shoreline is normal and does not indicate withdrawals exceeding sustainable yield. Additionally, spreading withdrawals rather than concentrated pumpage at the four existing MDWS wells in the Launiupoko Aquifer System may have a positive or neutral impact on freshwater discharge to the coast and streams. Another informant noted that the L1 well site is near a natural spring known to them. They are opposed to the location of the L1 well, as they are concerned that the planned well may have adverse effects on the spring and subsequent downstream water use.

The differing viewpoints between cultural practitioners and the MDWS underscore the importance of balancing a nuanced understanding and education regarding both the Native Hawaiian holistic perspective on water and watershed management and the hydrologically informed technical perspective of the MDWS rooted in public data and guidance from the CWRM.

This Ka Pa‘akai Analysis identified a number of feasible actions to help mitigate the potential impacts of new groundwater withdrawal from the planned L1 and L3 wells. These include employing a mauka to makai approach to water conservation; supporting community-based efforts to restore watersheds; maintaining and monitoring water quality; developing alternative water source strategies; requiring archaeological and cultural monitoring during new well construction; and soliciting ongoing feedback from community members.

8 GLOSSARY OF HAWAIIAN WORDS USED IN THE TEXT

ahupuaʻa	traditional land division usually extending from the mountains to the sea and encompassing a range of environmental zones that were known and used by the land's early Hawaiian residents. It was "so called because the boundary was marked by a heap (ahu) of stones surmounted by an image of a pig (puaʻa), or because a pig or other tribute was laid on the altar as tax to the chief" (Pukui and Elbert 1971:8).
ʻāina	land
akua	deity
aliʻi	chief, individual of chiefly blood
ʻāpana	land divisions within a helu
ʻauwai	ditch, canal
ʻawa	kava, *Piper methysticum*
hala	*Pandanus tectorius*
halalu	young akule, *Trachurops crumenophthalmus*
hanawai	irrigation
hapawai	a shellfish, *Theodoxus vespertinus*
hāʻukeʻuke	a type of edible sea urchin; *Colobocentrotus atratus*
heʻe	octopus
heiau	traditional temple or shrine
helu	Land Commission Award number
hīhīwai	an endemic, edible, freshwater and brackish grainy snail, *Neritinu granosa*; also known as wī if in fresh water; there is a shellfish of the same name
hoʻoilina kupapaʻu	freshwater burials of makaʻāinana
hukilau	a fishing technique involving a group of people using a long net to circle and entrap fish
ʻili	traditional land division, smaller in size and next in importance to an ahupuaʻa, usually a subdivision of an ahupuaʻa
ʻīlio moʻo	brindled dog
iwi kūpuna	ancestral remains
ka wā kahiko	pre-Contact times
kalana	a land division smaller than a moku; a county
kalo	taro, *Colocasia esculenta*
kanaka	people; often refers specifically to Native Hawaiians
kanaka maoli	Native Hawaiians

keiki	children
koʻe	worms
kole	surgeonfish, *Ctenochaetus strigosus*
konohiki	land stewards, sometimes minor aliʻi
kula	plain or open country
kula kahakai	nearshore lands
kuleana	responsibility; in the case of "kuleana lands," refers to the Land Commission Awards which granted title to a particular family who traditionally occupied and cultivated that land
kūmū	goatfish, *Parupeneus porphyreus*
kūpeʻe	an edible marine snail, *Nerita polita*
lāʻau lapaʻau	medicinal plant
lālākea	whitetip shark, *Pterolamiops longimanus*
lele	outlying portions of an ahupuaʻa
limu	marine and freshwater algae
limu ʻeleʻele	*Enteromorpha prolifera*
limu huluhuluwaena	*Grateloupia filicina*
limu kohu	*Asparagopsis taxiformis*
limu līpeʻe	*Laurencia* sp.
limu līpoa	*Dictyopteris pagiogramma* and *D. australis*
limu manauea	*Gracilaria coronopifolia*
limu wāwaeʻiole	*Codium edule*
loko iʻa	fishpond
mahiʻai	farming; farmers
maiʻa	bananas, *Musa paradisiaca*
makaʻāinana	common people
makai	toward the sea
mamaki	*Pipturus* sp.
manaʻo	thoughts
manini	a common reef surgeonfish, *Acanthurus triostegus*
manō	shark
mauka	inland
moai	the famous monoliths of Rapa Nui, also known as Easter Island
moano	goatfish, *Parupeneus multifasciatus*
moano hulu	similar to weke ʻula but with a beard

moelua	weke ʻula, *Mulloidichthys vanicolensis*
moku	district, land section, or island
moʻo	water deities or lizard goddesses; can also be any lizard
moʻolelo	oral histories; myths, legends, or stories
moʻokūʻauhau	geneaology
nananana/lanalana	spider
nehu	anchovies, *Encrasicholina purpureus*
ogo	a limu; *Gracilaria parvispora*, sometimes also called manauea
ʻohana	family
ʻōhiʻa ʻai	mountain apple tree, *Eugenia malaccensis*
ʻōlelo noʻeau	traditional Hawaiian proverbs and poetical sayings
ʻōmaʻi	weakness, illness
ʻoʻopu	goby fish, in the families Eleotridae, Gobiidae, and Blennidae
ʻoʻopu ʻakupa	*Eleotris sandwicensis*
ʻoʻopu nākea	*Awaous guamensis*
ʻoʻopu naniha	*Stenogobius hawaiiensis*
ʻoʻopu nōpili	*Sicyopterus stimpsoni*
ʻōpae	endemic shrimp
ʻōpae kuahiwi/kalaʻole	*Atyoida bisulcata*
ʻōpae ʻoehaʻa	*Macrobrachium grandimamus*
ʻōpelu	Mackerel scad, *Decapterus macarellus, D. pinnulatus* and/or *D. maruadsi*
ʻōpelu kala	a kala fish staying with ʻōpula schools; *Naso hexacanthus*
ʻopihi	limpets; *Cellana talcosa, C. sandwicensis, C. exarate*, and *C. melanostoma*
ʻopu ʻalamoʻo	*Lentipes concolor*
owama/oama	young weke or goatfish
pae ʻāina	the Hawaiian archipelago
pāpio	the youngest stage of ʻulua
pili ʻohana	close family
ti	*Cordyline fruticosa*
ʻuala	sweet potato; *Ipomoea batatas*
ʻuhaloa	a medicinal plant; *Waltheria indica*
ʻulua	carangids; the adult stage of certain species of fish such as Giant Trevally, crevalle, jack, or pompano, in the family of Carangidae
ʻumiʻumi	unknown, "whiskered"

wana	long-spined sea urchins; possibly *Diadema paucispinum* or *Echinothrix diadema*
wao akua	the highest elevation of mountain ranges; the realm of the gods and spirits
weke	certain species of the Mullidae, surmullets or goatfish. All weke have large scales and are usually found in reefs, sometimes in deep water

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Appendix A

Request for Consultation Letter

SWCA
ENVIRONMENTAL CONSULTANTS
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1200 Ala Moana Boulevard, #380
Honolulu, Hawaii 96814
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September 15, 2023

Re: Cultural Consultation for Lahaina Water Management Area Ka Pa'akai Analyses

Aloha,

On behalf of the County of Maui Department of Water Supply (DWS), SWCA Environmental Consultants (SWCA) is conducting Ka Pa'akai Analyses in support of water use permit applications for all DWS proposed water sources in the Lahaina Aquifer Sector.

In 2022, the State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resources Management (CWRM) designated the Lahaina Aquifer Sector as both a Surface and Ground Water Management Area. As a result, the Department of Water Supply is required to submit water use permit applications to the CWRM for all existing and proposed water sources within the Lahaina Aquifer Sector.

The Maui County DWS plans to prepare water use permit applications for additional use from several existing DWS wells, Honokōhau Stream, and six new, proposed water sources in the Honolua aquifer, the Honokōwai aquifer, and the Launiupoko aquifer. These proposed water sources include three wells in the Honolua aquifer, one well in Honokowai aquifer, and two wells in Launiupoko aquifer.

As water use within the Lahaina Aquifer Sector has the potential to affect traditional and customary Native Hawaiian rights and practices, a required part of the CWRM water use permit application for each water use is the preparation of a Ka Pa'akai Analysis. These analyses will follow the guidelines established by the 2000 Hawai'i Supreme Court decision in Ka Pa'akai O Ka 'Aina v. Land Use Commission and will involve:

- The identification of cultural, historical, and natural resources of value to Native Hawaiians located within the water use permit area, and the extent to which traditional and customary Native Hawaiian rights are exercised in the area.
- The determination of the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by actions associated with the existing or proposed water use.
- If impacts are found to exist, the identification of actions that could be taken, as needed, to reasonably protect traditional and customary Native Hawaiian rights and practices within the permit area and the development of an implementation plan and budget for these mitigating actions.

The Ka Pa'akai Analyses and consultation process is intended to address each of these three elements. As part of the consultation process, SWCA is attempting to identify and consult with individuals and organizations familiar with past and present cultural activities conducted in the permit areas, particularly those related to water. We are seeking your kōkua and mana'o regarding the following aspects of our study:

- Help to identify kama'āina, kūpuna, and other individuals who might be willing to share their cultural knowledge of the permit areas and their cultural resources.
- Information on present and past water use in the permit areas.
- Information on place names and cultural traditions associated with the permit areas.

- Information on cultural resources that may be impacted by water use activities by the DWS.
- Knowledge of traditional gathering practices within the permit area, both past and ongoing.
- Information on any current cultural practices being carried out within the permit areas.
- Any other concerns the community might have related to cultural practices within or in the vicinity of the permit areas.

We appreciate any information you would be willing to share regarding the permit areas and those individuals knowledgeable about its past and present cultural uses. Please contact us at Wainani.Traub@swca.com or by phone at (808) 646-6309, or at Tamara.Luthy@swca.com or by phone at (808) 892-3432. We look forward to hearing from you.

Mahalo no kou kōkua 'ana mai,

Wainani Traub
Assistant Project Anthropologist

Tamara Luthy
Assistant Staff Anthropologist

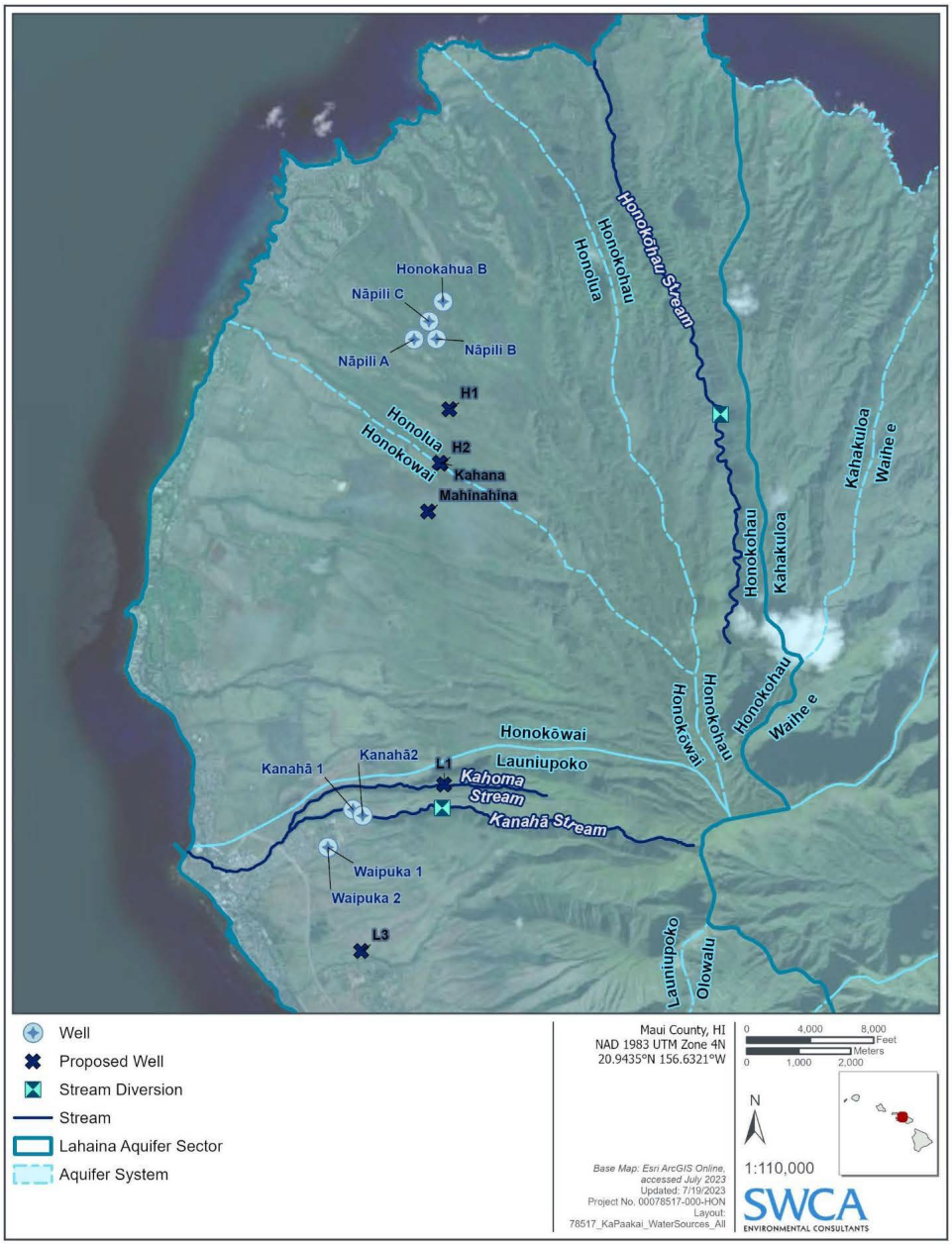
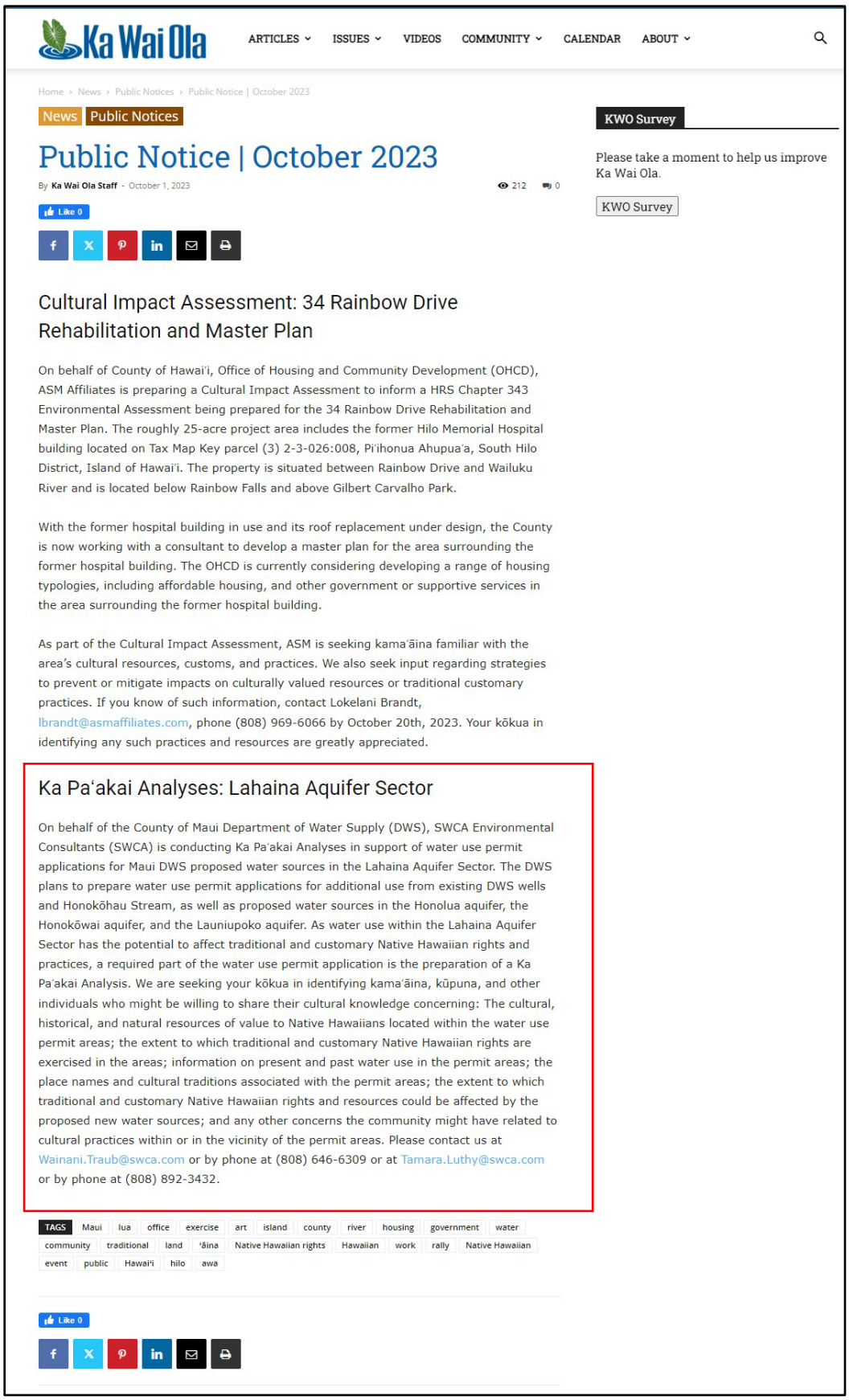


Figure 1. Lahaina Aquifer Sector

Appendix B

Public Notice in *Ka Wai Ola*



Ka Wai Ola

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News Public Notices

Public Notice | October 2023

By **Ka Wai Ola Staff** - October 1, 2023 212 0

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Cultural Impact Assessment: 34 Rainbow Drive Rehabilitation and Master Plan

On behalf of County of Hawai'i, Office of Housing and Community Development (OHCD), ASM Affiliates is preparing a Cultural Impact Assessment to inform a HRS Chapter 343 Environmental Assessment being prepared for the 34 Rainbow Drive Rehabilitation and Master Plan. The roughly 25-acre project area includes the former Hilo Memorial Hospital building located on Tax Map Key parcel (3) 2-3-026:008, Pi'ihonua Ahupua'a, South Hilo District, Island of Hawai'i. The property is situated between Rainbow Drive and Wailuku River and is located below Rainbow Falls and above Gilbert Carvalho Park.

With the former hospital building in use and its roof replacement under design, the County is now working with a consultant to develop a master plan for the area surrounding the former hospital building. The OHCD is currently considering developing a range of housing typologies, including affordable housing, and other government or supportive services in the area surrounding the former hospital building.

As part of the Cultural Impact Assessment, ASM is seeking kama'āina familiar with the area's cultural resources, customs, and practices. We also seek input regarding strategies to prevent or mitigate impacts on culturally valued resources or traditional customary practices. If you know of such information, contact Lokelani Brandt, lbrandt@asmaffiliates.com, phone (808) 969-6066 by October 20th, 2023. Your kōkua in identifying any such practices and resources are greatly appreciated.

Ka Paʻakai Analyses: Lahaina Aquifer Sector

On behalf of the County of Maui Department of Water Supply (DWS), SWCA Environmental Consultants (SWCA) is conducting Ka Pa'akai Analyses in support of water use permit applications for Maui DWS proposed water sources in the Lahaina Aquifer Sector. The DWS plans to prepare water use permit applications for additional use from existing DWS wells and Honokōhau Stream, as well as proposed water sources in the Honolua aquifer, the Honokōwai aquifer, and the Launiupoko aquifer. As water use within the Lahaina Aquifer Sector has the potential to affect traditional and customary Native Hawaiian rights and practices, a required part of the water use permit application is the preparation of a Ka Pa'akai Analysis. We are seeking your kōkua in identifying kama'āina, kūpuna, and other individuals who might be willing to share their cultural knowledge concerning: The cultural, historical, and natural resources of value to Native Hawaiians located within the water use permit areas; the extent to which traditional and customary Native Hawaiian rights are exercised in the areas; information on present and past water use in the permit areas; the place names and cultural traditions associated with the permit areas; the extent to which traditional and customary Native Hawaiian rights and resources could be affected by the proposed new water sources; and any other concerns the community might have related to cultural practices within or in the vicinity of the permit areas. Please contact us at Wainani.Traub@swca.com or by phone at (808) 646-6309 or at Tamara.Luthy@swca.com or by phone at (808) 892-3432.

TAGS Maui lua office exercise art island county river housing government water community traditional land ʻāina Native Hawaiian rights Hawaiian work rally Native Hawaiian event public Hawai'i hilo awa

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ANALYSIS OF PROJECT APPLICABILITY TO HAWAIʻI STATE PLAN

APPENDIX G

APPENDIX G

Analysis of Project Applicability to Hawai‘i State Plan

Chapter 226, HRS, also known as the Hawai‘i State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The Plan consists of three (3) parts. Part I includes the Overall Theme, Goals, Objectives, and Policies; Part II includes Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Inasmuch as Part II of the State Plan covers its administrative structure and implementation process, discussion of the proposed project's applicability to Part II is not appropriate. Below is an analysis of the project's applicability to Part I and Part III of the Hawai‘i State Plan.

The methodology for the analysis involves examining the project's applicability to the Hawai‘i State Plan's goals, objectives, and policies. "Applicability" refers to a project's need, purpose and effects, and how these advance or promote a particular set of goals, objectives and priority guidelines. In assessing the relationship between a proposed action and the Hawai‘i State Plan, an action may be categorized in one of the following groups:

1. **Directly applicable**: the action and its potential effects directly advance or promote the objective, policy or priority guideline.

   Example: A county project to develop a new water source and related transmission facilities would be directly applicable to the objectives and policies for Facility Systems-Water (HRS 226-16) which states" *(5) Support water supply services to areas experiencing critical water problems.*

2. **Indirectly applicable**: the action and its potential effects indirectly support or advance the objective, policy or priority guideline.

   Example: The county water source project cited above supports other related objectives and policies for the economy (HRS 226-6, General), which, by example, states: *(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.* In this case, the principle purpose of the project was not to create new construction activities, but nonetheless, supports this policy by creating temporary construction activity during the implementation of the project. In this instance, the proposed action may be deemed to be indirectly applicable to the objective and policy of the Hawai‘i State Plan.

3. **Not applicable**: The action and its potential effects have no direct or indirect relationship to the objectives and policies of the Hawai‘i State Plan.

   Example: That same county water source improvement project referenced above, may not have direct or indirect linkage to objectives and policies for the economy-Federal

Expenditures (HRS 226-9) which states: *(1)Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment*. From the standpoint of the agency proposing the water system improvement, and assuming no Federal Funding for the project, there is an unlikely intent that the proposed water source project would be connected to or reliant upon the foregoing policy. Hence, from the standpoint of judiciously applied policy analysis, the proposed action would be considered not applicable to the policy.

In general, a proposed action's applicability the objectives, policies and priority guidelines of the Hawai'i State Plan is judged on the basis of the action's direct or indirect relationship to the respective objectives, policies and priority directions. It is recognized that the categorization of "applicability" is subject to interpretation and should be appropriately considered in the context of local and regional conditions.

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 ensure, for the present and future generations, those elements of choice and mobility that ensure 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 is intended to identify potential water sources to meet water needs of residents in the West Maui region during times of low-flow and drought. If the proposed exploratory wells meet water quality standards, they could be converted to permanent production well to eventually restore stream-flow to Kanahā Stream by producing 1.55 million gallons per day (mgd) of surface water.**			
Chapter 226-5 Objective and Policies for Population			
Objective:			
(a) 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:			
(b) To achieve the population objective, it shall be the policy of this State to:			
(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.		✓	

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
(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.		✓	
Analysis: **The proposed project involves the construction of exploratory wells to identify viable water sources and ensure adequate water resources are available to service the West Maui region. The proposed action is indirectly supportive of the objective and policies for planning for population growth through seeking additional groundwater sources.**			
Chapter 226-6 Objectives and policies for the economy – – in general			
Objectives:			
(a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.		✓	
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.		✓	
Policies:			
(b) To achieve general economic objectives, it shall be the policy of this State to:			
(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.			✓

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
(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.			✓
(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.			✓

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 indirectly supports the general objectives and policies for the economy by supporting design and construction activity which contributes to increased employment opportunities, job choices, and living standards. Businesses positively affected by the project are those which support design and construction such as engineers and material suppliers.**			
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:			
(a) 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:			
(b) To achieve the agriculture objectives, it shall be the policy of this State to:			
(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.			✓
(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.			✓

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
(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 action is neither directly or indirectly applicable to the objectives and policies for the agricultural economy. However, should the exploratory wells be successful, the addition of a permanent production well could help to promote agricultural activity and traditional Hawaiian farming systems.**			
Chapter 226-8 Objective and policies for the economy – – visitor industry.			
Objective:			
(a) 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.			✓
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.			✓

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
(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 project is neither directly or indirectly applicable to the objective or policies for the visitor industry and has no implications for the enhancement or growth of the visitor industry.**			
Chapter 226-9 Objective and policies for the economy – – federal expenditures.			
Objective:			
(a) 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:			
(b) To achieve the federal expenditures objective, it shall be the policy of this State to:			
(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 State, and the counties.			✓
Analysis: **The proposed action does not involve federal funds and is not directly or indirectly applicable to the objective and policies for federal expenditures.**			
Chapter 226-10 Objective and policies for the economy – – potential growth and innovative activities.			
Objective:			
(a) 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:			
(b) To achieve the potential growth and innovative activity objective, it shall be the policy of this State to:			

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
(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;			✓
(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			✓

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
(17) Recognize and promote health care and health care information technology as growth industries.			✓
Analysis: **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:			
(a) 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:			
(b) To achieve the information industry objective, it shall be the policy of this State to:			
(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.			✓
Analysis: **The proposed action does not directly or indirectly affect Hawai'i's capacity to be a leader in the broadband wireless communication industries, nor does it affect innovative industries from advancing Hawai'i's economic position or influence in the Pacific Region.**			

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
Chapter 226-11 Objectives and policies for the physical environment – – land based, shoreline, and marine resources.			
Objectives:			
(a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.	✓		
(2) Effective protection of Hawaii's unique and fragile environmental resources.	✓		
Policies:			
(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:			
(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: ***T*****he proposed project is intended to identify viable water sources to replace stream flow to Kanahā Stream. Exploratory testing will be conducted to understand potential impacts to stream flow at Kanahā and Kahoma Streams. Because high-level groundwater does not feed into and maintain the stream flow, the proposed wells are not anticipated to affect the streams. The exploratory testing will be implemented to ensure compatible relationships among activities, facilities, and natural resources.**			
Chapter 226-12 Objective and policies for the physical environment – – scenic, natural beauty, and historic resources.			
Objective:			
(a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.		✓	

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:			
(b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:			
(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 proposed action is indirectly applicable to the objective and policies to preserve Hawai'i's natural and historical resources. An archeological study and Cultural Impact Assessment (CIA) conducted as part of the environmental review process, demonstrates an effort to preserve Hawai'i's natural and historical resources and protect Hawai'i's ethnic and cultural heritage. The State Historic Preservation Division (SHPD) has been consulted and the proposed project will comply with SHPD's recommendations for mitigation.**			
Chapter 226-13 Objectives and policies for the physical environment – – land, air, and water quality.			
Objectives:			
(a) 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:			
(b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:			
(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.			✓

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) 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 indirectly supports the objective and policies for the pursuit of improved quality in Hawai'i's water resources to achieve desired groundwater quality through the use of exploratory wells to determine potential yield and water quality as well as potential impacts to water resources.**			
Chapter 226-14 Objective and policies for facility systems – – in general.			
Objective:			
(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, sustainable development, climate change adaptation, sea level rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.	✓		
Policies:			
(b) To achieve the general facility systems objective, it shall be the policy of this State to:			
(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.			✓
(5) Identify existing and planned state facilities that are vulnerable to sea level rise, flooding impacts, and natural hazards.			✓
(6) Assess a range of options to mitigate the impacts of sea level rise to existing and planned state facilities.			✓
Analysis: **The proposed project involves the construction of exploratory wells to determine viable groundwater sources, directly advancing the objective and policies for facility systems and water facility systems, in particular.**			
Chapter 226-15 Objectives and policies for facility systems – – solid and liquid waste.			
Objectives:			
(a) 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.			✓

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
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.			✓
Policies:			
(b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:			
(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: **As an exploratory well project, the proposed action is neither directly or indirectly applicable to solid and liquid waste facility systems.**			
Chapter 226-16 Objective and policies for facility systems – – water.			
Objective:			
(a) 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.	✓		
Policies:			
(b) To achieve the facility systems water objective, it shall be the policy of this State to:			
(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 directly and indirectly supports the objective and policies for water facility systems through the use of exploratory wells to test potential water sources for yield and quality in order to meet the critical water needs of West Maui.**			
Chapter 226-17 Objectives and policies for facility systems – – transportation.			
Objectives:			
(a) 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:			

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(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:			
(b) To achieve the transportation objectives, it shall be the policy of this State to:			
(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;			✓
(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 action is not directly or indirectly applicable to the objectives or policies for transportation systems and has no implications for the development of transportation systems or services.**			
Chapter 226-18 Objectives and policies for facility systems – – energy.			
Objectives:			
(a) 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:			

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
(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.			✓
Policies:			
(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.			✓
(c) To further achieve the energy objectives, it shall be the policy of this State to:			
(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;			✓
(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;			✓

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
(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 action is not directly or indirectly applicable to the objectives and policies for energy facility systems and does not impact Hawai'i's energy supply, reliance on fossil fuels or use of renewable 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.			✓
Policies:			
(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.			✓
(c) To further achieve the telecommunications objective, it shall be the policy of this State to:			
(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.			✓
Analysis: **The proposed action is not directly or indirectly applicable to the objectives and policies for telecommunications facility systems' dependability, efficiency or cost parameters. The proposed project will 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:			
(a) Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			✓

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
(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 rental and for sale affordable housing is made available to very low-, very low- and, lower-, moderate-, and above 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:			
(b) To achieve the housing objectives, it shall be the policy of this State to:			
(1) Effectively accommodate the housing needs of Hawaii's people.			✓
(2) Stimulate and promote feasible approaches that increase affordable rental and for sale housing choices for extremely low-, very low-, lower-, moderate-, and above moderate-income 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 rental and for sale 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 action is not directly or indirectly applicable to the objectives or policies to increase homeownership or rental opportunities and does not affect the availability of affordable housing in Hawai'i.**			
Chapter 226-20 Objectives and policies for socio-cultural advancement – – health.			
Objectives:			
(a) 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.			✓
(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.			✓

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
(3) Elimination of health disparities by identifying and addressing social determinants of health.			✓
Policies:			
(b) To achieve the health objectives, it shall be the policy of this State to:			
(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 is neither directly or indirectly applicable to the objectives and policies for public health, health care or the elimination of health disparities.**			
Chapter 226-21 Objectives and policies for Socio-cultural advancement – – education.			
Objective:			
(a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.			✓
Policies:			
(b) To achieve the education objectives, it shall be the policy of this State to:			
(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.			✓

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
(3) Provide appropriate educational opportunities for groups with special needs.			✓
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			✓
(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: **The proposed action is not directly or indirectly applicable to the objectives and policies for education, nor does it affect the State's ability to promote or enhance educational programs or opportunities.**			
Chapter 226-22 Objective and policies for socio-cultural advancement – – social services.			
<u>Objective</u>:			
(a) 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.			✓
<u>Policies</u>:			
(b) To achieve the social service objective, it shall be the policy of this State to:			
(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.			✓

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
(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 proposed action is not directly or indirectly applicable to the objectives and policies for the provision of social services and will not impact the promotion of assistance programs for vulnerable populations.**			
Chapter 226-23 Objective and policies for socio-cultural advancement – – leisure.			
Objective:			
(a) 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:			
(b) To achieve the leisure objective, it shall be the policy of this State to:			
(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.			✓

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 involves the use of exploratory wells to determine viable water sources and does not have recreational implications and is not indirectly applicable to the objectives and policies for leisure.**			
Chapter 226-24 Objective and policies for socio-cultural advancement – – individual rights and personal well-being.			
Objective:			
(a) 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:			
(b) To achieve the individual rights and personal well-being objective, it shall be the policy of this State to:			
(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 action is not directly or indirectly applicable to the objectives and policies for the advancement of individual rights and self-determination and has no implications for the alleviation of the consequences of criminal acts.**			
Chapter 226-25 Objective and policies for socio-cultural advancement – – culture.			
Objective:			
(a) 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.		✓	
Policies:			
(b) To achieve the culture objective, it shall be the policy of this State to:			
(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.			✓

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 is indirectly applicable to the objectives and policies for theenhancement of culture and helps to foster an increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and history through the preparation of a Cultural Impact Assessment (CIA) that was completed as part of the environmental review process.**			
Chapter 226-26 Objectives and policies for socio-cultural advancement – – public safety.			
Objectives:			
(a) 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):			
(b) To achieve the public safety objectives, it shall be the policy of this State to:			
(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):			
(c) To further achieve public safety objectives related to criminal justice, it shall be the policy of this State to:			
(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):			
(d) To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:			
(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.			✓

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 the objectives and policies for public safety. In particular, the proposed project does not address protection of life and property parameters, organizational readiness and capacity, or community responsibility for people's welfare and safety.**			
Chapter 226-27 Objectives and policies for socio-cultural advancement – – government.			
Objectives:			
(a) 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:			
(b) To achieve the government objectives, it shall be the policy of this State to:			
(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 action is indirectly applicable to the objectives and policies for government. Specifically, the proposed project will comply with regulatory requirements of the environmental review process that advances transparency in the flow of project-related information to the public.**			

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
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 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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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 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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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.			✓
(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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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.			✓
(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 project is directly and indirectly applicable to the State's economic priority guidelines. The project indirectly supports the State's long-term commitments through the use of exploratory wells to determine adequate water sources to meet instream flow standards in Kanahā Stream. As a water source project, the proposed action also supports research and development of water sources and water system improvements.**			
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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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.			✓
(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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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 action indirectly supports the priority guidelines for statewide growth and distribution by seeking adequate water sources to ensure sufficient water supply is available in West Maui.**			
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 is not directly or indirectly applicable to the priority guidelines for crime and criminal justice and will not support law enforcement efficacy, conditions of correctional facilities, or alternative sanctions.**			
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 extremely low-, very low-, lower-, moderate-, and above moderate-income 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.			✓
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low-, very low-, lower-, and moderate-income 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.			✓

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(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 action is not directly or indirectly applicable to the priority guidelines for affordable housing. However, it is acknowledged that adequate infrastructure, including availability of water resources, is imperative to the development of affordable housing.**			
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 is not directly or indirectly applicable to the priority guidelines and principles for quality education and does not affect the improvement or development of educational programs and resources.**			
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;		✓	
(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		✓	

Hawai'i State Plan, Chapter 226, HRS Part III. Priority Guidelines Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	N/A
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaii.			✓
Analysis: **The proposed action indirectly supports the priority guidelines and principles for sustainability and living within the natural resources and limits of the State by pursuing water sources to sustain instream flow standards in West Maui. Restored stream flow also supports the principles of the ahupua'a system.**			
CHAPTER 226-109: Climate change adaptation priority guidelines			
Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:		✓	
(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 resilience in the water sector through the pursuit of potential groundwater sources. In addition, the project will be implemented in area that is outside of natural landscape features such as the tsunami evacuation zone and the projected sea level rise hazard, which helps to avoid impacts related to climate change.**			

ANALYSIS OF PROJECT APPLICABILITY TO COUNTYWIDE POLICY PLAN

APPENDIX G-1

APPENDIX G-1

Analysis of Project Applicability to Countywide Policy Plan

The Countywide Policy Plan was adopted in March 2010 and is a comprehensive policy document for the islands of Maui County to the year 2030. The plan replaces the *General Plan of the County of Maui 1990 Update* and provides the policy framework for the development of the forthcoming Maui Island Plan as well as for updating the nine detailed Community Plans.

The Countywide Policy Plan provides broad goals, objectives, policies and implementing actions that portray the desired direction of the County's future. Goals are intended to describe a desirable condition of the County by the year 2030 and are intentionally general. Objectives tend to be more specific and may be regarded as milestones to achieve the larger goals. Policies are not intended as regulations, but instead provide a general guideline for County decision makers, departments, and collaborating organizations toward the attainment of goals and objectives. Implementing actions are specific tasks, procedures, programs, or techniques that carry out policy.

Discussion of the proposed project conforms to the relevant goals, objectives, policies, and implementing actions of the Countywide Policy Plan is provided below. The methodology for assessing a project's relationship to the Countywide Policy Plan involves examining the project's applicability to the Plan's goals, objectives, and policies. "Applicability" refers to a project's need, purpose and effects, and how they advance or promote a particular set of goals, objectives and policies. In assessing the relationship between a proposed action and the Countywide Policy Plan, an action may be categorized in one of the following groups:

1. **Directly applicable:** the action and its potential effects directly advances, promotes or affects the relevant goal, objective, or policy.

   Example: A County project to develop a new water source and related transmission facilities would be directly applicable to improving physical infrastructure. The relevant objective states: *"Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water*" (Objective I.1). A policy within this objective category states: *Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents* (Policy I.1.a).

   In this instance, the proposed action is considered to be directly applicable to the cited objective and policy.

2. **Indirectly applicable:** the action and its potential effects indirectly supports, advances or affects the objective, policy or priority guideline.

   Example: The county water source project cited above supports the objective to: *"Improve land use management and implement a directed-growth strategy"* (Objective J.1). A related policy encompassed by this objective states: *"Direct new development in and*

around communities with existing infrastructure and service capacity, and protect natural, scenic, shoreline, and cultural resources" (Policy J.1.h). In this case, the principle purpose of the project is not to create source specifically intended to improve land use management. Nonetheless, the proposed action indirectly supports the Countywide Policy Plan's directives relating to appropriate locations for new development.

3. **Not applicable:** the action and its potential effects have no direct or indirect relationship to the objectives and policies of the Countywide Policy Plan.

Example: The county water source improvement project referenced above, may not have direct or indirect linkage to Objective D.1, which states: *"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"*. Hence, from a policy analysis and linkage standpoint, the proposed action would be considered not applicable to this set of objectives and policies.

It is recognized that policy analysis is subject to interpretation and is best considered in the context of the proposed action's local and regional conditions.

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Implementing Actions:			
(a) Develop island-wide networks of greenways, watercourses, and habitat corridors.			✓
Analysis: **The proposed action is indirectly applicable to the objective and policies to preserve Maui County's natural environment, and indigenous and endemic species' habitats. A biological resources survey and report was prepared for each of the five (5) sites considered for the proposed project demonstrating an effort to identify and preserve Maui County's natural biological resources. The surveys did not identify any endangered or threatened flora and fauna species or critical habitats. The proposed project is not expected to have adverse negative impacts on the project area's natural environment. Furthermore, the proposed exploratory wells seek to identify potential water sources to meet stream flow standards in West Maui, indirectly supporting the policy to restore and protect stream flows.**			
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.			✓
(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 is intended to identify viable water sources to replace stream flow to Kanahā Stream. Exploratory testing will be conducted to understand potential impacts to stream flow at Kanahā and Kahoma Streams. Because high-level groundwater does not feed into and maintain the stream flow, the proposed wells are not anticipated to affect the streams. The exploratory testing will be implemented to ensure compatible relationships among activities, facilities, and natural resources.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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.			✓
Analysis: **A flora and fauna survey addressing biological resources in the project area was conducted as part of the environmental review process indirectly supporting the objective for improving the stewardship of the natural environment. As previously mentioned, the proposed project is intended to identify viable water sources to restore stream flow to Kanahā Stream.**			
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, neither directly nor indirectly, advances the objective for educating residents or visitors about responsible stewardship of the natural environment, native flora and fauna, or ecosystems.**			
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.		✓	

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
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 ahupua'a 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 ahupua'a 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 ahupua'a or district.			✓
(b) Develop requirements for all County applicants to perpetuate and use proper traditional place names in all applications submitted.			✓
Analysis: **Indirectly, the proposed action supports the objective and policies to perpetuate traditional Hawaiian cultural practices. 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. The CIA includes mitigation measures to ensure that safe access will be maintained for local residents during and following project implementation while prioritizing community involvement and protecting natural resources from non-native users.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **The proposed 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, while recommending measures to maintain natural and cultural resources from impacts of non-native users.**			
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 is an exploratory well project that 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.**			
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.			✓
(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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 project is indirectly applicable to this objective and policy to preserve significant historic and cultural sites through the preparation of and initiation of archaeological consultation. With implementation of mitigation measures recommended in the CIA, safe access will be maintained for local residents during and following project implementation while protecting natural resources from non-native users.**			
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 proposed action is neither directly or indirectly applicable to the goal, objective and policies for the retention of high-quality educators and administrators.**			
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, NA = Not Applicable)	DA	IA	NA
(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: **The proposed project does not directly or indirectly affect the County's goal, objective, or policies for enhancing learning environments that build 21st Century skills.**			
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			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
development of other higher-education institutions to enable residents to obtain bachelor degrees and postgraduate degrees in Maui County.			
Analysis: **The proposed project is not directly or indirectly applicable to the goals or policies for allowing residents to realize their ambitions through educational opportunities.**			
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: **As an exploratory well project, the proposed action does not directly or indirectly support the objectives or policies for maximizing 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.			✓

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Analysis: ***T*****he proposed action is not directly or indirectly applicable to the objectives and policies for the provision of social and healthcare services and will not impact access to these services or facilities.**			
Objective:			
(2) Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.			✓
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 proposed action does not directly or indirectly support the objective or policies for encouraging the government or private sector to improve social services or health and mental health services.**			
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.			✓

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Analysis: **The proposed action is not directly or indirectly applicable to the objective or policies for public-awareness programs and will not impact public-awareness of healthy lifestyles and social and medical services.**			
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.			✓
(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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **he proposed action does not directly or indirectly support the goal or objective for the availability of housing and affordable housing, nor does it impact the policies for increased access to housing.**			
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.			✓
(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 does not impact the objectives and policies to improve the mix of housing types.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **The affordable housing inventory will not be directly or indirectly supported by the proposed project.**			
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: **The proposed action does not directly or indirectly affect access to education or information related to homeownership, housing choice, or financing.**			
F. STRENGTHEN THE LOCAL ECONOMY			
Goal: Maui County's economy will be diverse, sustainable, and supportive of community values.		✓	
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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: **The proposed action indirectly supports the objectives and policies for strengthening and diversifying the economy by supporting design and construction activity which contributes to increased employment opportunities, job choices, and living standards. Businesses positively affected by the project are those which support design and construction such as engineers and material suppliers.**			
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.			✓
(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 communal farming and 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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **The proposed action does not directly or indirectly affect the objectives and policies for the diversification and expansion of agriculture or aquaculture. It is noted that water supply is an essential component for agricultural activity and the implementation of the proposed action will not adversely affect agricultural productivity of Maui County.**			
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 kama'aina 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 2006-2015.			✓
(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 not directly or indirectly applicable to the objective and policies for the visitor industry and has no implications for promoting traditional Hawaiian practices or local culture in the visitor industry.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **The proposed project will support design and construction activity, however, it will not directly or indirectly expand emerging economic sectors that increase job choices.**			
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 is not directly or indirectly applicable to the objective or policies for expanding or improving access to recreational and public facilities. Additionally, the proposed exploratory wells will not encourage the development or enhancement of community centers and recreational venues.**			
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.			✓
(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 proposed action does not directly or indirectly support the objective or policies for the improvement or provision of adequate community facilities.**			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
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 action is not directly or indirectly applicable to the enhancement of funding, management, or planning of public facilities and recreational park lands.**			
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.			✓
(i) Collaborate with transit agencies, government agencies, employers, and operators to provide planning strategies that reduce peak-hour traffic.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 proposed action is not directly or indirectly applicable to the objective or policies for sustainable transportation options and has no implications for the encouragement of transportation systems or services. It is noted that the project involves the grading of access roads to the well sites, however, these roads will not be utilized by the public.**			
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 action does not directly or indirectly support reducing the reliance on automobiles and fossil fuels, and has no implications for the encouragement of alternative modes of transportation.**			

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Objective:			
(3) Improve opportunities for affordable, efficient, safe, and reliable air transportation.			✓
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: **The proposed project does not directly or indirectly affect the objective or policies for 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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(k) Support the redevelopment of harbors as pedestrian-oriented gathering places.			✓
Analysis: **The proposed project will be located inland and away from harbor facilities, and therefore, will not directly or indirectly affect the objective or policies for 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.			✓
(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 objectives and policies for the improvement or expansion of transportation systems are not directly or indirectly applicable to this project.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Implementing Actions:			
(a) Develop a process to review all applications for desalination.			✓
Analysis: **The proposed project directly supports the objective of improving water systems and infrastructure to assure access to sustainable, clean, reliable and affordable sources of water. Test results from the proposed exploratory wells will be used to determine which well sites are most suitable for possible conversion to permanent production wells. The proposed project is intended to support restoration of stream flow to Kanahā Stream.**			
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.			✓
(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 proposed action is neither directly or indirectly applicable to the objective for improving waste-disposal practices and will not involve upgrades to waste-disposal systems.**			
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, NA = Not Applicable)	DA	IA	NA
(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 action is not directly or indirectly applicable to the objective and policies for renewable and sustainable energy systems and does not impact Maui County's energy supply, reliance on fossil fuels or use of renewable 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 assess groundwater sources and is neither directly or indirectly applicable to the objectives or policies for regional or urban growth.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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:			
(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 directly applicable to the objectives and policies for the planning and management of infrastructure systems and infrastructure capacity through the hydrographical studies and research conducted to identify groundwater sources to meet the established sustainable yields.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 exploratory wells will be implemented within the Launiupoko aquifer and is compatible with the surrounding land use.**			
Objective:			
(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: **Three (3) of the five (5) proposed exploratory well sites are located on agriculturally zoned land. As a minor utility system, the proposed action is a permitted use as defined by Maui County Code Chapter 19.30A.050. However, the exploratory wells selected for construction are outside of the "Agricultural" District.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 action is neither directly or indirectly applicable to the objective or policies for protecting a community's sense of place.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
Analysis: **The proposed action is indirectly applicable to the objective for increasing efficiency in land use planning and management. The environmental review processes involve detailed analysis of the proposed project's potential impacts on the environment, infrastructure, and socio-economic conditions.**			
K. STRIVE FOR GOOD GOVERNANCE			
Goal: Government services will be transparent, effective, efficient, and responsive to the needs of residents.			
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.			✓
(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 is 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, indirectly strengthening governmental planning and collaboration. In addition, the proposed project will conform to requirements of the Commission on Water Resource Management (CWRM), State Department of Health (DOH) wellhead protection protocols, and DWS standards.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 involved opportunities for the public to provide input throughout the environmental review process, indirectly promoting civic engagement.**			
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 Lanaʻi 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:			
(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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
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.**			
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:			
(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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 objective and policies regarding the reduction of carbon emissions to mitigate the impacts of climate change and limit the rate of global warming are not applicable to the proposed project.**			
Objective:			
(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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 ri0se 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 proposed project will not be located adjacent to or within areas which will be subject to projected sea-level rise. The objective and policies regarding the reduction of impacts of sea-level rise and associated acknowledgement and mitigation of climate change are not applicable to the proposed project.**			
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.			✓

COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)	DA	IA	NA
(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 involves the drilling and testing of exploratory wells to determine potential yield. The objective and policies aiming to significantly increase the use of renewable and green technologies to promote energy efficiency are not applicable to the proposed project.**			

ANALYSIS OF PROJECT APPLICABILITY TO MAUI ISLAND POLICY PLAN

APPENDIX G-2

APPENDIX G-2

Analysis of Project Applicability to Maui Island Plan

The Maui Island Plan (MIP) is applicable to the island of Maui only, providing more specific policy-based strategies for population, land use, transportation, public and community facilities, water and wastewater systems, visitor destinations, urban design, and other matters related to future growth.

As provided by Chapter 2.80B, the MIP shall include the following components:

1. *An island-wide land use strategy, including a managed and directed growth plan*

2. *A water element assessing supply, demand and quality parameters*

3. *A nearshore ecosystem element assessing nearshore waters and requirements for preservation and restoration*

4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*

5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted that Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979, October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. In December 2013 and March 2014, the Council approved time extensions for approval and adoption of the implementation chapter of the MIP. The implementation program component of the MIP was adopted as Ordinance No. 4126 on May 29, 2014.

The MIP addresses a number of planning categories with detailed policy analysis and recommendations which are framed in terms of goals, objectives, policies and implementing actions. These planning categories address the following areas:

1. *Population*
2. *Heritage Resources*
3. *Natural Hazards*
4. *Economic Development*
5. *Housing*
6. *Infrastructure and Public Facilities*
7. *Land Use*

The proposed project has been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. The analysis is presented in the table below.

The methodology used for assessing a project's relationship to the MIP involves examining the project's applicability to the Plan's goals, objectives, and policies. "Applicability" refers to a project's need, purpose and effects, and how these advance or promote a particular set of goals, objectives and priority guidelines. In assessing the relationship between a proposed action and the MIP, an action may be categorized in one of the following groups:

1. **Directly applicable:** the action and its potential effects directly advances or promotes the objective, policy or priority guideline.

   Example: Using a county project to develop a new water source and related transmission facilities as an example, a project of this nature would be directly applicable to the MIP's Objective 6.3.2, which states: *"Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs".* As well, this action would directly advance the MIP's Policy 6.3.2.f, which states: *Acquire and develop additional sources of potable water.* The need, purpose and effects of the proposed new water source project is directly applicable to the foregoing objective and policy.

2. **Indirectly applicable:** the action's potential effects indirectly supports or advances the objective, policy or priority guideline.

   Example: The county water source project cited above supports the MIP's Objective 7.3.2 which states: *"Facilitate more self-sufficient and sustainable communities".* Additionally, this kind of action is indirectly applicable to the related MIP Policy 7.3.2.f, which states: *"Facilitate the development of housing by focusing projects in locations where land and infrastructure costs facilitate the development of affordably-priced housing".* In this case, the principle purpose of the project was not to specifically facilitate the development of affordably-priced housing. However, the project's contribution to adequate infrastructure systems is supportive of the policy. In this instance, the proposed action may be deemed to be indirectly applicable to the objective and policy of the MIP.

3. **Not applicable:** The action and its potential effects have no direct or indirect relationship to the objectives and policies of the Maui Island Plan.

   Example: That same county water source improvement project referenced above, may not have direct or indirect linkage to the MIP's Objective 4.2.1, which states: *"Increase the economic contribution of the visitor industry to the island's environmental well-being for the island's residents' quality of life"*. In this case, there is no reasonably deduced direct or indirect relationship between the proposed action and Objective 4.2.1. Hence, the proposed action would be considered not applicable to the objective.

In general, a proposed action's applicability to the MIP is assessed on the basis of the action's direct or indirect relationship to the respective objectives, policies and implementing actions. It is recognized that the categorization of "applicability" is subject to interpretation and should be appropriately considered in the context of local and regional conditions.

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 indirectly applicable to the goal, objective and policies for population through efforts to identify a potable water source which can contribute to strong, healthy, and vibrant island communities.**			
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.			✓
2.1.1.c Ensure traditional public access routes, including native Hawaiian trails, are maintained for public use.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
Analysis: **The goal for respecting and protecting archaeological and cultural resources is indirectly applicable to the proposed project through the preparation of a cultural impact assessment (CIA) and archaeological investigations of the potential project sites.**			
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 proposed action is indirectly applicable to the objective and policies for a more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies. An archeological study and CIA conducted as part of the environmental review process demonstrates an effort to preserve Hawai'i's natural and historical resources and protect Hawai'i's ethnic and cultural heritage. The State Historic Preservation Division (SHPD) has been consulted and the proposed project will comply with SHPD's recommendations for mitigation.**			
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 marine ecosystem.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Objective:			
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 action will be inland and away from the shoreline. With 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 involves grading and earth-moving activity, 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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.3.1.g Encourage the State to mandate instream assessment to provide adequate 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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.3.5.c Strongly encourage new subdivisions and developments that are proximate to environmentally sensitive watershed resources to prepare and implement CSD 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 indirectly applicable to the goal of maintaining healthy watersheds, streams, and riparian environments through the use of appropriate BMPs during construction. In addition, the proposed project will use exploratory wells to identify appropriate groundwater sources to restore streamflow to Kanahā Stream.**			
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.		✓	

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
2.4.1.c Support the implementation of Hawai`i's Comprehensive Wildlife Conservation Strategy (October 2005).			✓
Objective:			
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 related to the goal, objective and policies for the preservation of Maui's natural areas and indigenous flora and fauna. A flora and fauna survey addressing biological resources in the project area was conducted as part of the environmental review process. This assessment addresses the objective of identification and protection (as applicable) restoration of wildlife habitats.**			

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
SCENIC RESOURCES			
Goal:			
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.			✓

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2.5.2.g Protect scenic vistas from intrusion by power poles.			✓
Objective:			
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 proposed action is neither directly or indirectly applicable to the goal, policies and objectives for preserving scenic resources, attracting visitors or promoting a sense of place.**			
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.**			
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.			✓

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Policies:			
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, objectives and policies for the economy as the project will generate short-term design and construction-related employment opportunities.**			
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 kama'āina 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 action is not directly or indirectly applicable to the objective and policies for the tourism industry and has no implications for enhancement of the visitor industry or mitigation from the impacts of tourism on the host culture.**			
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 action does not directly or indirectly affect the objectives and policies for the diversification of agriculture. The implementation of the proposed action is not considered to impact agricultural productivity on Maui.**			

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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 sewer system improvements is neither directly or indirectly applicable to the goal, objectives and policies for emerging or innovative economic sectors.**			
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 action is not directly or indirectly supportive of the goal, objective and policies for small businesses.**			
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:			
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.			✓

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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 action is not directly or indirectly applicable to the health care sector and has no implications for the expansion of health care facilities or services.**			
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.			✓
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.			✓

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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 proposed action is not directly or indirectly applicable to the objectives and policies for education, nor does it affect the State's ability to promote or enhance educational programs or opportunities for Maui residents.**			
CHAPTER 5 – HOUSING			
Goal:			
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.			✓

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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:			✓
(1) Disseminate information on different housing/financial assistance programs (loans, grants, etc.) including information on housing rehabilitation/restoration/adaptive reuse;			✓

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(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.			✓

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Objective:			
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 lā'au lapa'au.			✓
Analysis: **The proposed action does not directly or indirectly support the priority guidelines for housing and will not affect the availability of affordable housing.**			
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.			✓

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6.1.2.e Discourage the disposal of landfill leachate by diversion to wastewater treatment plants, where practicable.			✓
Analysis: **The proposed project is neither directly or indirectly applicable to the goal, objectives and policies for solid waste and will not impact the planning or management of solid waste.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
Objective:			
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 exploratory well project is neither or indirectly applicable to the goal, objectives or policies for wastewater and wastewater systems.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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 proposed action is directly applicable and supportive of the goal for an environmentally sustainable, reliable, safe, and efficient water system. The proposed action involves analyzing pump test and water quality data to determine potential sources of potable water, directly advancing the objective for improving water quality and increasing capacity of the water systems in striving to meet the needs and balance the island's water needs.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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 action is not directly or indirectly applicable to the objectives or policies for transportation systems and has no implications for the development of transportation systems and infrastructure.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
6.5.1.e Require new development where appropriate, to provide right-of-ways (ROWs) 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 action is not directly or indirectly applicable to the objectives or policies for an island-wide transit system and has no implications for the development of transit systems and infrastructure.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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 loʻi 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 ʻĀhihi-Kīnaʻu and La Perouse-Keoneʻōʻio 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 is neither directly or indirectly applicable to the goal and objectives for parks and recreation facilities and opportunities.**			
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 Puʻunēnē.			✓
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
6.7.1.h Focus future expenditures for additional government office space, parking, and related facilities in Wailuku's Civic Center District.			✓
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 project is not directly or indirectly applicable to the objective or policies for public facilities and funding for public facilities.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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:			
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: **The proposed action is not directly or indirectly applicable to the priority guidelines and principles for schools and libraries and does not affect the construction of schools or pedestrian friendly streets, pathways and bikeways.**			
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.			✓

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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.			✓
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 is neither directly or indirectly applicable to the goal and objectives for health care and does not impact the provision or quality of health care services.**			
ENERGY			
Goal:			
6.10 Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.			✓

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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.			✓
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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 action is not directly or indirectly applicable to the goal, objectives and policies for energy, renewable energy and energy conservation.**			
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).			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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 proposed action is a water supply project that does not have implications for airport or harbor facilities.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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 proposed project is neither directly or indirectly applicable to the goal, objectives and policies of a prosperous agricultural industry. Two (2) of the five (5) proposed exploratory well sites are located on agriculturally zoned land. As a minor utility system, the proposed action is a permitted use as defined by Maui County Code Chapter 19.30A.050. However, the sites selected for exploratory well development are not designated for agricultural use.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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 action will not be implemented in a rural area and does not interfere with the goals or objectives for rural communities.**			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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.			✓
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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 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 Kā'anapali. "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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable	DA	IA	NA
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 action is not applicable to the objectives and policies for urban development patterns, sustainable communities and strengthening the island's sense of place.**			
CHAPTER 8 – DIRECTED GROWTH PLAN			
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.			✓

Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable		DA	IA	NA
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 not located within the Urban Growth Boundary or the Small Town Growth Boundary and will not interfere with the goal or policies for urban communities and small towns.**				
RURAL GROWTH AREA				
Goal:				
8.2	Maui will maintain opportunities for agriculture and rural communities through 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.			✓

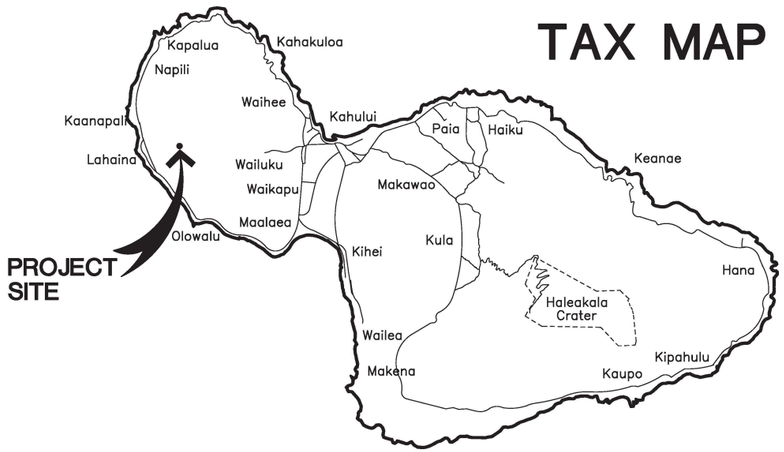
Maui Island Plan Goals, Objectives and Policies Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable		DA	IA	NA
8.2.h	Urban-scale infrastructure and public facilities shall not be provided in rural areas except as described in the defined Level-of-Service (LOS) standards. There 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.			✓
Analysis: **The proposed project is not located within the Rural Growth Boundary and will not hinder opportunities for agriculture and rural communities.**				
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. Diagram NW-1 shows that the project sites L-1 and L-2 are uncategorized by the MIP, but are within the State Land Use Conservation district. Site H-2 is classified as *"Sensitive Lands"* by the MIP. As such, the County Council and Administration will be notified of the proposed project should this alternative well location be pursued.**				

PRE-FINAL CONSTRUCTION PLANS FOR WELL SITE L-1 AND WELL SITE L-3

APPENDIX H

Launiupoko Aquifer
Site L-1 Exploratory Well

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY



TAX MAP KEYS (2) 4-5-017:002, 4-5-021:001
4-6-018:007 & 010

DWS JOB NO. 20-01

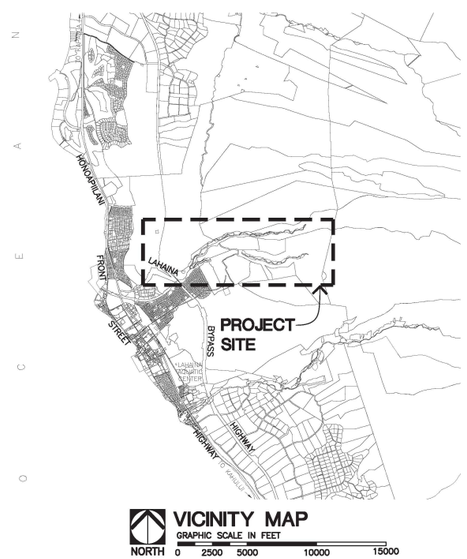
LAHAINA, MAUI, HAWAII

PREPARED FOR:

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, HAWAII 96793

PREPARED BY:

FUKUMOTO ENGINEERING, INC.
Civil Engineering & Land Surveying Consultants
1721 Wili Pa Loop, Suite 203 • Wailuku, Hawaii 96793



APPROVALS:

DIRECTOR, DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
(APPROVAL LIMITED TO WATER IMPROVEMENTS WHICH WILL BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

DATE

INDEX OF DRAWINGS:

SHT.	SHT. NO.	DESCRIPTION
1	T-1	TITLE SHEET
2	C-1	GENERAL PLAN
3	C-2	CONSTRUCTION NOTES
4	C-3	EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN
5	C-4	SITE PLAN
6	C-5	GRADING PLAN
7	C-6	PLAN AND PROFILE – STA. 0+00 TO STA. 11+00
8	C-7	PLAN AND PROFILE – STA. 11+00 TO STA. 21+00
9	C-8	PLAN AND PROFILE – STA. 21+00 TO STA. 32+00
10	C-9	PLAN AND PROFILE – STA. 32+00 TO STA. 43+00
11	C-10	PLAN AND PROFILE – STA. 43+00 TO STA. 54+00
12	C-11	PLAN AND PROFILE – STA. 54+00 TO STA. 65+00
13	C-12	PLAN AND PROFILE – STA. 65+00 TO STA. 76+00
14	C-13	PLAN AND PROFILE – STA. 76+00 TO STA. 87+00
15	C-14	PLAN AND PROFILE – STA. 87+00 TO STA. 98+00
16	C-15	PLAN AND PROFILE – STA. 98+00 TO STA. 104+71
17	C-16	SITE SECTIONS
18	C-17	WELL SECTION AND DETAILS

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Website: www.femaui.com

Prepared for:
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY
DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

TITLE SHEET

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

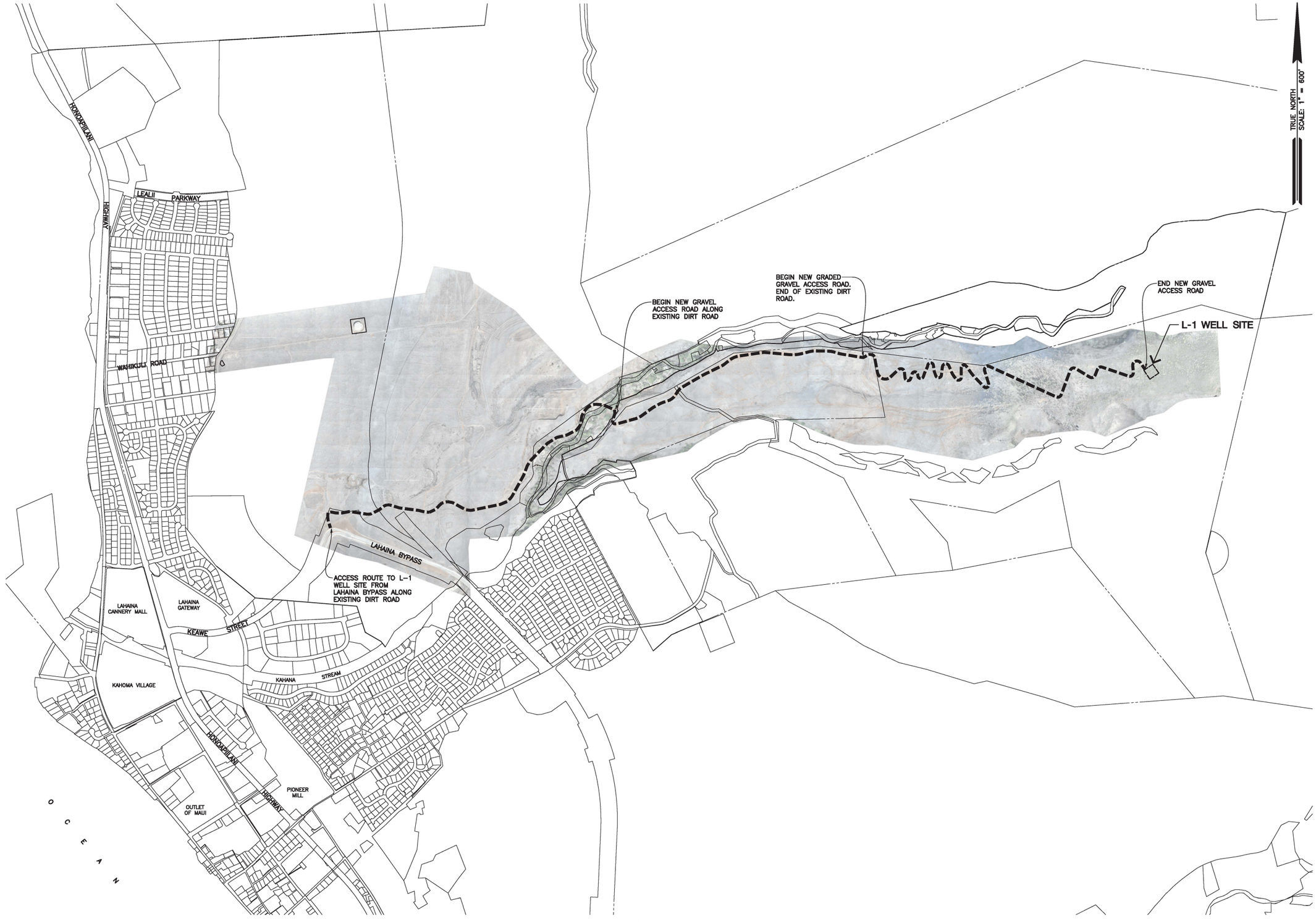
LICENSE EXPIRES: 04/30/2026

DESIGNED BY:	R.F., S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET
T-1
1 OF 18

LAUNIUPOKO AQUIFER WELL DEVELOPMENT DEVELOPMENT DWS JOB NO. 20-01

LAUNIUPOKO AQUIFER WELL DEVELOPMENT EXPLORATORY DWS JOB NO. 20-01



GENERAL PLAN
SCALE: 1" = 600'

SCALE IN FEET
0 300 600 1200 1800

FUKUMOTO ENGINEERING, INC.
Civil Engineering &
Land Surveying Consultants

1721 Wili Pa Loop, Suite 203
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Website: www.femaui.com

Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

GENERAL PLAN

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

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SHEET C-1
2 OF 18

CONSTRUCTION NOTES

WATER SYSTEM

1. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER SUPPLY (DWS), IN WRITING, ONE (1) WEEK PRIOR TO COMMENCEMENT OF WORK.
2. IF CONSTRUCTION OF WATER SYSTEM IMPROVEMENTS WILL AFFECT DWS CONSUMERS, CONTRACTOR SHALL NOTIFY CONSUMERS BY RADIO/NEWSPAPER TWO (2) DAYS BEFORE AND ON DAY OF CONNECTION. CONTRACTOR SHALL ALSO NOTIFY CONSUMERS HOUSE-TO-HOUSE ONE (1) DAY BEFORE CONNECTION WORK.
3. ALL MATERIALS USED AND METHODS OF CONSTRUCTION OF WATER SYSTEM FACILITIES SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF DWS WATER SYSTEM STANDARDS. CONTRACTOR SHALL OBTAIN THE LATEST REVISIONS OF THE DWS STANDARDS BEFORE COMMENCING CONSTRUCTION.
4. ALL WATER SYSTEM WORK SHALL BE PERFORMED BY CONTRACTORS POSSESSING VALID STATE OF HAWAII CONTRACTOR'S LICENSES, REGARDLESS OF THE VALUE OF THE WORK.
5. CONTRACTOR SHALL FOLLOW ALL LOCAL, STATE, FEDERAL LAWS, RULES AND REGULATIONS REGARDING THE HANDLING, REMOVAL AND DISPOSAL OF ASBESTOS PIPE.
6. CONTRACTOR SHALL PROTECT EXISTING WATERLINE DURING COURSE OF CONSTRUCTION AND SUPPORT EXPOSED WATERLINE TO PREVENT ANY MOVEMENT.
7. THE EXACT DEPTH AND LOCATION OF EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES ARE NOT KNOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SAME PRIOR TO TRENCHING FOR THE NEW WATERLINE. THE COST OF LOWERING, RELOCATING OR ADJUSTING EXISTING WATERLINES, SERVICE LATERALS AND APPURTENANCES, WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS AT THE CONTRACTOR'S EXPENSE.
8. PAVING RESURFACING/RESTORATION:
   a. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING DWS VALVES AND MANHOLES, WHEN AFFECTED BY THE WORK, PRIOR TO START OF CONSTRUCTION.
   b. ALL WATER VALVE AND WATER MANHOLE CONCRETE COLLARS WITHIN THE PROJECT LIMITS SHALL BE DEMOLISHED AND RECONSTRUCTED PER DWS STANDARD DETAIL V12 AND V23, RESPECTIVELY, AT THE CONTRACTOR'S EXPENSE.
   c. THE VALVE BOX RISER AND COVER OF ALL WATER VALVES WITHIN THE PROJECT LIMITS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
   d. CONTRACTOR SHALL ADJUST DWS SLIDING VALVE BOX ASSEMBLY AND MANHOLE FRAME AND COVER TO FINISHED GRADE.
   e. PRIOR TO PAVEMENT RESURFACING/RESTORATION WORK, THE CONTRACTOR SHALL SCHEDULE INSPECTION WITH DWS.
9. ANY SLIDING VALVE BOX ASSEMBLY, MANHOLE COVER, OR CONCRETE COLLAR, WHETHER DISCOVERED DAMAGED OR NOT SPECIFIED ON THE PLANS TO BE ADJUSTED OR REPLACED, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10. CONTRACTOR SHALL ADJUST TO FINISHED GRADES, ALL UTILITIES (I.E., WATER, SEWER, DRAIN, ETC.) AFFECTED BY THE WORK WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS AT THE CONTRACTOR'S EXPENSE.
11. CONTRACTOR SHALL RESTORE ALL ROAD IMPROVEMENTS DISTURBED OR DAMAGED DURING CONSTRUCTION IN ACCORDANCE WITH THE 2005 "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AS AMENDED, TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS AT THE CONTRACTOR'S EXPENSE. ROAD IMPROVEMENTS INCLUDE, BUT ARE NOT LIMITED TO, PAVEMENT, PAVEMENT MARKERS, SHOULDER DRESSING, STRIPING, AND SPEED HUMPS.
12. CONCRETE FOR REACTION BLOCKS AND ANCHOR BLOCKS SHALL BE DWS CLASS 2500.
13. THE MAXIMUM DISTANCE BETWEEN VALVE NUT AND TOP OF MANHOLE COVER SHALL BE THREE (3) FEET.
14. CONTRACTOR SHALL SUBMIT A MATERIALS LIST TO DWS FOR APPROVAL PRIOR TO CONSTRUCTION.
15. CONNECTION TO DWS SYSTEM:
   a. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY FITTINGS AND OTHER MATERIALS AND EQUIPMENT REQUIRED FOR THE HOOK-UP. CONTRACTOR SHALL VERIFY THE EXACT LOCATION, DEPTH, TYPE, AND CONDITION OF THE EXISTING LINE BEFORE ORDERING MATERIALS FOR THE HOOK-UP. CONTRACTOR SHALL, HOWEVER, CHECK WITH DWS BEFORE EXCAVATING FOR VERIFICATION PURPOSES.
   b. WHENEVER FEASIBLE, MECHANICAL JOINT FITTINGS SHALL BE USED FOR BURIED APPLICATIONS AND FLANGED JOINT FITTINGS SHALL BE USED FOR EXPOSED APPLICATIONS.
   c. DWS PERSONNEL MAY BE REQUIRED TO BE PRESENT OR ASSIST WITH CONNECTIONS TO THE EXISTING WATER SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST INCURRED BY DWS FOR SAID WORK.
   d. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR FOR TRENCH EXCAVATION, BACKFILLING, CLEANING AND CHLORINATION, PAVING, AND OTHER WORK NECESSARY TO COMPLETE THE HOOK-UP, AS DIRECTED BY AND TO THE SATISFACTION OF DWS.
16. MINIMUM COVER OVER WATER MAIN, 6" DIAMETER OR LARGER, SHALL BE 3'-0". MINIMUM COVER FOR 4" DIAMETER SHALL BE 2'-6". MINIMUM COVER FOR DIAMETERS LESS THAN 4" SHALL BE 1'-6".
17. CONTRACTOR SHALL ENSURE INSTALLATION OF WATERLINES, SERVICE LATERALS AND APPURTENANCES HAVE PROPER CLEARANCES FROM EXISTING TREES, WALLS, FENCES, ETC. IN ACCORDANCE WITH CURRENT DWS WATER SYSTEM STANDARDS.
18. CONTRACTOR SHALL VERIFY AND MAINTAIN 18" MINIMUM CLEARANCE WITH WATERLINE OR SERVICE LATERAL CROSSING OVER EXISTING SEWERLINE OR SERVICE LATERAL. INSTALL REINFORCED CONCRETE JACKET AROUND SEWERLINE WHERE SEWER IS ABOVE WATERLINE OR LESS THAN 18" BELOW WATERLINE. THE LENGTH OF JACKET REQUIRED SHALL BE AS SPECIFIED IN TABLE 100-5 OF THE DWS STANDARDS. PROVIDE 6" MINIMUM CLEARANCE FROM OUTSIDE JACKET TO WATERLINE OR SERVICE LATERAL. STANDARD CONCRETE JACKET DETAILS FOR SEWERLINE AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS STANDARDS SHALL BE FOLLOWED.
19. CONTRACTOR SHALL HAVE LICENSED SURVEYOR STAKE OUT WATERLINE BASELINE STATIONING, RIGHT-OF-WAY LIMITS, PROPERTY LINES, AND EASEMENT LINES TO ENSURE PROPER LOCATION OF WATER SYSTEM IMPROVEMENTS.
20. BOLTS FOR EXPOSED FLANGED DUCTILE IRON PIPE JOINTS SHALL BE EITHER SILICON BRONZE BOLTS AND NUTS OR 316 STAINLESS STEEL BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED. T-BOLTS FOR DUCTILE IRON MECHANICAL JOINT (MJ) PIPE AND FITTING CONNECTIONS IN UNDERGROUND SITUATIONS SHALL BE ONE OF THE FOLLOWING SYSTEMS:
   a. 316 STAINLESS STEEL T-BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED.
   b. COR-TEN T-BOLTS AND NUTS WITH HIGH GRADE ZINC SACRIFICIAL ANODES, EQUIVALENT TO "DURATRON" SACRIFICIAL "SAC-NUT" MODULES, INSTALLED ON THE NUTS FOR ALL STANDARD COR-TEN T-BOLTS.
   c. COR-TEN T-BOLTS AND NUTS BOTH FACTORY COATED WITH TRIPAC 2000 BLUE COATING SYSTEM BY "TRIPAC FASTENERS".

   ALL HOT FORGED STAINLESS STEEL BOLTS ARE REQUIRED TO BE PASSIVATED PER ASTM A380. MANUFACTURER CERTIFICATES ARE REQUIRED FOR PROOF WITH EACH SHIPMENT.
21. CONTRACTOR SHALL FURNISH AND INSTALL DUCTILE IRON NIPPLES FOR COMPLETE INSTALLATION OF THE WATERLINE, WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS, AT THE CONTRACTOR'S EXPENSE.
22. CONTRACTOR SHALL FURNISH TEMPORARY CLEANOUTS WHEN NECESSARY TO TEST, FLUSH, AND CHLORINATE THE WATERLINE AT THE CONTRACTOR'S EXPENSE.
23. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL PORTIONS OF ABANDONED WATERLINES THAT ARE EXPOSED OR WITHIN 12-INCHES BELOW THE GROUND SURFACE AT THE CONTRACTOR'S EXPENSE.
24. ALL BURIED METALS, INCLUDING COPPER PIPES, SHALL BE WRAPPED WITH POLY-WRAP. FOR ALL BURIED INSTALLATIONS OF DUCTILE IRON PIPE AND FITTINGS, POLY-WRAP IS REQUIRED EXCEPT WITHIN CONCRETE JACKETS.
25. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
26. CONTRACTOR SHALL PAINT AND NUMBER FIRE HYDRANT(S). NUMBERING TO BE FURNISHED BY DWS.
27. WATER MAINS AND APPURTENANCES SHALL BE SUBJECT TO HYDROSTATIC TESTING IN ACCORDANCE WITH THE LATEST REVISION OF AWWA C600, UNDER THE "HYDROSTATIC TESTING" SECTION, TO A PRESSURE OF AT LEAST 1.5 TIMES THE WORKING PRESSURE. UNLESS OTHERWISE STATED IN THE CONSTRUCTION DOCUMENTS OR LIMITED BY THE PRESSURE RATING OF EQUIPMENT, THE PRESSURE TEST AND LEAKAGE TEST SHALL BE PERFORMED AT 225 POUNDS PER SQUARE INCH PRESSURE.
28. DEVELOPER SHALL SUBMIT A COST LIST ALONG WITH AN AFFIDAVIT FOR THE WATER SYSTEM PRIOR TO ACCEPTANCE.
29. CONTRACTOR SHALL SUBMIT ONE (1) SET OF RECORD DRAWINGS VIA A CONSULTANT PRIOR TO ACCEPTANCE OF THE WATER SYSTEM. AN ELECTRONIC IMAGE FILE IN PDF FORMAT AT FULL PAGE SIZE (24"x36") SHALL BE PROVIDED TO THE DWS FOR ALL PROJECTS.

REVISION 6/8/2018

CHLORINATION OF WATER SYSTEMS

1. WATER MAINS AND APPURTENANCES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. ALL PROCEDURES AND MATERIALS (LIQUID CHLORINE OR CALCIUM HYPOCHLORITE) USED FOR THE CHLORINATION OF THE PROJECT SHALL CONFORM TO AWWA REQUIREMENTS.
2. PRIOR TO CHLORINATION, THE PROJECT PIPELINES SHALL BE THOROUGHLY CLEANED. CLEANING OF LINES 8" AND LARGER SHALL BE BY PIGGING USING FOAM PIGS. SMALLER LINES CAN BE FLUSHED IN ACCORDANCE WITH AWWA REQUIREMENTS IF ADEQUATE WATER SUPPLY IS PROVIDED, OTHERWISE BY PIGGING. THE CONTRACTOR SHALL SUBMIT HIS PLAN FOR PIPELINE CLEANING, INCLUDING FITTING REQUIREMENTS FOR PIGGING, FOR APPROVAL PRIOR TO PROCEEDING.
3. THE INTERIOR SURFACES OF THE PROJECT SHALL BE EXPOSED TO THE CHLORINATING SOLUTION FOR A MINIMUM OF 24 HOURS AND THE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.
4. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE PROJECT TO BE CHLORINATED.
5. AT THE END OF THE 24-HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A CHLORINE RESIDUAL OF AT LEAST 10 PPM. MEASUREMENTS FOR CHLORINE RESIDUAL TESTS SHALL BE BY A TRAINED, QUALIFIED TESTER APPROVED BY THE DIRECTOR.
6. SHOULD THE RESULTS INDICATE ADEQUATE CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED AND FILLED WITH POTABLE WATER FROM THE EXISTING POTABLE WATER SYSTEM AND AGAIN TESTED FOR CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE TEST RESULTS INDICATE THAT THE WATER IN THE PROJECT HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.
7. FOLLOWING THE ACCEPTABLE FLUSHING OF THE HIGH CONCENTRATION CHLORINE SOLUTION, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART FROM REPRESENTATIVE POINTS IN THE PROJECT AND SUBJECTED TO MICROBIOLOGICAL TESTS PERFORMED BY A CERTIFIED LABORATORY APPROVED BY THE DEPARTMENT OF HEALTH. AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED AND TESTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE SET FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. POSITIVE RESULTS WILL NOT BE ACCEPTABLE AND THE ENTIRE CHLORINATION PROCESS WILL BE REPEATED.
8. ANALYSIS FOR RESIDUAL CHLORINE SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
9. MICROBIOLOGICAL TESTS SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
10. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

REVISED: 12/1/07

GENERAL NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE BASED ON AVAILABLE "AS-BUILT" OF RECORD CONSTRUCTION PLANS, ARE APPROXIMATE ONLY, AND THEIR ACCURACY IS NOT GUARANTEED.
2. EXISTING CONTOURS AND FEATURES ARE BASED ON TOPOGRAPHIC MAP FOR LAUNIUPOKO AQUIFER WELL SITE L1 PREPARED BY FUKUMOTO ENGINEERING, INC. DATED APRIL 27, 2023.
3. ELEVATIONS SHOWN ARE BASED ON NATIONAL GEODETIC SURVEY BENCH MARK "SOH 048", A BRASS DISC LOCATED ON A GRATED DRAIN INLET ON THE NORTHEASTERLY CORNER OF THE INTERSECTION OF HONOAPIILANI HIGHWAY AND WAHIKULI ROAD. EL.=10.58 FEET ABOVE MEAN SEA LEVEL.
4. VERIFY EXISTING GRADES BEFORE PROCEEDING WITH GRADING WORK. SHOULD ANY DISCREPANCIES BE DISCOVERED IN THE EXISTING GRADES OR DIMENSIONS GIVEN ON THE PLANS, NOTIFY THE ENGINEER BEFORE PROCEEDING ANY FURTHER WITH THE WORK. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY COST INVOLVED IN THE CORRECTION OF CONSTRUCTION PLACED DUE TO SUCH DISCREPANCIES.
5. DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES WITHIN PROJECT LIMITS BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR DAMAGES DUE TO FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
6. REPORT ANY INCONSISTENCIES WITH THE PROPOSED PLAN TO THE OWNER'S REPRESENTATIVE AND DEMOLISH, REMOVE, OR RELOCATE ALL EXISTING UTILITIES, IMPROVEMENTS, ETC. INCONSISTENT WITH THE PROPOSED PLAN AS DIRECTED BY THE OWNER'S REPRESENTATIVE AND AT THE CONTRACTOR'S EXPENSE.
7. THE LATEST REVISIONS OF THE "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," SEPTEMBER 1984 AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," 2005 IS INCLUDED AS PART OF THESE CONSTRUCTION PLANS. OBTAIN THE LATEST REVISIONS BEFORE COMMENCING CONSTRUCTION.
8. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS AND MOUNDS, OR REMAINS SUCH AS ARTIFACTS, BURIALS, CONCENTRATION OF CHARCOAL OR SHELLS BE ENCOUNTERED DURING CONSTRUCTION WORK, CEASE WORK IN THE IMMEDIATE VICINITY OF THE FIND, AND PROTECT THE FIND FROM FURTHER DAMAGE. THE CONTRACTOR MUST IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND MITIGATION MEASURES, IF NECESSARY.
9. PURSUANT TO CHAPTER 6E OF THE HAWAII REVISED STATUTES, IN THE EVENT THAT ANY HUMAN SKELETAL REMAINS ARE INADVERTENTLY DISCOVERED DURING CONSTRUCTION, DO NOT MOVE THE REMAINS, CEASE ANY ACTIVITY IN THE IMMEDIATE AREA THAT COULD DAMAGE THE REMAINS OR THE POTENTIAL HISTORIC SITE, AND CONTACT THE DEPARTMENT OF LAND AND NATURAL RESOURCES' HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), THE APPROPRIATE MEDICAL EXAMINER OR CORONER, AND THE POLICE DEPARTMENT (TELEPHONE: 244-6400).

GRADING NOTES

1. FINISH SPOT ELEVATIONS AND FINISH CONTOURS, AS SHOWN ON PLAN REPRESENTS FINISH GRADING. THE SITE WORK CONTRACTOR SHALL COORDINATE WITH THE LANDSCAPE CONTRACTOR THE LOCATION AND DEPTH OF TOPSOIL THE FINISH SUBGRADE SHALL REFLECT THE FINISH GRADE LESS SPECIFIED TOPSOIL DEPTH.
2. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE MEASURES OF THE BEST MANAGEMENT PRACTICE (BMP) PLAN. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN THE PUBLIC HEALTH REGULATIONS, STATE DEPARTMENT OF HEALTH, ON WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS.
3. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS, AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE STATE DEPARTMENT OF HEALTH SHALL BE PAYABLE BY THE CONTRACTOR.
4. THE CONTRACTOR, AT HIS EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE OF DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
5. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE SITE. THE CONTRACTOR SHALL INFORM THE ENGINEER OF THE LOCATION OF DISPOSAL SITES. THE DISPOSAL SITE MUST ALSO FULFILL REQUIREMENTS OF THE GRADING ORDINANCES.
6. THE CONTRACTOR SHALL NOT DEMOLISH OR CLEAR ANY STRUCTURE, SITE OR VACANT LOT WITHOUT FIRST ASCERTAINING THE PRESENCE OR ABSENCE OF RODENTS WHICH MAY ENDANGER THE PUBLIC HEALTH BY DISPERSAL FROM SUCH PREMISES. SHOULD SUCH INSPECTION REVEAL THE PRESENCE OF SUCH RODENTS, THE CONTRACTOR SHALL ERADICATE SUCH RODENTS BEFORE DEMOLISHING OR CLEARING SAID STRUCTURE, SITE OR VACANT LOT.
7. THE FOLLOWING MEASURES SHALL BE TAKEN TO CONTROL DUST AND EROSION DURING THE SITE DEVELOPMENT PERIOD:
   A. MINIMIZE TIME OF CONSTRUCTION.
   B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   C. CONSTRUCT REMAINING PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE.
   D. USE TEMPORARY AREA SPRINKLERS IN NON-ACTIVE CONSTRUCTION AREAS WHEN GROUND COVER IS REMOVED.
   E. STATION WATER TRUCK ON-SITE DURING CONSTRUCTION PERIOD TO PROVIDE FOR IMMEDIATE SPRINKLING, AS NEEDED, IN ACTIVE CONSTRUCTION AREAS (WEEKENDS AND HOLIDAYS INCLUDED).
   F. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION. IMPLEMENT AND MAINTAIN THE MEASURES OF THE BMP PLAN.
   G. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   H. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.

COMPACTION REQUIREMENTS

1. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:
   A. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 600 SQUARE YARDS PER LIFT;
   B. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
   C. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS PER LIFT OF MATERIAL; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER PROJECT;
   D. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE; THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;
   E. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.
2. CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.
3. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE COUNTY OF ANY TESTING FAILURES AND CORRECT EACH FAILURE PRIOR TO PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION.

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Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY
DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

CONSTRUCTION NOTES

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

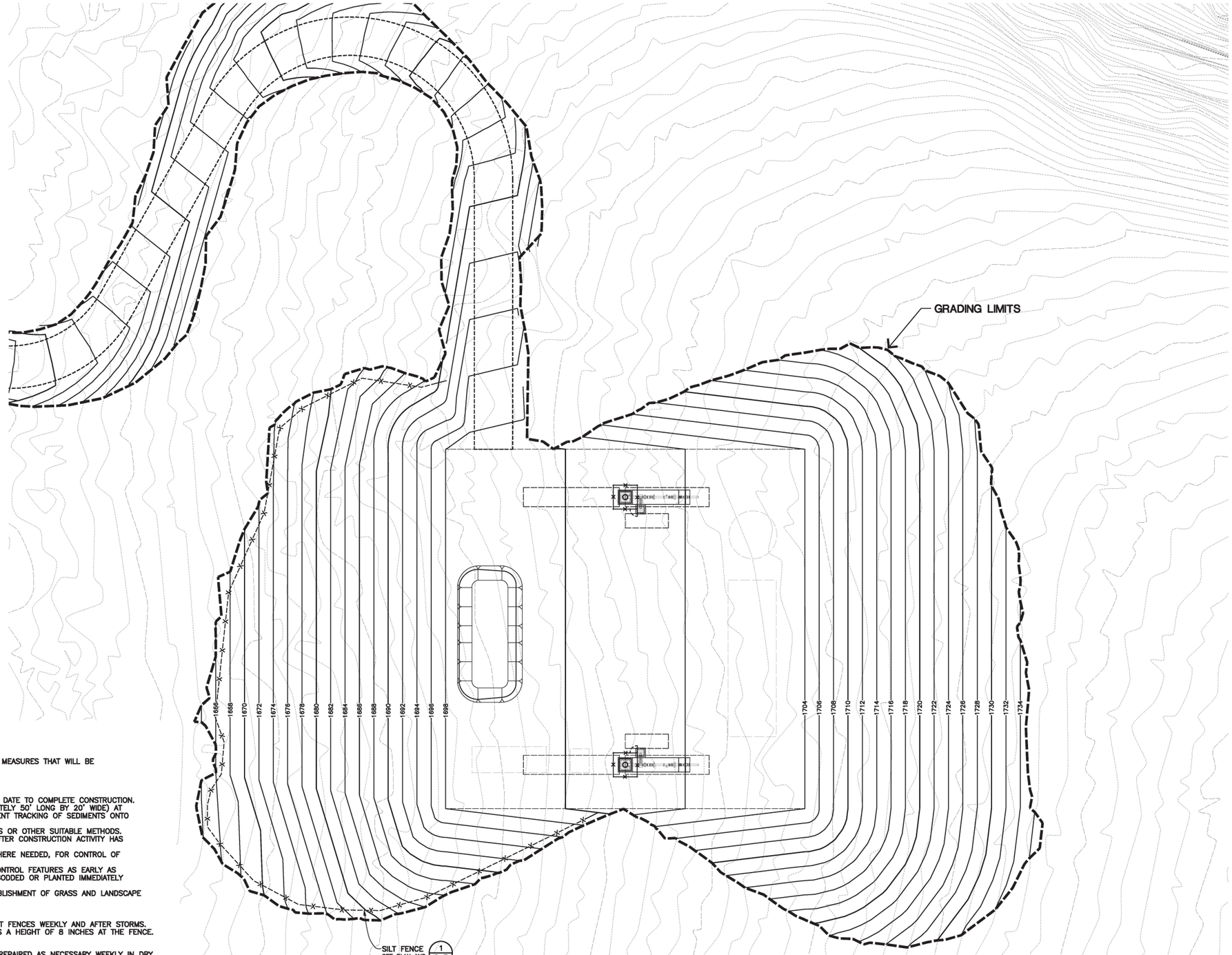
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

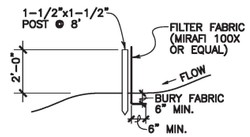
LICENSE EXPIRES: 04/30/2026

DESIGNED BY:	R.F., S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET C-2







1 / C-3 **SILT FENCE SECTION**
NOT TO SCALE

EROSION CONTROL NOTES

THE FOLLOWING IS AN OUTLINE OF THE EROSION CONTROL MEASURES THAT WILL BE IMPLEMENTED FOR THIS PROJECT.

1. GENERAL EROSION CONTROL MEASURES
   - A. MINIMIZE TIME OF CONSTRUCTION.
   - B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   - C. PROVIDE TEMPORARY GRAVEL APRON(S) (APPROXIMATELY 50' LONG BY 20' WIDE) AT POINT OF CONNECTION TO PAVED STREET TO PREVENT TRACKING OF SEDIMENTS ONTO STREET.
   - D. CONTROL DUST BY SPRINKLING WITH WATER WAGONS OR OTHER SUITABLE METHODS. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   - E. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION.
   - F. CONSTRUCT PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.
   - G. MAINTAIN EROSION CONTROL MEASURES UNTIL ESTABLISHMENT OF GRASS AND LANDSCAPE PLANTING.
2. SITE-SPECIFIC EROSION CONTROL MEASURES
   - A. INSTALL SILT FENCES AS NOTED ON PLAN. INSPECT FENCES WEEKLY AND AFTER STORMS. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES A HEIGHT OF 8 INCHES AT THE FENCE.
3. ADDITIONAL EROSION CONTROL NOTES
   - A. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 1/2 INCH OR GREATER WITHIN A 24-HOUR PERIOD. DURING PROLONGED PERIODS OF RAINFALL, DAILY CHECKING IS NECESSARY. THE PERMITTEE SHALL MAINTAIN RECORDS OF THE DURATION AND ESTIMATED VOLUME OF STORM WATER DISCHARGE(S), CHECKS, AND REPAIRS.
   - B. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
   - C. A SPECIFIC INDIVIDUAL SHALL BE DESIGNATED TO BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS ON EACH PROJECT.
   - D. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN 30 CALENDAR DAYS.
   - E. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION OR PAVEMENT SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING. IRRIGATION AND MAINTENANCE OF THE PERENNIAL VEGETATION SHALL BE PROVIDED FOR 30 DAYS OR UNTIL THE VEGETATION TAKES ROOT, WHICHEVER IS SHORTER.

EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN

SCALE: 1" = 20'

SCALE IN FEET
0 10 20 40 60

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Prepared for:

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County of Maui
200 South High Street
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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN

SEAN K. OGATA
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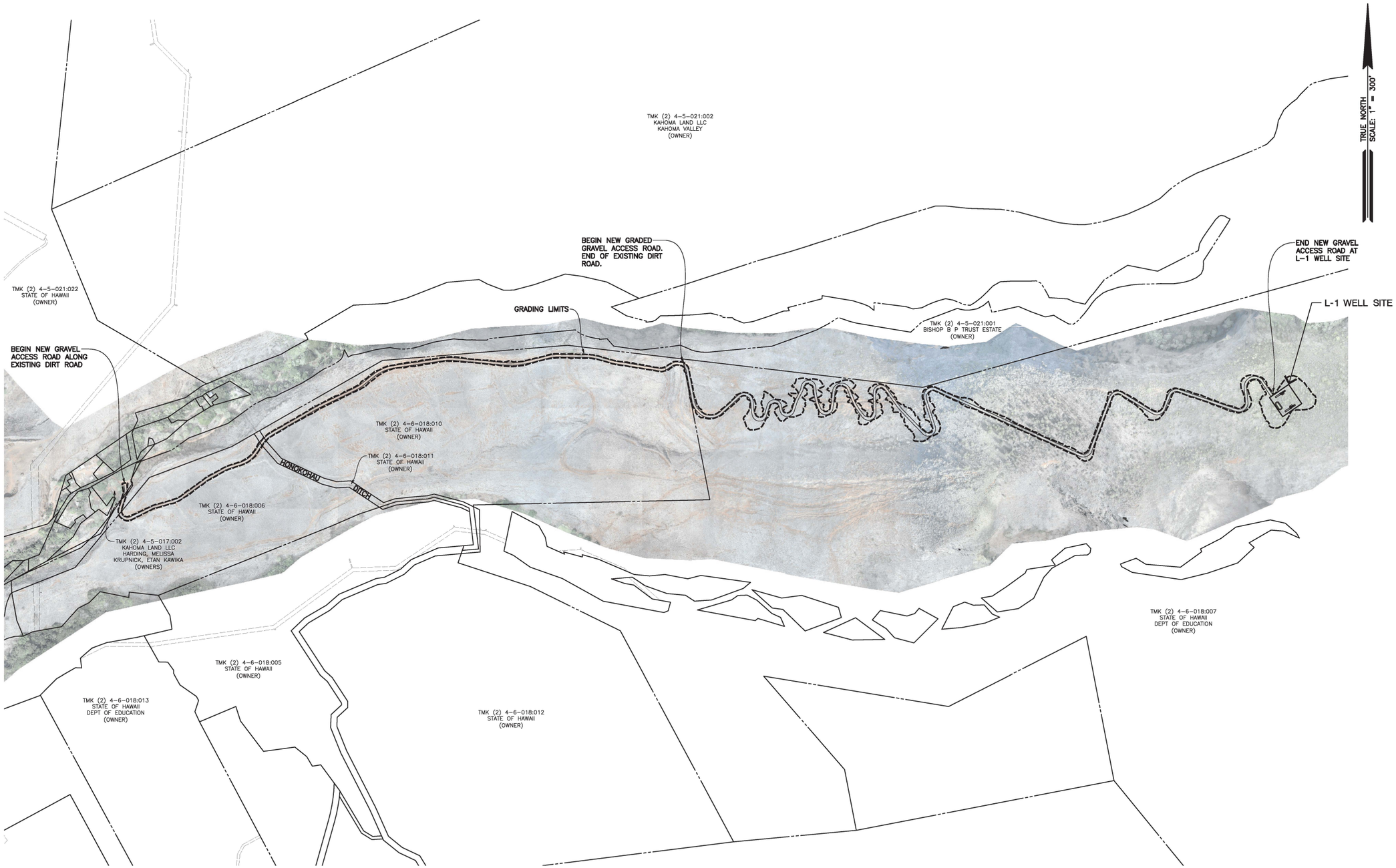
SHEET C-3



SITE PLAN
SCALE: 1" = 300'

SCALE IN FEET
0 150 300 600 900

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Prepared for:

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY
DWS JOB NO. 20-01
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SITE PLAN

SEAN K. OGATA
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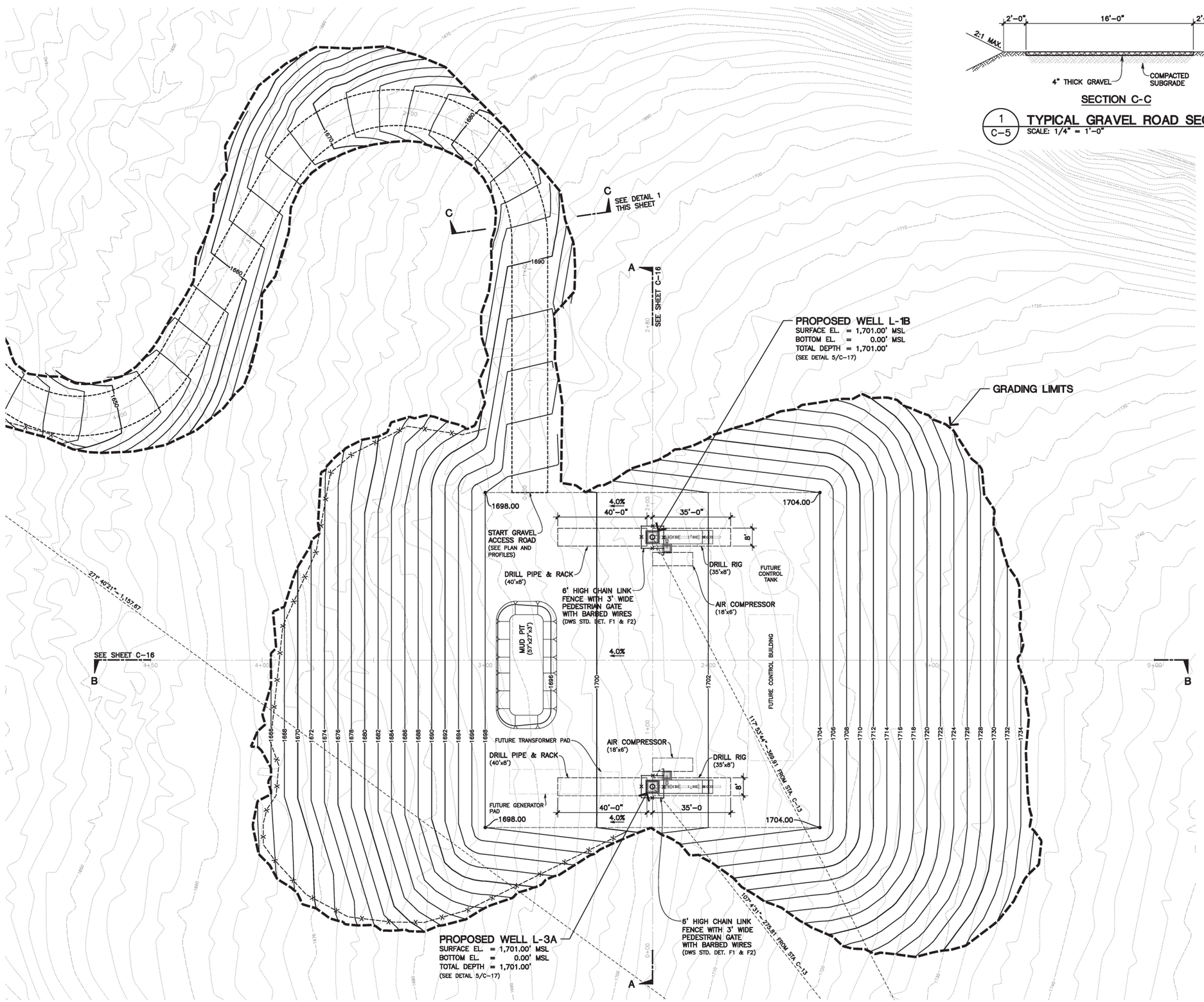
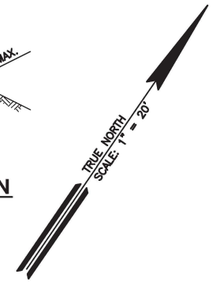
SHEET **C-4**

5 OF 18



SECTION C-C

1 / C-5 TYPICAL GRAVEL ROAD SECTION
SCALE: 1/4" = 1'-0"



NOTES:
1. LOCATIONS OF EQUIPMENT (SUCH AS DRILL RIG, DRILL PIPE AND RACK, AND AIR COMPRESSOR) AND TEMPORARY FACILITIES (SUCH AS MUD PITS) SHOWN ON PLAN ARE SUGGESTED LOCATIONS ONLY. CONTRACTOR SHALL DETERMINE SIZE AND LOCATIONS OF EQUIPMENT AND TEMPORARY FACILITIES.

EARTHWORK QUANTITIES:

EXCAVATION = 24,000 CU. YDS.
EMBANKMENT = 20,000 CU. YDS.
AREA OF GRADING = 9.92 ACRES

EARTHWORK QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES.

GRADING PLAN

SCALE: 1" = 20'

SCALE IN FEET
0 10 20 40 60

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Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

GRADING PLAN

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

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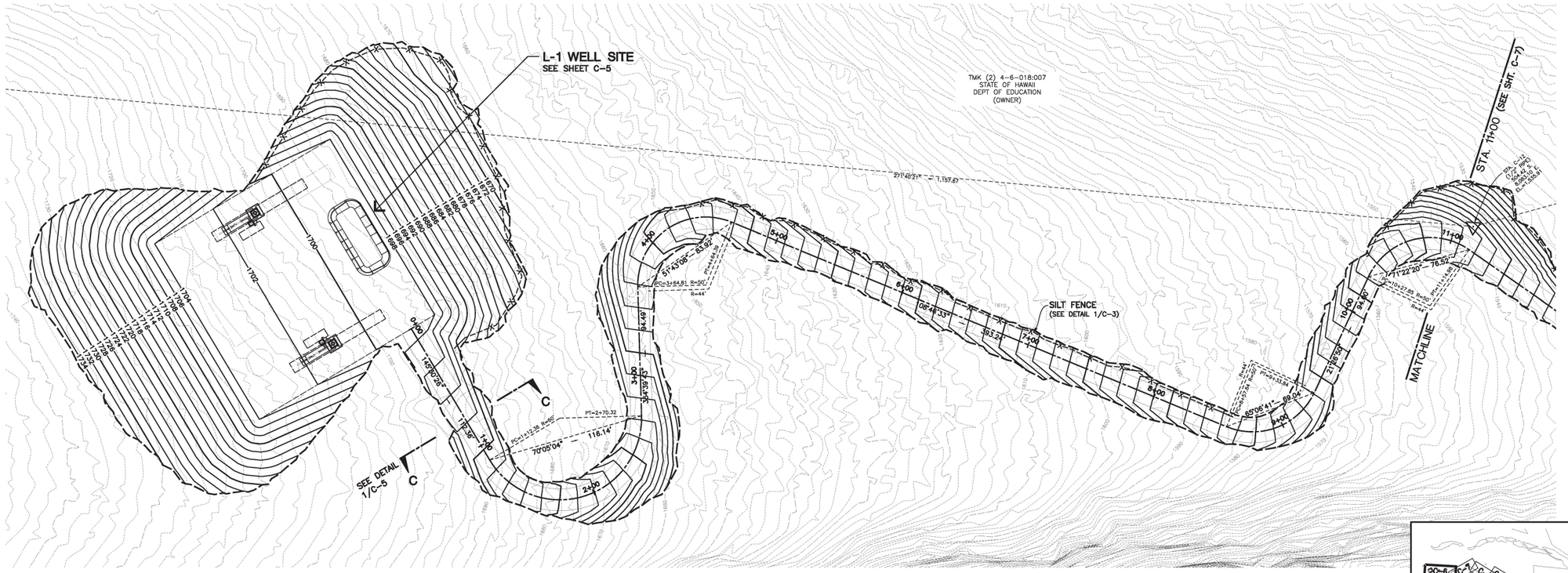
LICENSE EXPIRES: 04/30/2026

DESIGNED BY:	R.F., S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET C-5

6 OF 18

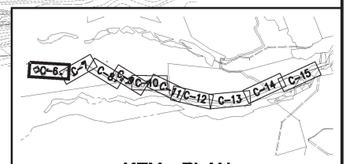


PLAN - STA. 0+00 TO STA. 11+00

SCALE: 1" = 40'

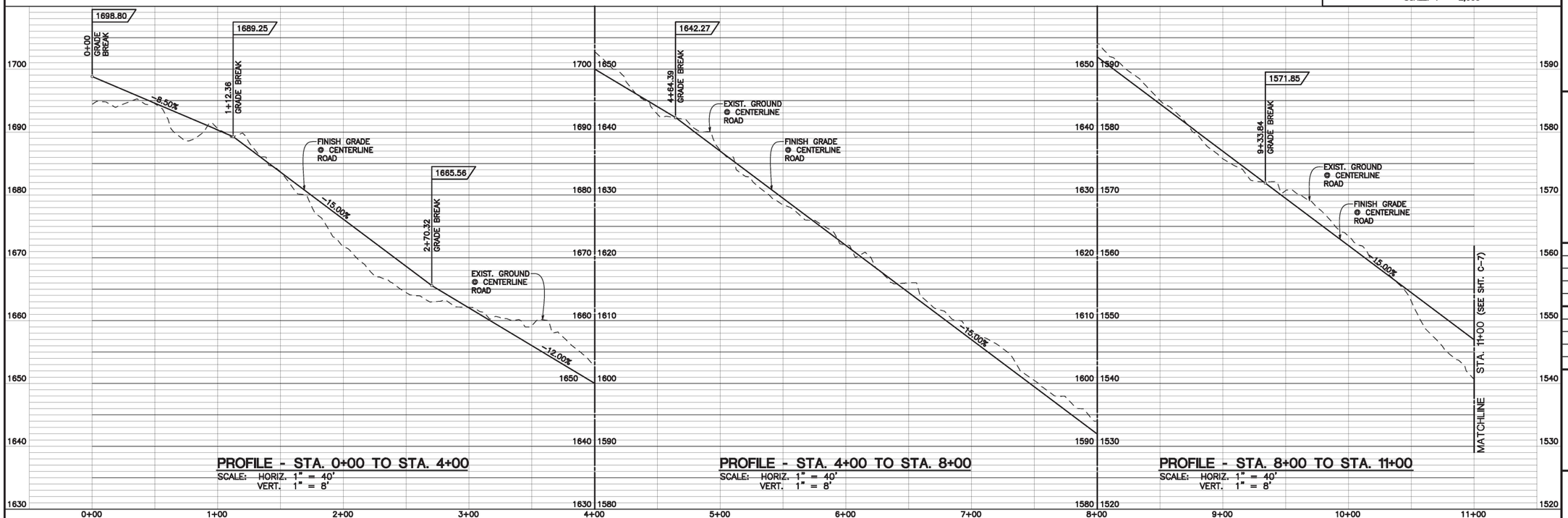
SCALE IN FEET

0 20 40 80 120



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 0+00 TO STA. 4+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 4+00 TO STA. 8+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 8+00 TO STA. 11+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 0+00 TO STA. 11+00

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

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LICENSE EXPIRES: 04/30/2026

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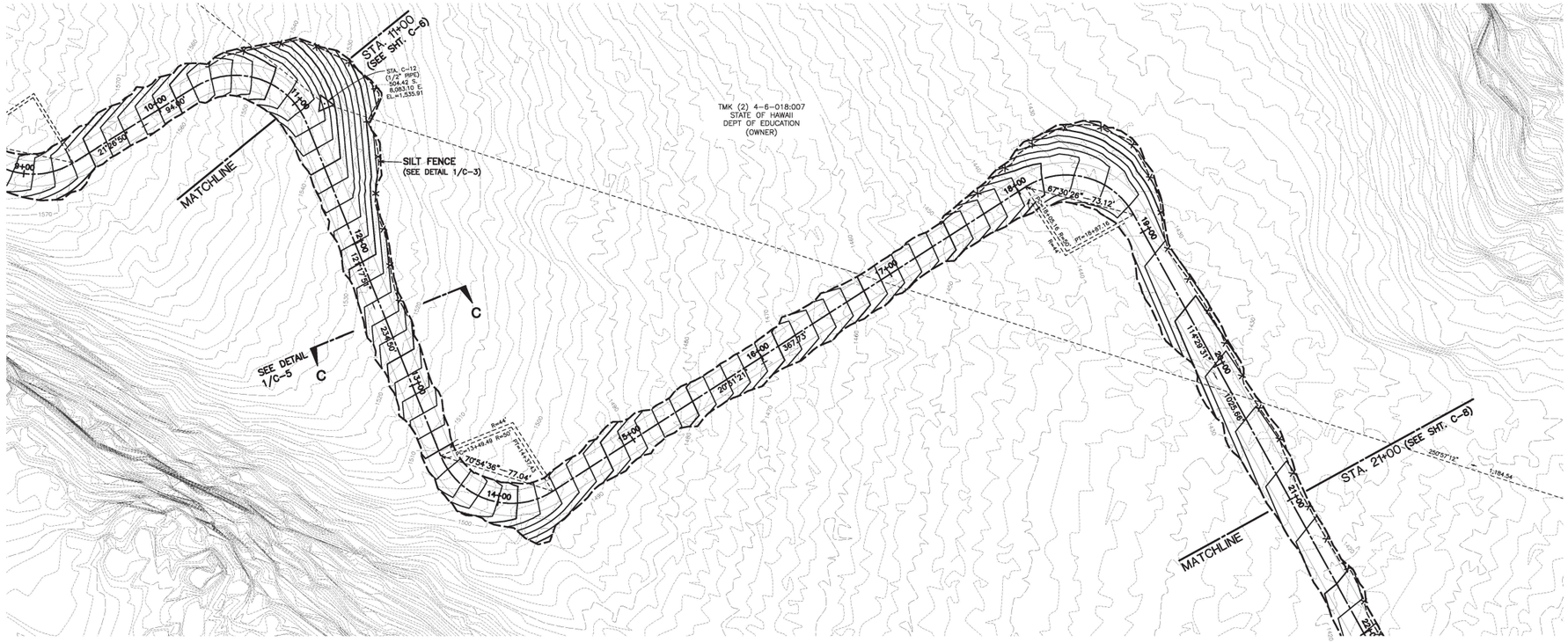
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET C-6

7 OF 18

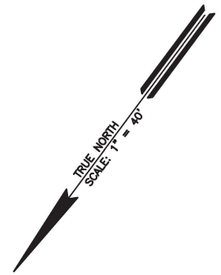


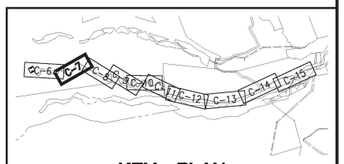
PLAN - STA. 11+00 TO STA. 21+00

SCALE: 1" = 40'

SCALE IN FEET

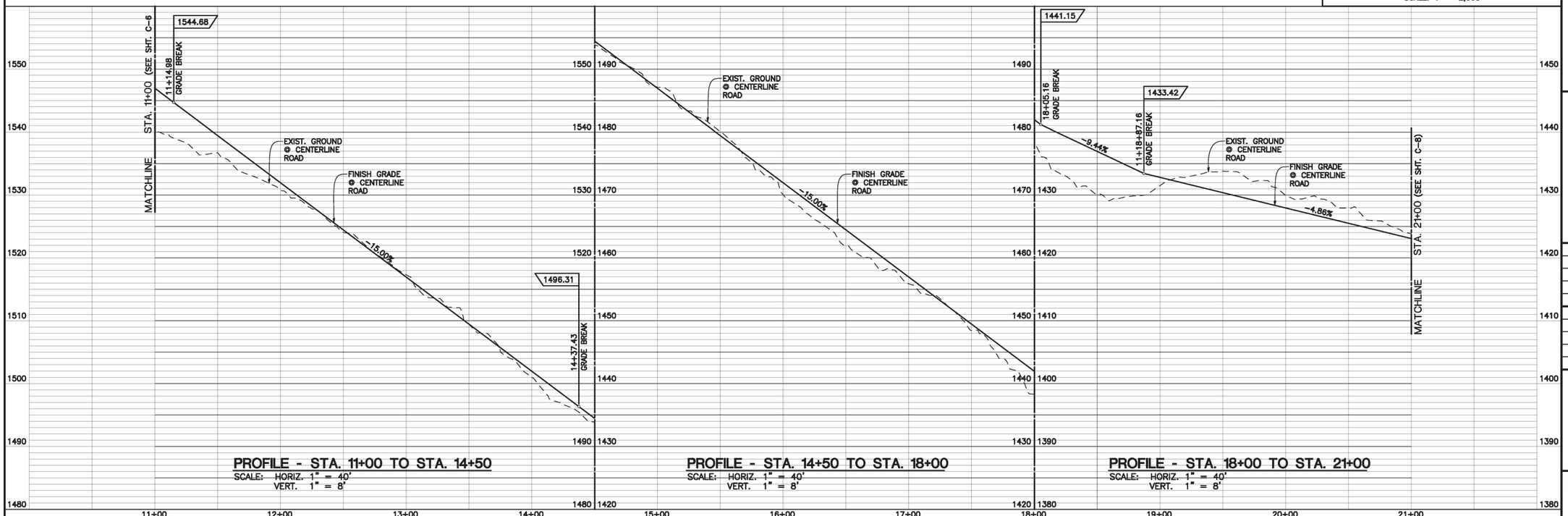
0 20 40 80 120





KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 11+00 TO STA. 14+50

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 14+50 TO STA. 18+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 18+00 TO STA. 21+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 11+00 TO STA. 21+00

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LICENSED PROFESSIONAL ENGINEER
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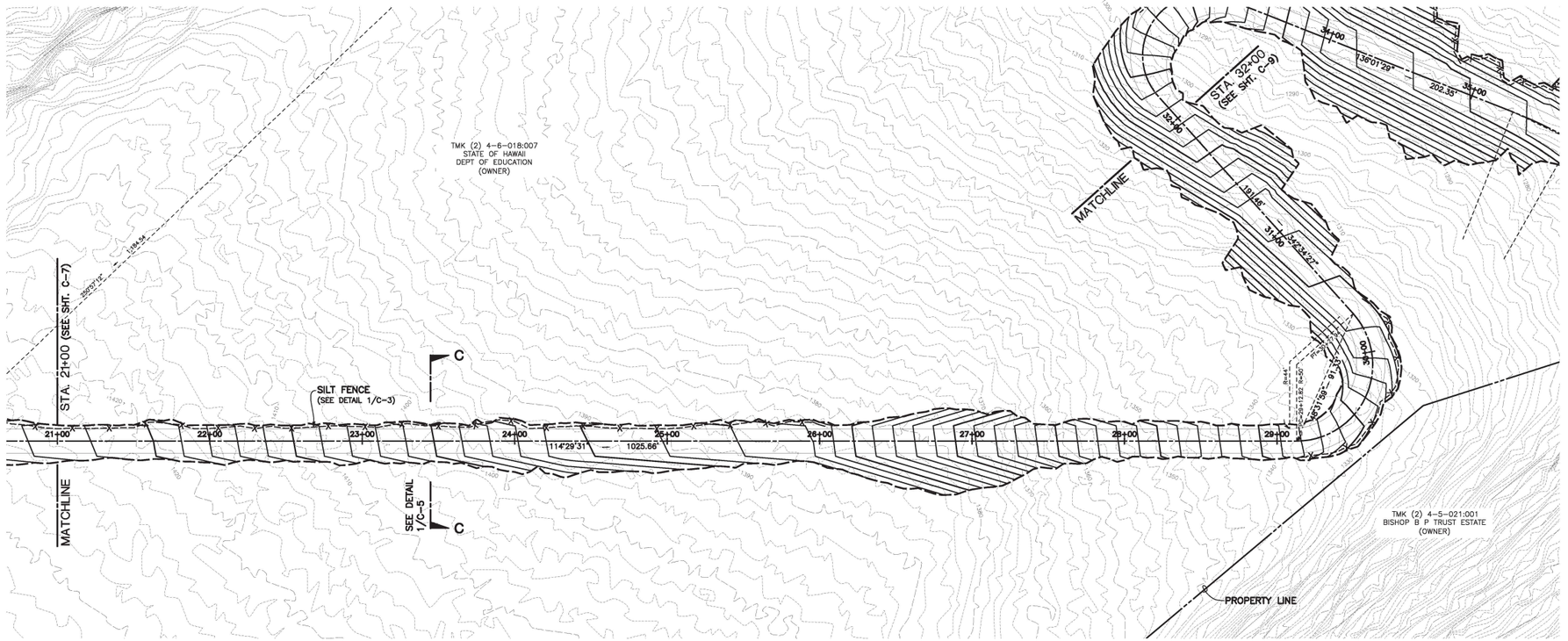
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET C-7

8 OF 18

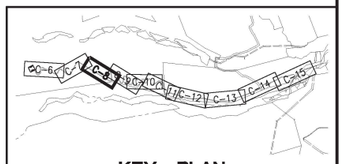


PLAN - STA. 21+00 TO STA. 32+00

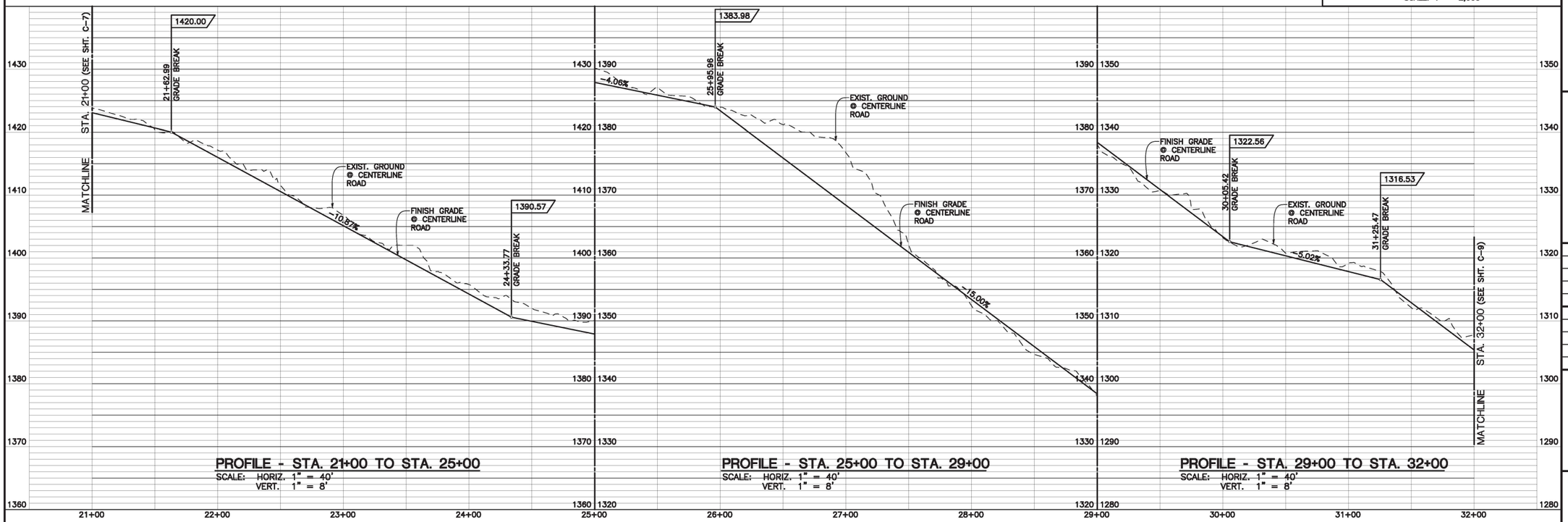
SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120

TRUE NORTH
SCALE: 1" = 40'



KEY PLAN
SCALE: 1" = 2,000'



PROFILE - STA. 21+00 TO STA. 25+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 25+00 TO STA. 29+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 29+00 TO STA. 32+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 21+00 TO STA. 32+00

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 18030-C
HAWAII, U.S.A.

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LICENSE EXPIRES: 04/30/2026

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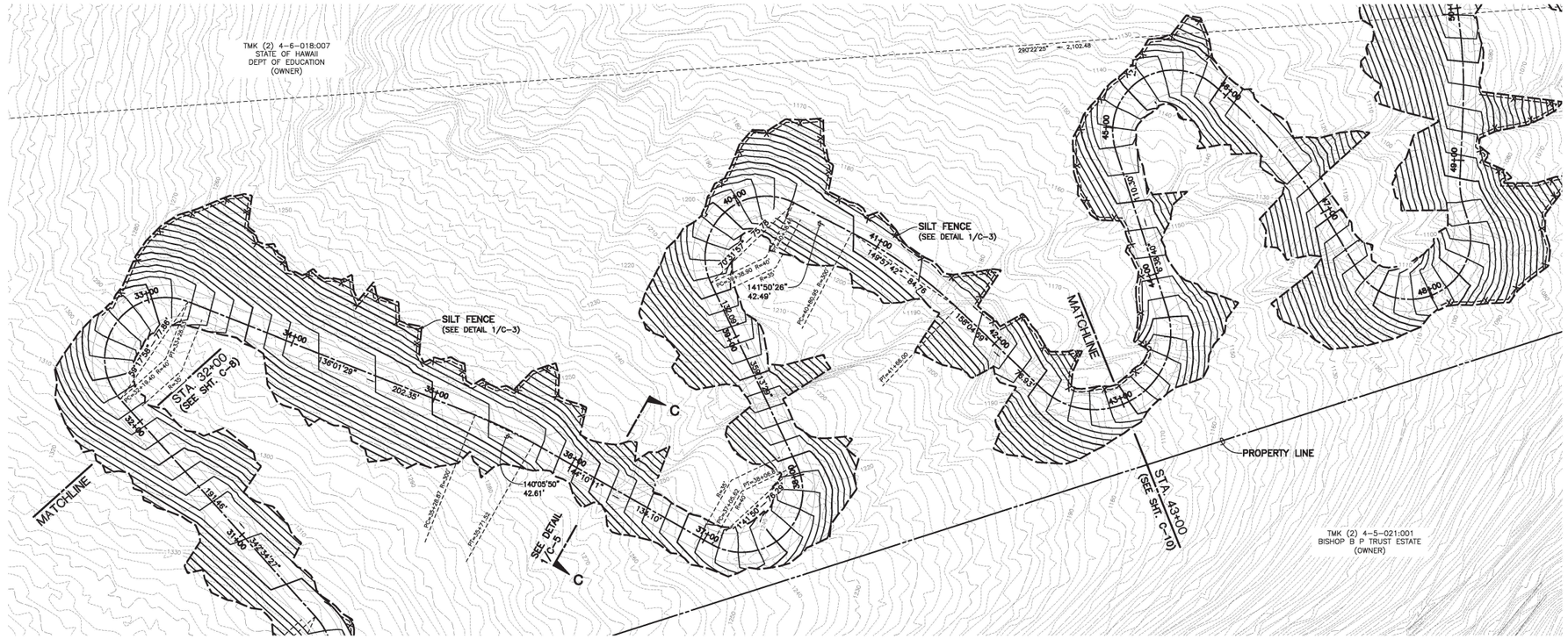
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET C-8
9 OF 18

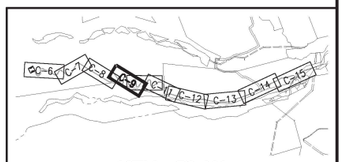


PLAN - STA. 32+00 TO STA. 43+00

SCALE: 1" = 40'

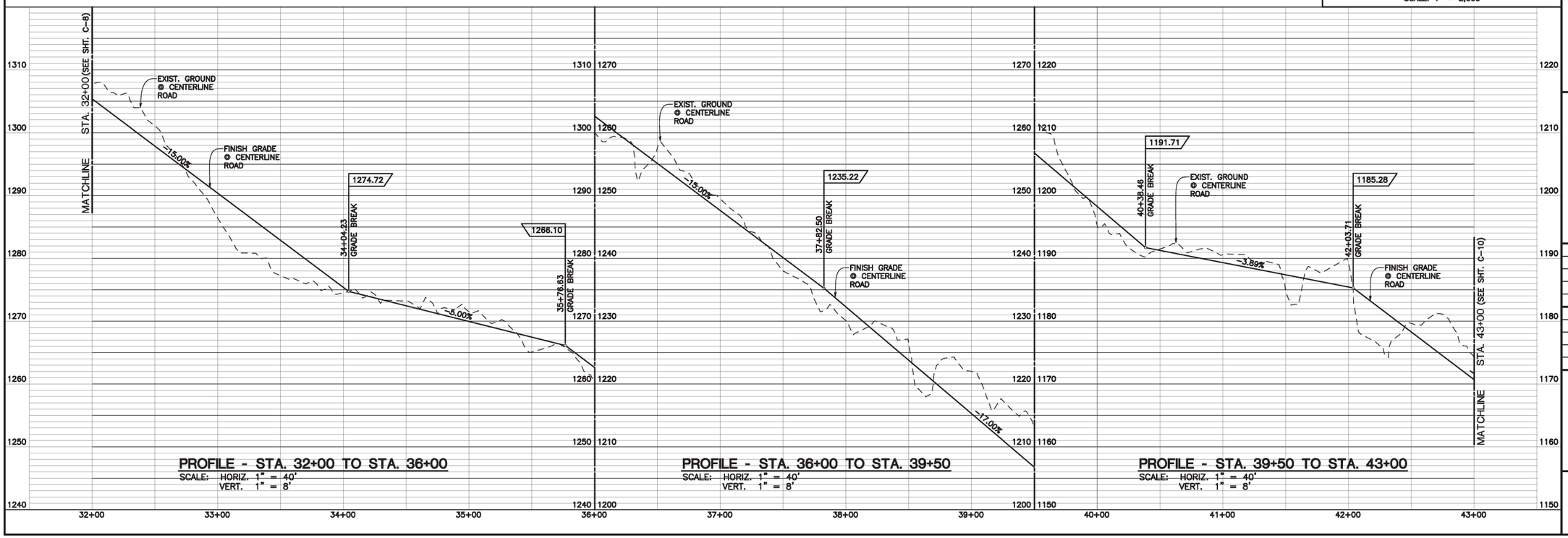
SCALE IN FEET
0 20 40 80 120

TRUE NORTH
SCALE: 1" = 40'



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 32+00 TO STA. 36+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 36+00 TO STA. 39+50

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 39+50 TO STA. 43+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 32+00 TO STA. 43+00

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

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LICENSE EXPIRES: 04/30/2026

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DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
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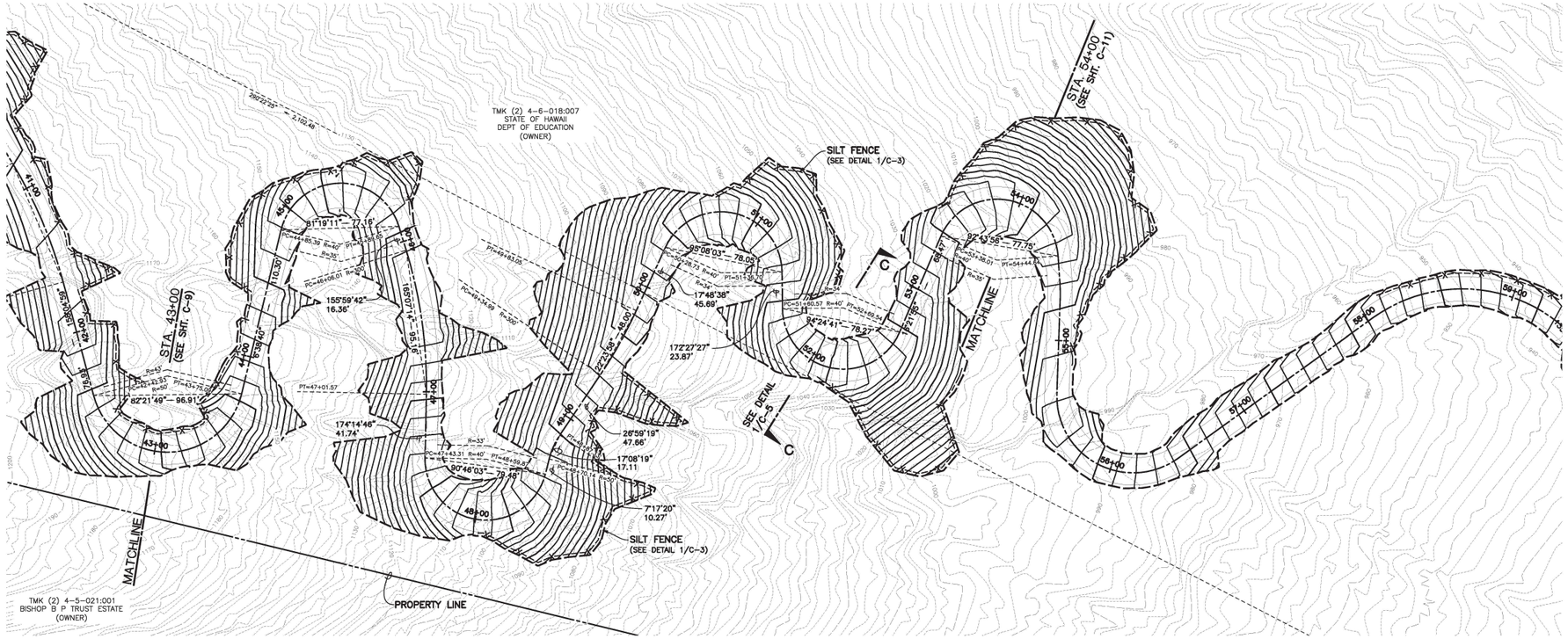
SHEET C-9
10 OF 18

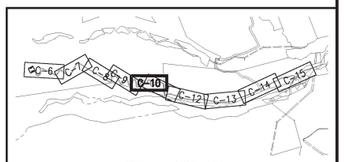


PLAN - STA. 43+00 TO STA. 54+00

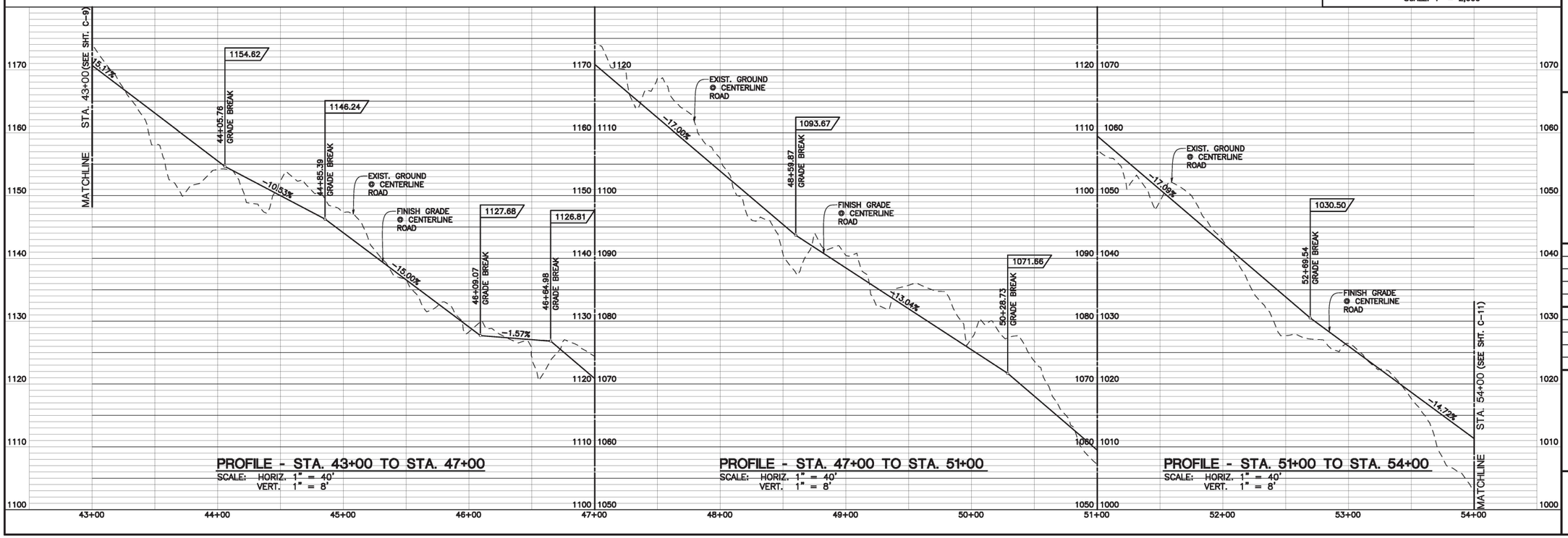
SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120

TRUE NORTH
SCALE: 1" = 40'



KEY PLAN
SCALE: 1" = 2,000'



PROFILE - STA. 43+00 TO STA. 47+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 47+00 TO STA. 51+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 51+00 TO STA. 54+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 43+00 TO STA. 54+00

SEAN K. OGATA
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No. 16030-C
HAWAII, U.S.A.

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LICENSE EXPIRES: 04/30/2026

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DATE:	JUNE 26, 2025
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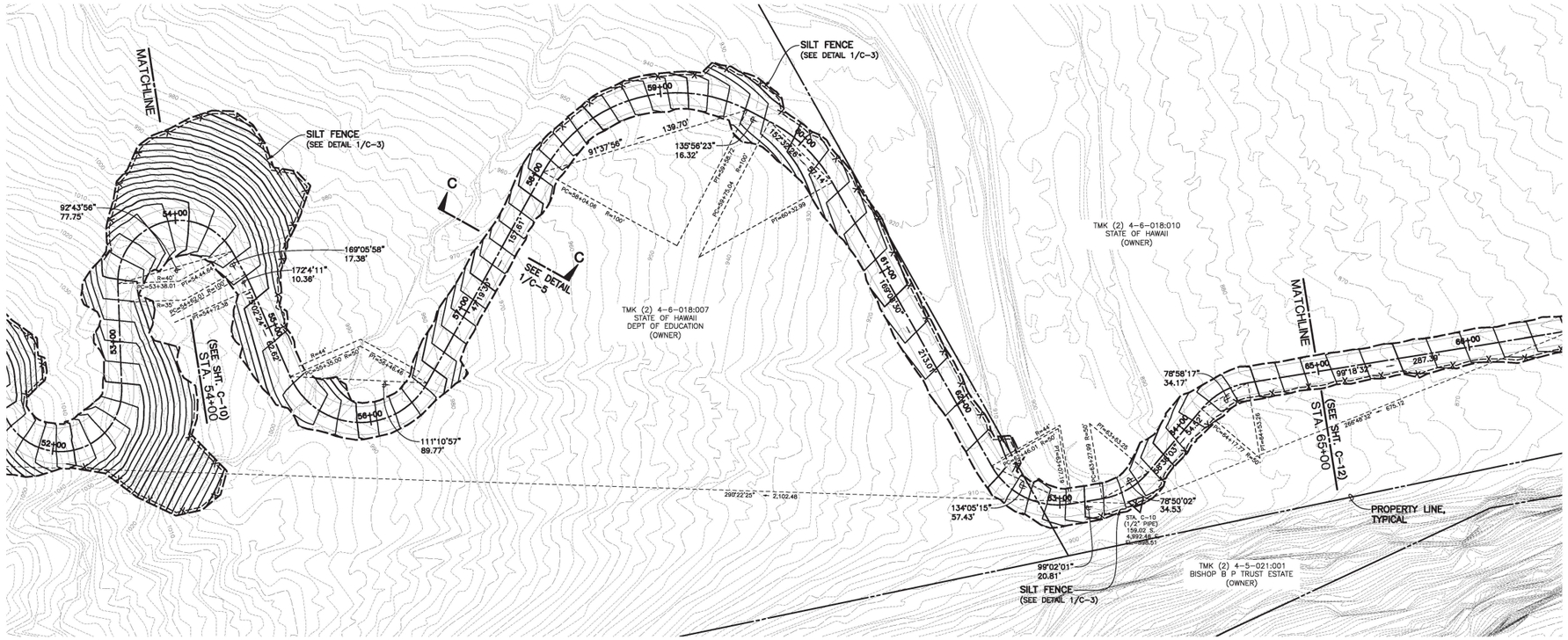
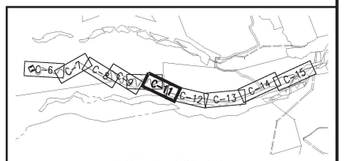
SHEET C-10
11 OF 18



PLAN - STA. 54+00 TO STA. 65+00

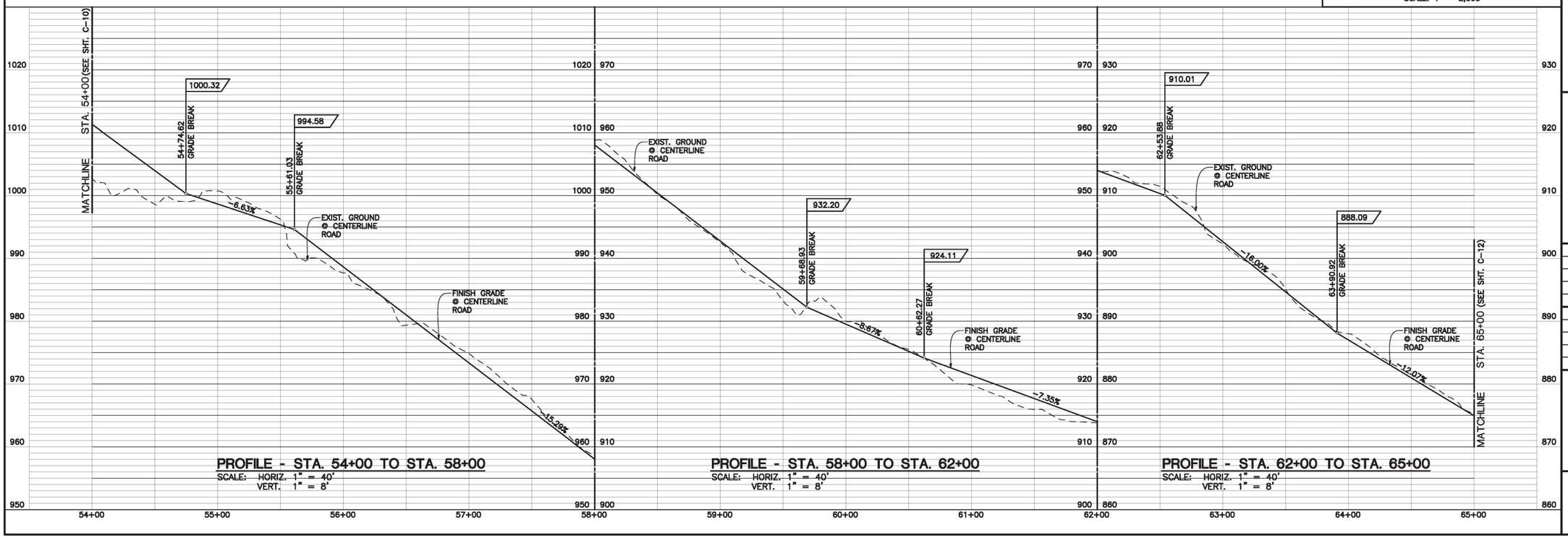
SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 54+00 TO STA. 58+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 58+00 TO STA. 62+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 62+00 TO STA. 65+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 54+00 TO STA. 65+00

SEAN K. OGATA
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HAWAII, U.S.A.

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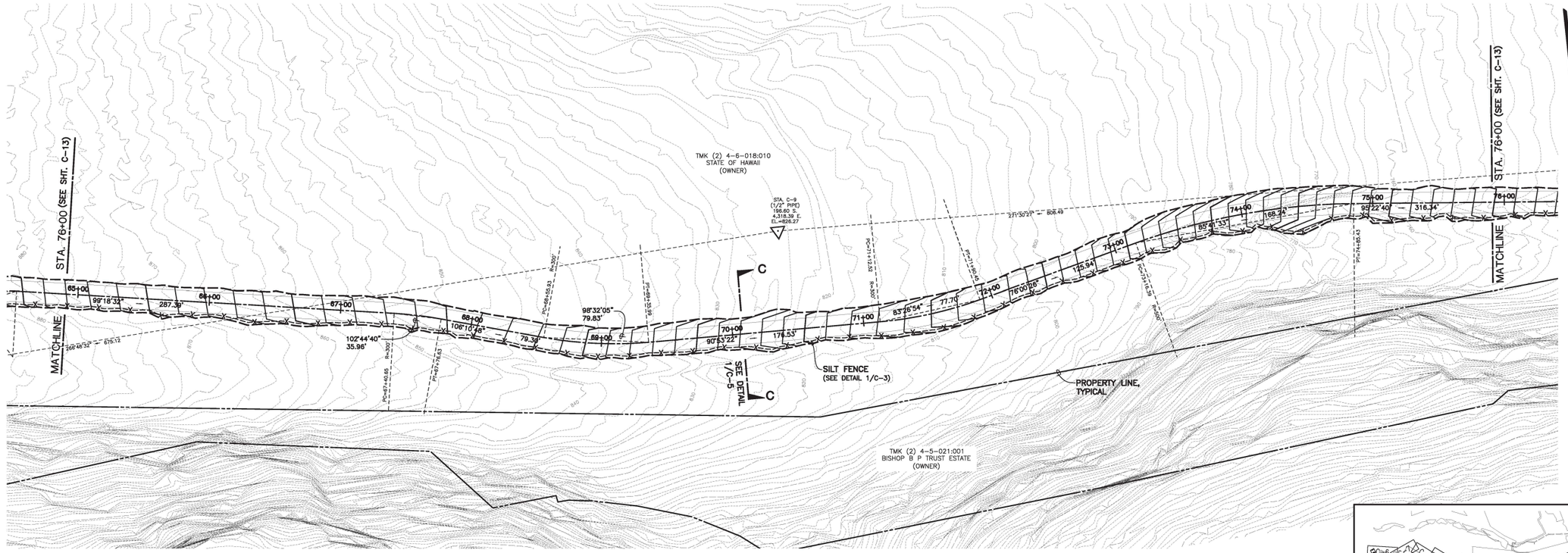
SHEET C-11
12 OF 18



PLAN - STA. 65+00 TO STA. 76+00

SCALE: 1" = 40'

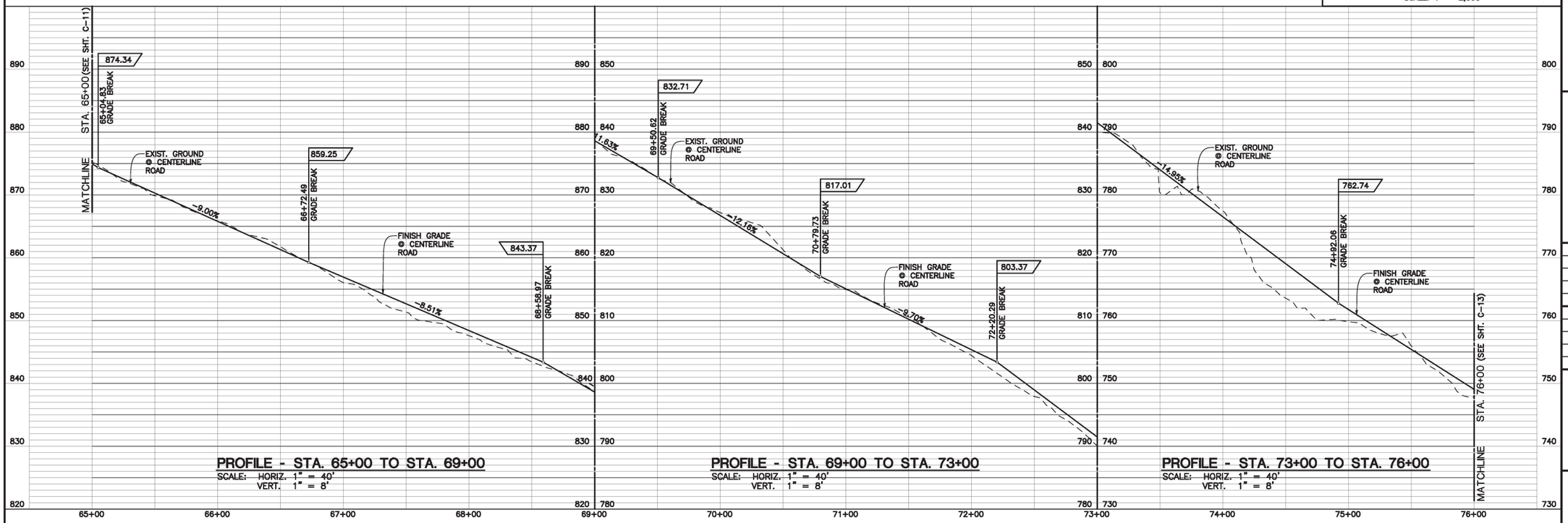
SCALE IN FEET
0 20 40 80 120

PT=60+32.99



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 65+00 TO STA. 69+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 69+00 TO STA. 73+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 73+00 TO STA. 76+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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DATE:	JUNE 26, 2025
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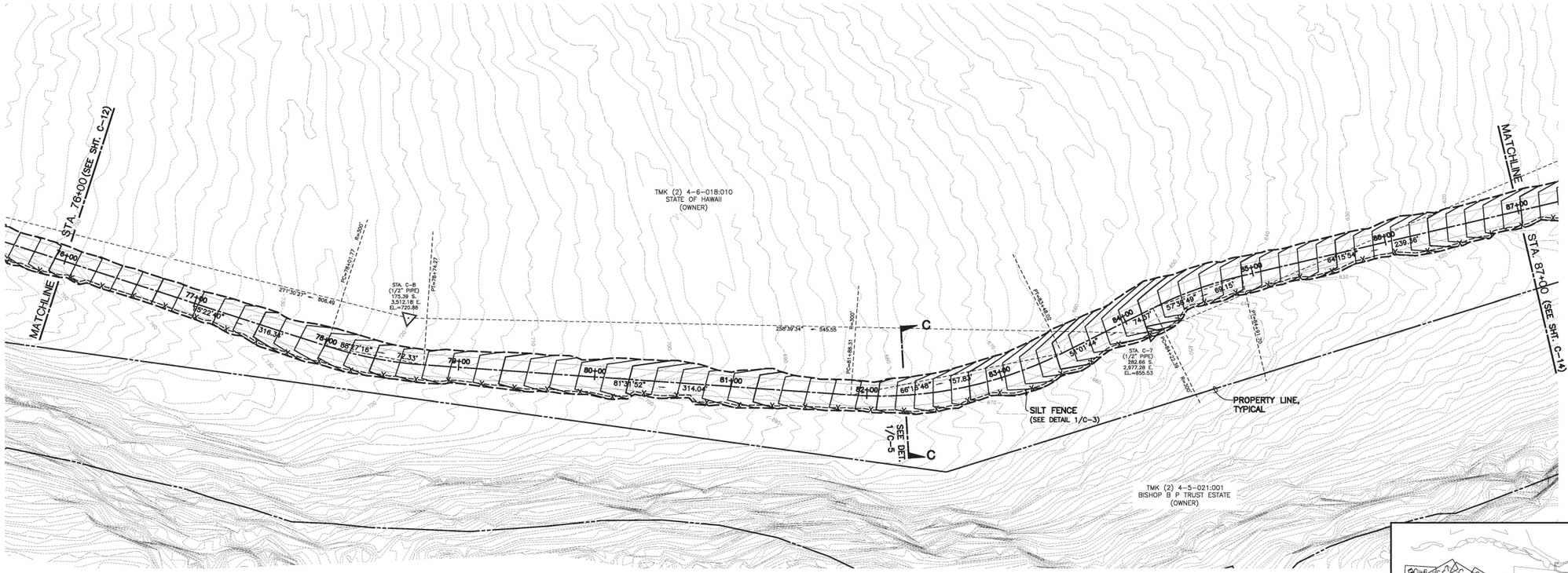
SHEET **C-12**

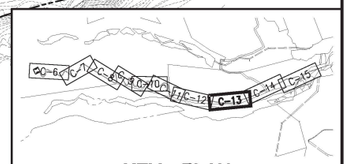
13 OF 18



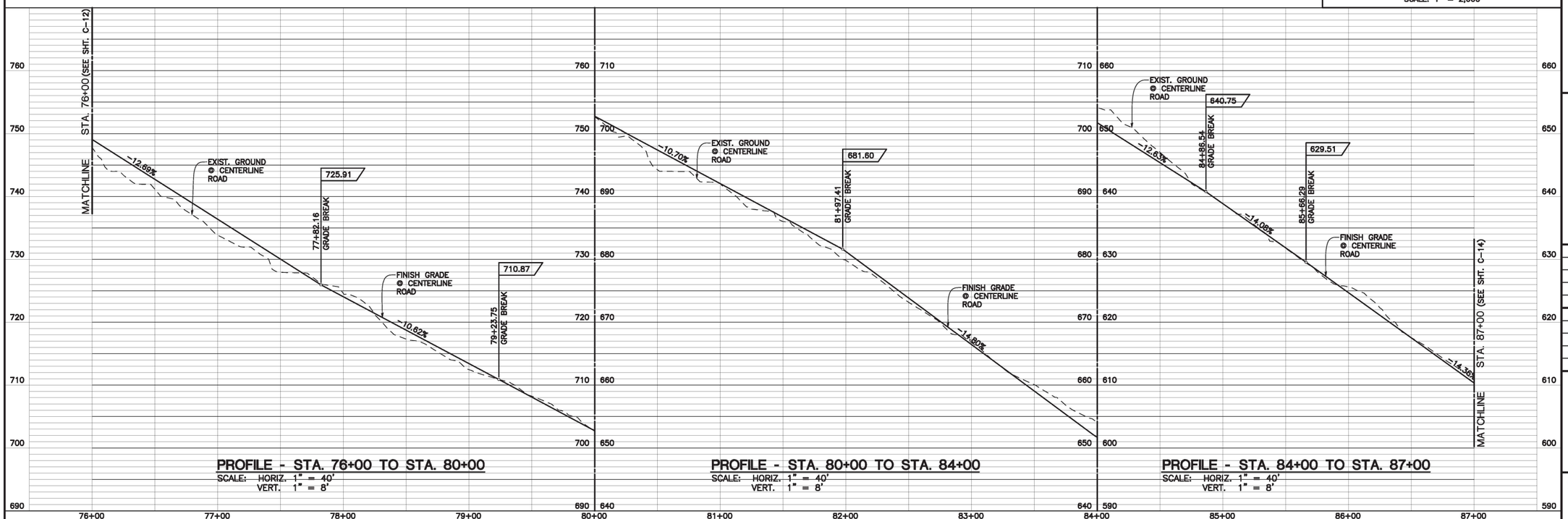
PLAN - STA. 76+00 TO STA. 87+00

SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120



KEY PLAN
SCALE: 1" = 2,000'



PROFILE - STA. 76+00 TO STA. 80+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 80+00 TO STA. 84+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 84+00 TO STA. 87+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

FUKUMOTO ENGINEERING, INC.
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Website: www.femaui.com

Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 76+00 TO STA. 87+00

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
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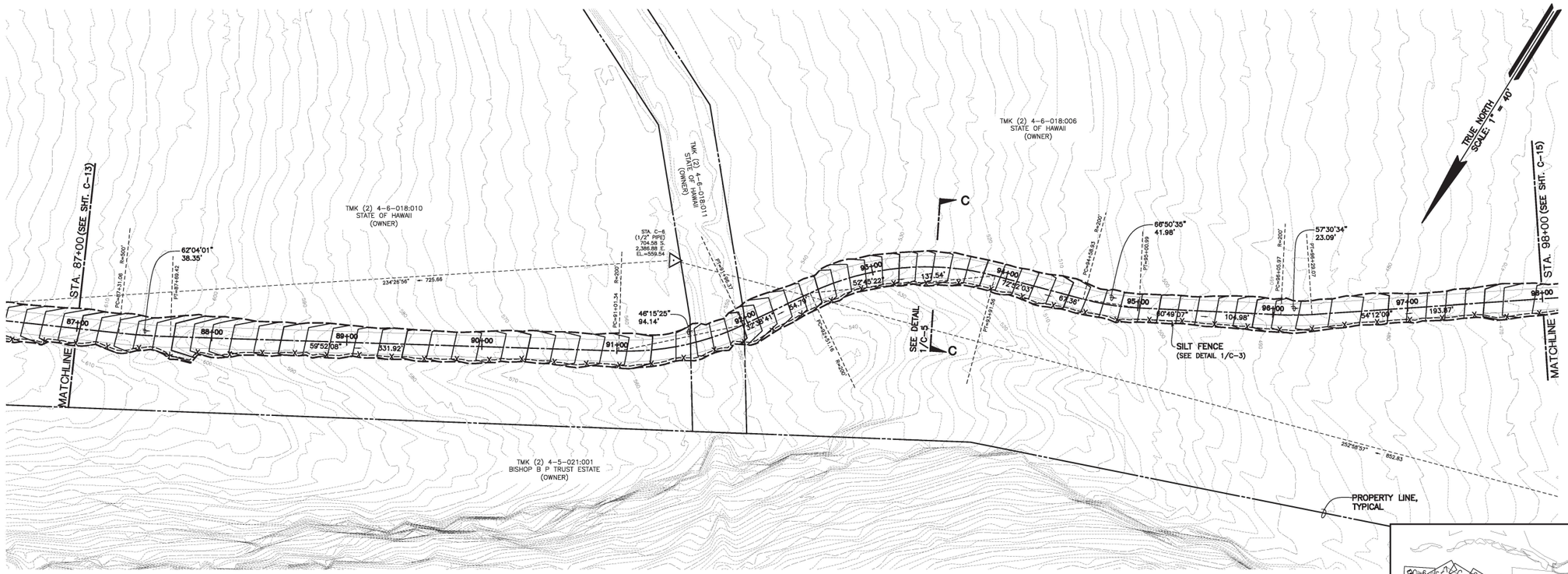
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2026

DESIGNED BY:	R.F., S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

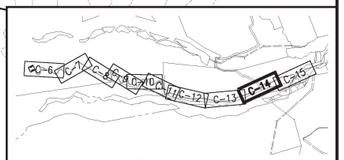
SHEET C-13
14 OF 18



PLAN - STA. 87+00 TO STA. 98+00

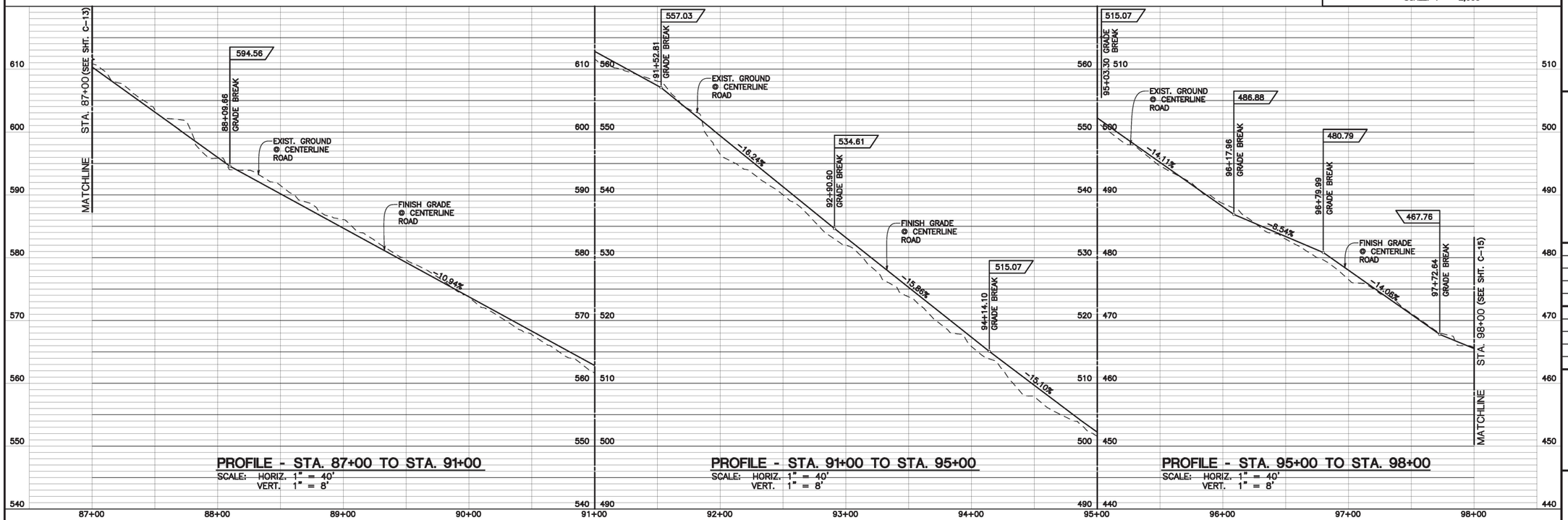
SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 87+00 TO STA. 91+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 91+00 TO STA. 95+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 95+00 TO STA. 98+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 87+00 TO STA. 98+00

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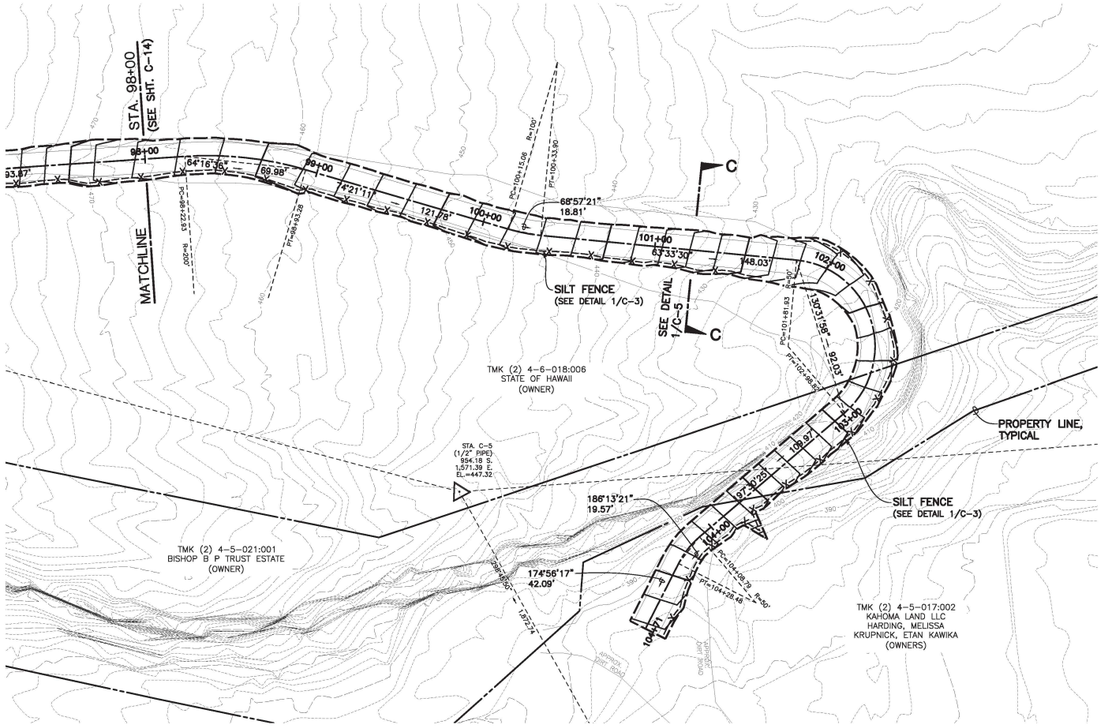
FILE NO:	COM95

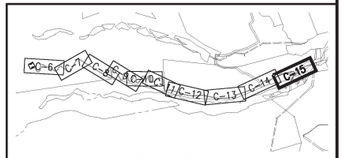
SHEET C-14
15 OF 18



PLAN - STA. 98+00 TO STA. 104+71

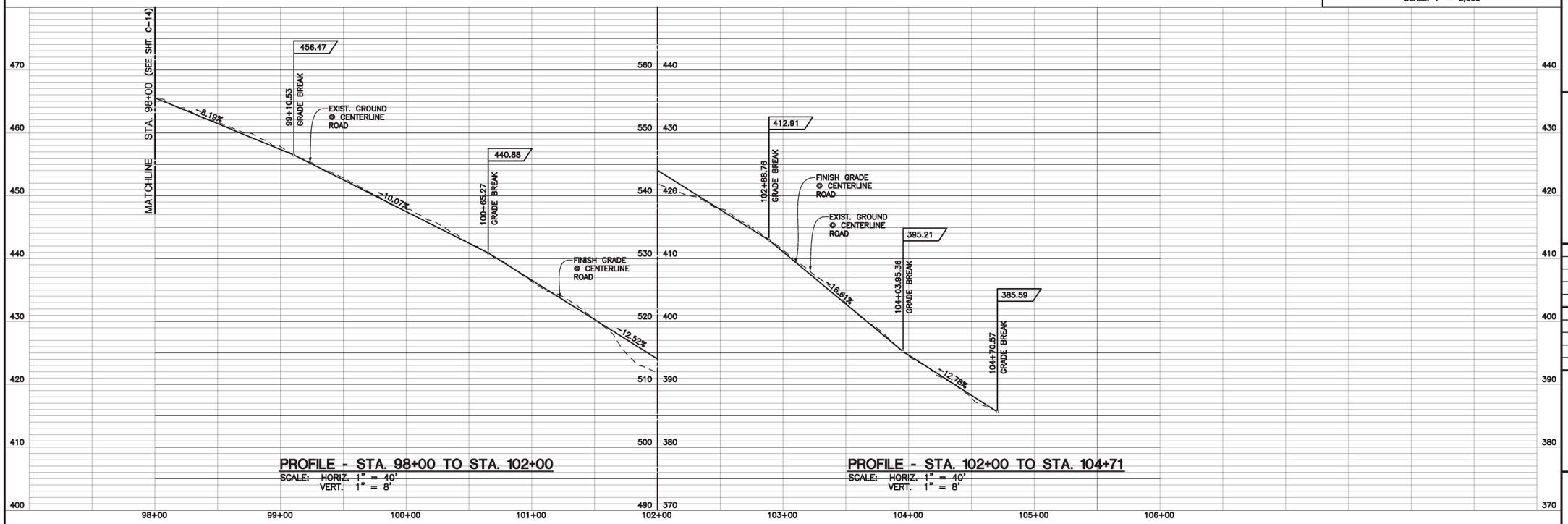
SCALE: 1" = 40'

SCALE IN FEET
0 20 40 80 120



KEY PLAN

SCALE: 1" = 2,000'



PROFILE - STA. 98+00 TO STA. 102+00

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

PROFILE - STA. 102+00 TO STA. 104+71

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

PLAN AND PROFILE - STA. 98+00 TO STA. 104+71

SEAN K. OGATA
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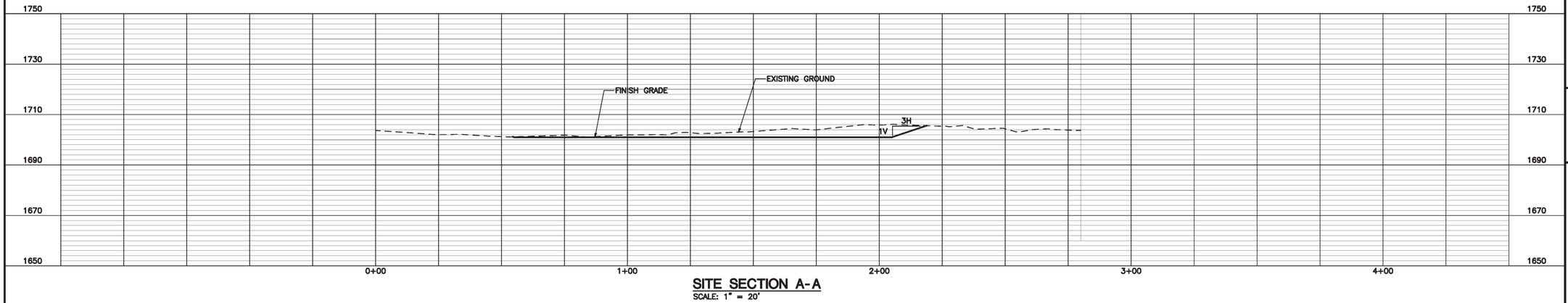
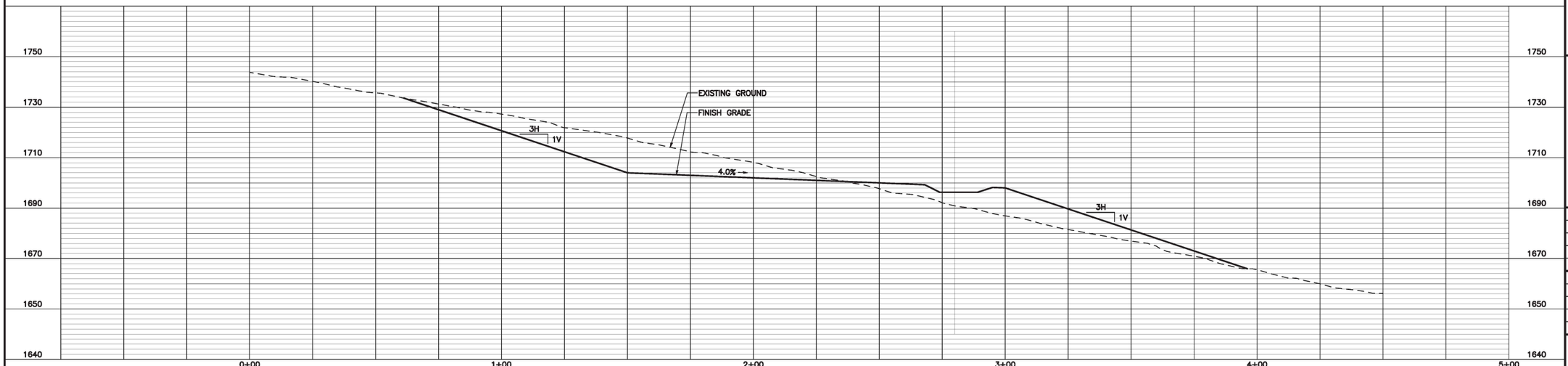
SHEET C-15

16 OF 18



SITE SECTION A-A
SCALE: 1" = 20'



SITE SECTION B-B
SCALE: 1" = 20'

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
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LAHAINA, MAUI, HAWAII

SITE SECTIONS

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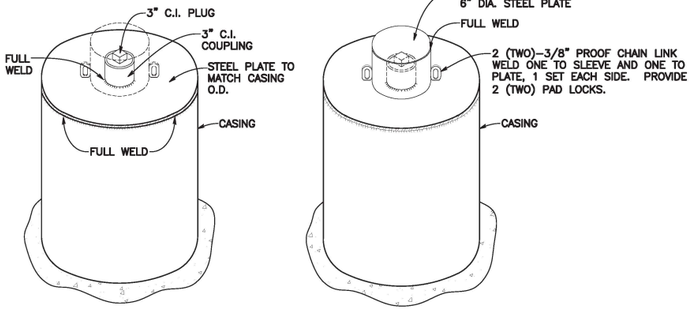
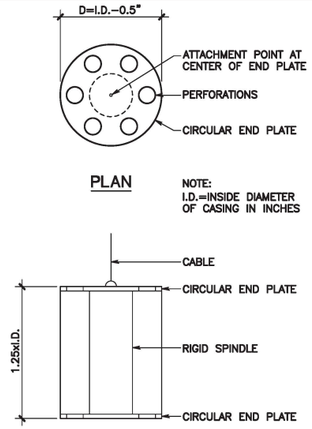
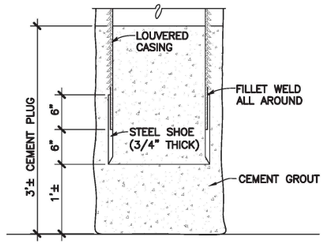
SHEET C-16
17 OF 18



1 / C-17 **WELL CAPPING DETAIL**
NOT TO SCALE



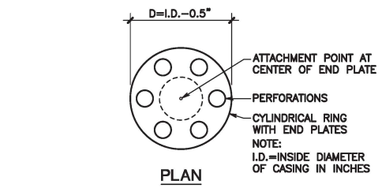
3 / C-17 **PLUMBNESS TEST PLUMMET**
NOT TO SCALE

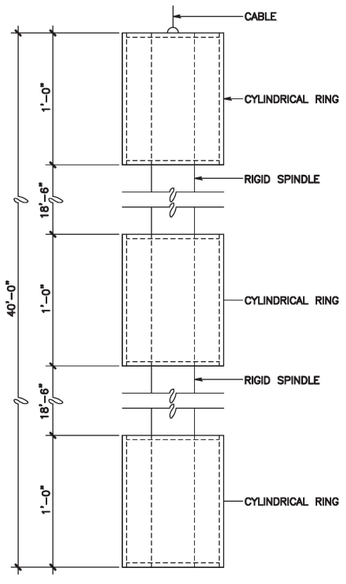


2 / C-17 **STEEL SHOE WITH CEMENT PLUG**
SCALE: 1" = 1'-0"

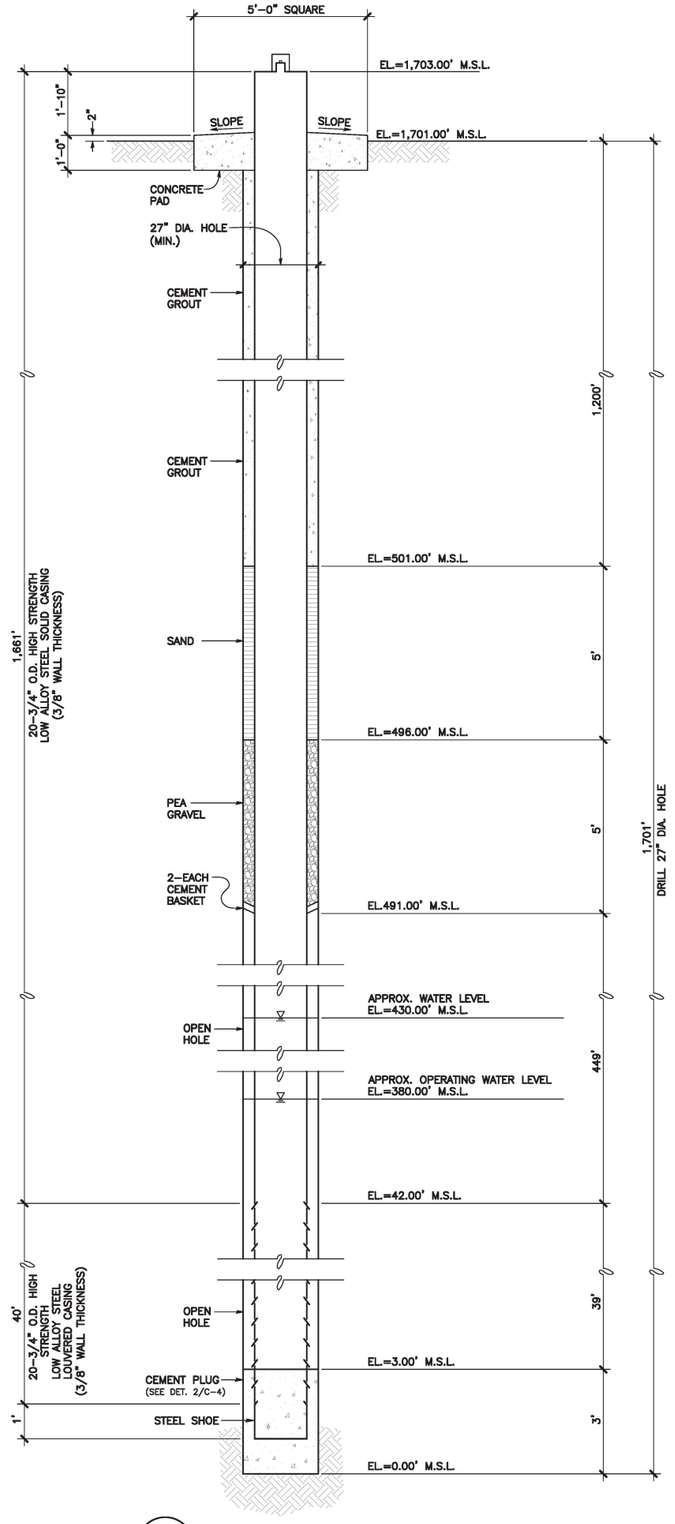
SEQUENCE OF WORK

1. DRILL 12-INCH PILOT HOLE. MEASURE WATER LEVELS WHEN AQUIFER IS ENCOUNTERED. CLEAN AND VIDEO LOG PILOT HOLE. CONTINUOUSLY CHECK PLUMBNESS WHILE DRILLING HOLE.
2. DUE TO EXPECTED HIGH-LEVEL GROUNDWATER, DEPTH OF WELL WILL BE ADJUSTED AND AN OPEN BOREHOLE PUMP TEST WILL BE REQUIRED. PERFORM OPEN BOREHOLE PUMP TEST AS DIRECTED BY DWS.
3. REAM PILOT HOLE AND BAIL TO REMOVE SEDIMENT TO BOTTOM OF REAMED HOLE.
4. DETERMINE AQUIFER HEAD AND SALINITY.
5. RUN PRELIMINARY PLUMBNESS AND ALIGNMENT TEST OF COMPLETED DRILLED HOLE AS DEEMED NECESSARY TO ASSURE HOLE ALIGNMENT AND PLUMBNESS.
6. RUN VIDEO LOG AFTER WELL WATER HAS CLEARED.
7. INSTALL WELL CASING AND DOUBLE CEMENT BASKETS.
8. SET WELL CASING TO FINAL DEPTH AND POUR CEMENT PLUG. RUN PRELIMINARY PLUMBNESS AND ALIGNMENT TEST OF CASED HOLE AS DEEMED NECESSARY.
9. INSTALL TEST PUMP OR VIDEO CAMERA.
10. FILL ANNULAR SPACE WITH AGGREGATE, SAND AND CEMENT GROUT. OPERATE TEST PUMP OR VIDEO CAMERA TO MONITOR OPERATIONS WHILE FILLING THE ANNULAR SPACE.
11. MEASURE STATIC WATER LEVEL.
12. DEVELOP THE WELL BY PUMP SURGING THE WELL.
13. CONDUCT STEP-DRAWDOWN TEST AS DIRECTED BY DWS.
14. CONDUCT CONSTANT-RATE (96 HOURS) TEST AS DIRECTED BY DWS.
15. OBTAIN WATER QUALITY SAMPLES DURING THE CONSTANT-RATE PUMP TEST.
16. RUN PLUMBNESS AND ALIGNMENT TEST OF THE CASED WELL IN THE PRESENCE OF DWS.
17. CAP WELL, CLEAN UP, AND DEMOBILIZE. ESTABLISH A PERMANENT BENCH. MARK ADJACENT TO THE WELL AND DETERMINE THE TOP OF CASING ELEVATION. BENCH MARK ELEVATION AND TOP OF CASING ELEVATION SHALL BE ESTABLISHED BY A LICENSED PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF HAWAII.





4 / C-17 **ALIGNMENT TEST DUMMY**
NOT TO SCALE



5 / C-17 **WELL SECTION**
SCALE: 1/2" = 1'-0

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Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT SITE L-1 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-018:007
LAHAINA, MAUI, HAWAII

WELL SECTION AND DETAILS

SEAN K. OGATA
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DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 26, 2025
FILE NO:	COM95

SHEET **C-17**
18 OF 18

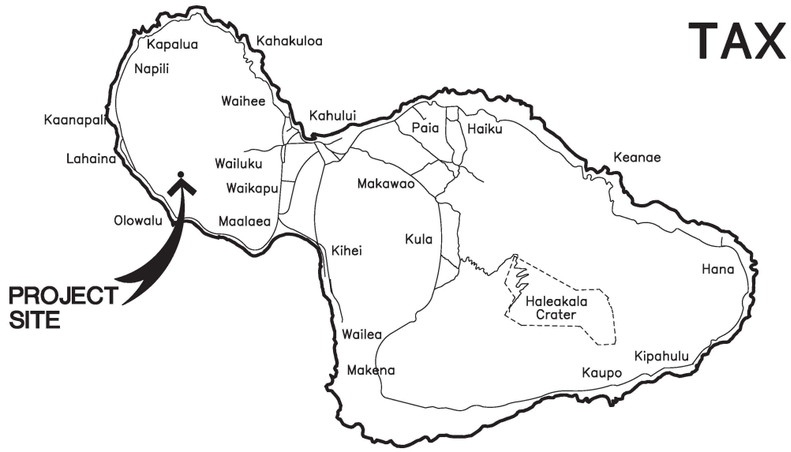
Launiupoko Aquifer
Site L-3 Exploratory Well

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY

TAX MAP KEY (2) 4-6-019:003

DWS JOB NO. 20-01

LAHAINA, MAUI, HAWAII



MAP OF MAUI
SCALE IN MILES
NORTH 5 0 5 10 15

PREPARED FOR:

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, HAWAII 96793

PREPARED BY:

FUKUMOTO ENGINEERING, INC.
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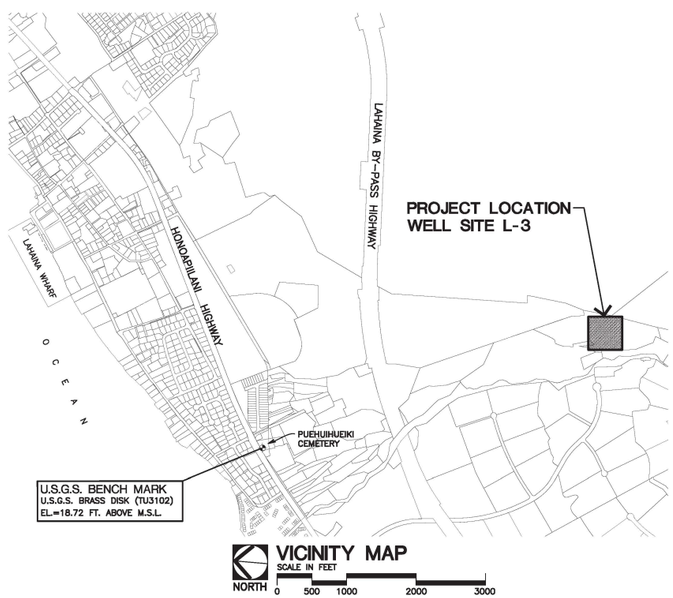

VICINITY MAP
SCALE IN FEET
NORTH 0 500 1000 2000 3000

APPROVALS:

_____ _____
DIRECTOR, DEPARTMENT OF WATER SUPPLY — DATE
COUNTY OF MAUI
(APPROVAL LIMITED TO WATER IMPROVEMENTS WHICH WILL BE DEDICATED TO THE DEPARTMENT OF WATER SUPPLY)

INDEX OF DRAWINGS:

SHT.	SHT. NO.	DESCRIPTION
1	T-1	TITLE SHEET
2	C-1	GENERAL PLAN
3	C-2	CONSTRUCTION NOTES
4	C-3	EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN
5	C-4	SITE PLAN
6	C-5	GRADING PLAN
7	C-6	ROAD PROFILE AND SITE SECTIONS
8	C-7	WELL SECTION AND DETAILS

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LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY
DWS JOB NO. 20-01
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TITLE SHEET

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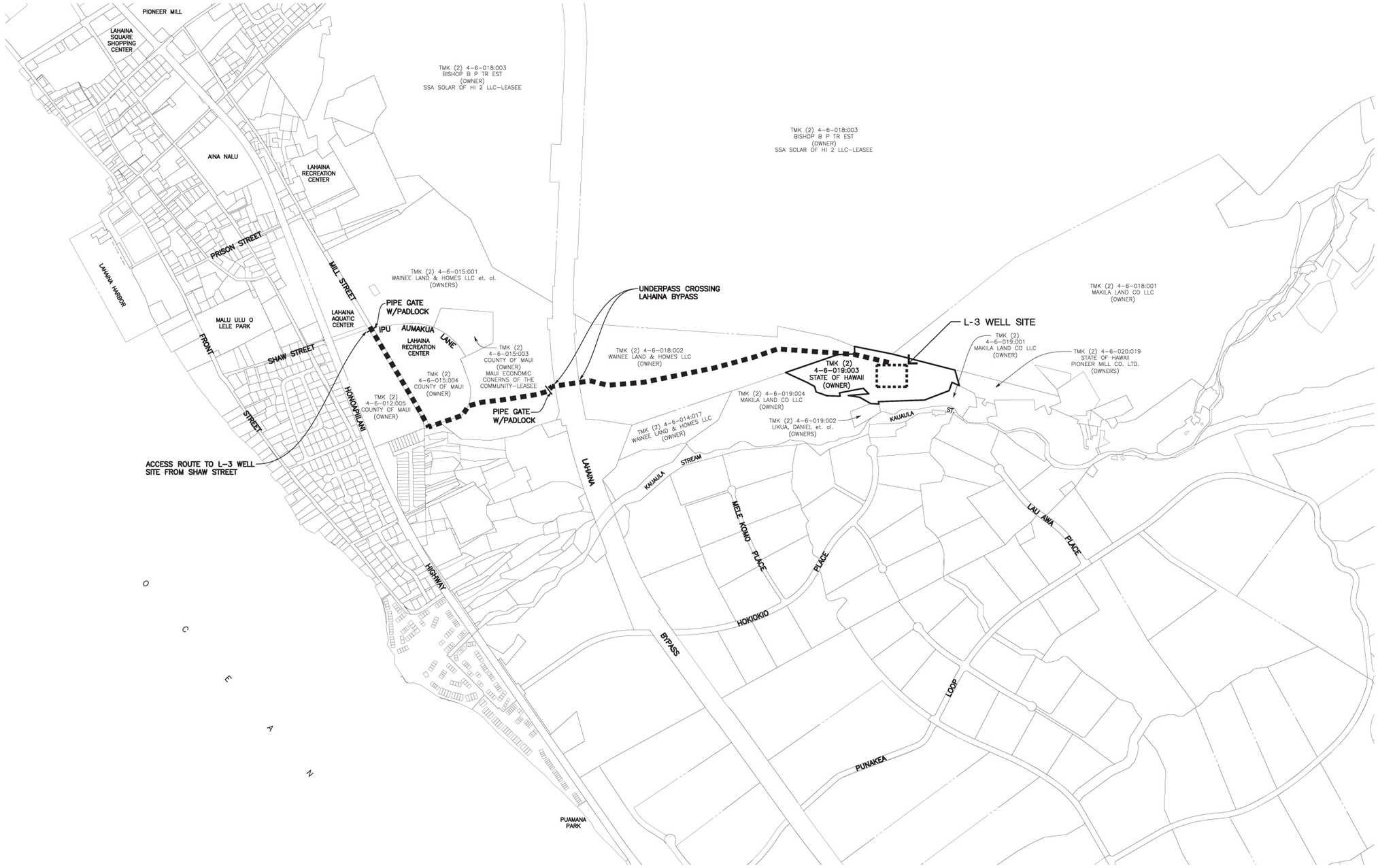
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 2, 2025
FILE NO:	COM95

SHEET T-1
1 OF 8

LAUNIUPOKO AQUIFER WELL DEVELOPMENT DEVELOPMENT EXPLORATORY DWS JOB NO. 20-01

LAUNIUPOKO AQUIFER WELL DEVELOPMENT DEVELOPMENT DWS JOB NO. 20-01



GENERAL PLAN
SCALE: 1" = 500'

SCALE IN FEET
0 250 500 1000 1500

TRUE NORTH
SCALE: 1" = 500'

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SITE L-3 EXPLORATORY

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GENERAL PLAN

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DATE:	JUNE 2, 2025
FILE NO:	COM95

SHEET C-1
2 OF 8

CONSTRUCTION NOTES

WATER SYSTEM

1. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER SUPPLY (DWS), IN WRITING, ONE (1) WEEK PRIOR TO COMMENCEMENT OF WORK.
2. IF CONSTRUCTION OF WATER SYSTEM IMPROVEMENTS WILL AFFECT DWS CONSUMERS, CONTRACTOR SHALL NOTIFY CONSUMERS BY RADIO/NEWSPAPER TWO (2) DAYS BEFORE AND ON DAY OF CONNECTION. CONTRACTOR SHALL ALSO NOTIFY CONSUMERS HOUSE-TO-HOUSE ONE (1) DAY BEFORE CONNECTION WORK.
3. ALL MATERIALS USED AND METHODS OF CONSTRUCTION OF WATER SYSTEM FACILITIES SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF DWS WATER SYSTEM STANDARDS. CONTRACTOR SHALL OBTAIN THE LATEST REVISIONS OF THE DWS STANDARDS BEFORE COMMENCING CONSTRUCTION.
4. ALL WATER SYSTEM WORK SHALL BE PERFORMED BY CONTRACTORS POSSESSING VALID STATE OF HAWAII CONTRACTOR'S LICENSES, REGARDLESS OF THE VALUE OF THE WORK.
5. CONTRACTOR SHALL FOLLOW ALL LOCAL, STATE, FEDERAL LAWS, RULES AND REGULATIONS REGARDING THE HANDLING, REMOVAL AND DISPOSAL OF ASBESTOS PIPE.
6. CONTRACTOR SHALL PROTECT EXISTING WATERLINE DURING COURSE OF CONSTRUCTION AND SUPPORT EXPOSED WATERLINE TO PREVENT ANY MOVEMENT.
7. THE EXACT DEPTH AND LOCATION OF EXISTING WATERLINES, SERVICE LATERALS AND OTHER UTILITIES ARE NOT KNOWN. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE SAME PRIOR TO TRENCHING FOR THE NEW WATERLINE. THE COST OF LOWERING, RELOCATING OR ADJUSTING EXISTING WATERLINES, SERVICE LATERALS AND APPURTENANCES, WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS AT THE CONTRACTOR'S EXPENSE.
8. PAVING RESURFACING/RESTORATION:
   a. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING DWS VALVES AND MANHOLES, WHEN AFFECTED BY THE WORK, PRIOR TO START OF CONSTRUCTION.
   b. ALL WATER VALVE AND WATER MANHOLE CONCRETE COLLARS WITHIN THE PROJECT LIMITS SHALL BE DEMOLISHED AND RECONSTRUCTED PER DWS STANDARD DETAIL V12 AND V23, RESPECTIVELY, AT THE CONTRACTOR'S EXPENSE.
   c. THE VALVE BOX RISER AND COVER OF ALL WATER VALVES WITHIN THE PROJECT LIMITS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
   d. CONTRACTOR SHALL ADJUST DWS SLIDING VALVE BOX ASSEMBLY AND MANHOLE FRAME AND COVER TO FINISHED GRADE.
   e. PRIOR TO PAVEMENT RESURFACING/RESTORATION WORK, THE CONTRACTOR SHALL SCHEDULE INSPECTION WITH DWS.
9. ANY SLIDING VALVE BOX ASSEMBLY, MANHOLE COVER, OR CONCRETE COLLAR, WHETHER DISCOVERED DAMAGED OR NOT SPECIFIED ON THE PLANS TO BE ADJUSTED OR REPLACED, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10. CONTRACTOR SHALL ADJUST TO FINISHED GRADES, ALL UTILITIES (I.E., WATER, SEWER, DRAIN, ETC.) AFFECTED BY THE WORK WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS AT THE CONTRACTOR'S EXPENSE.
11. CONTRACTOR SHALL RESTORE ALL ROAD IMPROVEMENTS DISTURBED OR DAMAGED DURING CONSTRUCTION IN ACCORDANCE WITH THE 2005 "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AS AMENDED, TO THE SATISFACTION OF THE DEPARTMENT OF PUBLIC WORKS AT THE CONTRACTOR'S EXPENSE. ROAD IMPROVEMENTS INCLUDE, BUT ARE NOT LIMITED TO, PAVEMENT, PAVEMENT MARKERS, SHOULDER DRESSING, STRIPING, AND SPEED HUMPS.
12. CONCRETE FOR REACTION BLOCKS AND ANCHOR BLOCKS SHALL BE DWS CLASS 2500.
13. THE MAXIMUM DISTANCE BETWEEN VALVE NUT AND TOP OF MANHOLE COVER SHALL BE THREE (3) FEET.
14. CONTRACTOR SHALL SUBMIT A MATERIALS LIST TO DWS FOR APPROVAL PRIOR TO CONSTRUCTION.
15. CONNECTION TO DWS SYSTEM:
   a. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY FITTINGS AND OTHER MATERIALS AND EQUIPMENT REQUIRED FOR THE HOOK-UP. CONTRACTOR SHALL VERIFY THE EXACT LOCATION, DEPTH, TYPE, AND CONDITION OF THE EXISTING LINE BEFORE ORDERING MATERIALS FOR THE HOOK-UP. CONTRACTOR SHALL, HOWEVER, CHECK WITH DWS BEFORE EXCAVATING FOR VERIFICATION PURPOSES.
   b. WHENEVER FEASIBLE, MECHANICAL JOINT FITTINGS SHALL BE USED FOR BURIED APPLICATIONS AND FLANGED JOINT FITTINGS SHALL BE USED FOR EXPOSED APPLICATIONS.
   c. DWS PERSONNEL MAY BE REQUIRED TO BE PRESENT OR ASSIST WITH CONNECTIONS TO THE EXISTING WATER SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST INCURRED BY DWS FOR SAID WORK.
   d. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR FOR TRENCH EXCAVATION, BACKFILLING, CLEANING AND CHLORINATION, PAVING, AND OTHER WORK NECESSARY TO COMPLETE THE HOOK-UP, AS DIRECTED BY AND TO THE SATISFACTION OF DWS.
16. MINIMUM COVER OVER WATER MAIN, 6" DIAMETER OR LARGER, SHALL BE 3'-0". MINIMUM COVER FOR 4" DIAMETER SHALL BE 2'-6". MINIMUM COVER FOR DIAMETERS LESS THAN 4" SHALL BE 1'-6".
17. CONTRACTOR SHALL ENSURE INSTALLATION OF WATERLINES, SERVICE LATERALS AND APPURTENANCES HAVE PROPER CLEARANCES FROM EXISTING TREES, WALLS, FENCES, ETC. IN ACCORDANCE WITH CURRENT DWS WATER SYSTEM STANDARDS.
18. CONTRACTOR SHALL VERIFY AND MAINTAIN 18" MINIMUM CLEARANCE WITH WATERLINE OR SERVICE LATERAL CROSSING OVER EXISTING SEWERLINE OR SERVICE LATERAL. INSTALL REINFORCED CONCRETE JACKET AROUND SEWERLINE WHERE SEWER IS ABOVE WATERLINE OR LESS THAN 18" BELOW WATERLINE. THE LENGTH OF JACKET REQUIRED SHALL BE AS SPECIFIED IN TABLE 100-5 OF THE DWS STANDARDS. PROVIDE 6" MINIMUM CLEARANCE FROM OUTSIDE JACKET TO WATERLINE OR SERVICE LATERAL. STANDARD CONCRETE JACKET DETAILS FOR SEWERLINE AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS STANDARDS SHALL BE FOLLOWED.
19. CONTRACTOR SHALL HAVE LICENSED SURVEYOR STAKE OUT WATERLINE BASELINE STATIONING, RIGHT-OF-WAY LIMITS, PROPERTY LINES, AND EASEMENT LINES TO ENSURE PROPER LOCATION OF WATER SYSTEM IMPROVEMENTS.
20. BOLTS FOR EXPOSED FLANGED DUCTILE IRON PIPE JOINTS SHALL BE EITHER SILICON BRONZE BOLTS AND NUTS OR 316 STAINLESS STEEL BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED. T-BOLTS FOR DUCTILE IRON MECHANICAL JOINT (MJ) PIPE AND FITTING CONNECTIONS IN UNDERGROUND SITUATIONS SHALL BE ONE OF THE FOLLOWING SYSTEMS:
   a. 316 STAINLESS STEEL T-BOLTS WITH THE HEAVY DUTY STAINLESS STEEL NUTS (ONLY) FURNISHED WITH TRIPAC 2000 BLUE COATING SYSTEM. ANTI-SEIZE SHALL NOT BE USED.
   b. COR-TEN T-BOLTS AND NUTS WITH HIGH GRADE ZINC SACRIFICIAL ANODES, EQUIVALENT TO "DURATRON" SACRIFICIAL "SAC-NUT" MODULES, INSTALLED ON THE NUTS FOR ALL STANDARD COR-TEN T-BOLTS.
   c. COR-TEN T-BOLTS AND NUTS BOTH FACTORY COATED WITH TRIPAC 2000 BLUE COATING SYSTEM BY "TRIPAC FASTENERS".

   ALL HOT FORGED STAINLESS STEEL BOLTS ARE REQUIRED TO BE PASSIVATED PER ASTM A380. MANUFACTURER CERTIFICATES ARE REQUIRED FOR PROOF WITH EACH SHIPMENT.
21. CONTRACTOR SHALL FURNISH AND INSTALL DUCTILE IRON NIPPLES FOR COMPLETE INSTALLATION OF THE WATERLINE, WHETHER SHOWN OR NOT SHOWN ON THE CONSTRUCTION PLANS, AT THE CONTRACTOR'S EXPENSE.
22. CONTRACTOR SHALL FURNISH TEMPORARY CLEANOUTS WHEN NECESSARY TO TEST, FLUSH, AND CHLORINATE THE WATERLINE AT THE CONTRACTOR'S EXPENSE.
23. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL PORTIONS OF ABANDONED WATERLINES THAT ARE EXPOSED OR WITHIN 12-INCHES BELOW THE GROUND SURFACE AT THE CONTRACTOR'S EXPENSE.
24. ALL BURIED METALS, INCLUDING COPPER PIPES, SHALL BE WRAPPED WITH POLY-WRAP. FOR ALL BURIED INSTALLATIONS OF DUCTILE IRON PIPE AND FITTINGS, POLY-WRAP IS REQUIRED EXCEPT WITHIN CONCRETE JACKETS.
25. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
26. CONTRACTOR SHALL PAINT AND NUMBER FIRE HYDRANT(S). NUMBERING TO BE FURNISHED BY DWS.
27. WATER MAINS AND APPURTENANCES SHALL BE SUBJECT TO HYDROSTATIC TESTING IN ACCORDANCE WITH THE LATEST REVISION OF AWWA C600, UNDER THE "HYDROSTATIC TESTING" SECTION, TO A PRESSURE OF AT LEAST 1.5 TIMES THE WORKING PRESSURE. UNLESS OTHERWISE STATED IN THE CONSTRUCTION DOCUMENTS OR LIMITED BY THE PRESSURE RATING OF EQUIPMENT, THE PRESSURE TEST AND LEAKAGE TEST SHALL BE PERFORMED AT 225 POUNDS PER SQUARE INCH PRESSURE.
28. DEVELOPER SHALL SUBMIT A COST LIST ALONG WITH AN AFFIDAVIT FOR THE WATER SYSTEM PRIOR TO ACCEPTANCE.
29. CONTRACTOR SHALL SUBMIT ONE (1) SET OF RECORD DRAWINGS VIA A CONSULTANT PRIOR TO ACCEPTANCE OF THE WATER SYSTEM. AN ELECTRONIC IMAGE FILE IN PDF FORMAT AT FULL PAGE SIZE (24"x36") SHALL BE PROVIDED TO THE DWS FOR ALL PROJECTS.

REVISION 6/8/2018

CHLORINATION OF WATER SYSTEMS

1. WATER MAINS AND APPURTENANCES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. ALL PROCEDURES AND MATERIALS (LIQUID CHLORINE OR CALCIUM HYPOCHLORITE) USED FOR THE CHLORINATION OF THE PROJECT SHALL CONFORM TO AWWA REQUIREMENTS.
2. PRIOR TO CHLORINATION, THE PROJECT PIPELINES SHALL BE THOROUGHLY CLEANED. CLEANING OF LINES 8" AND LARGER SHALL BE BY PIGGING USING FOAM PIGS. SMALLER LINES CAN BE FLUSHED IN ACCORDANCE WITH AWWA REQUIREMENTS IF ADEQUATE WATER SUPPLY IS PROVIDED, OTHERWISE BY PIGGING. THE CONTRACTOR SHALL SUBMIT HIS PLAN FOR PIPELINE CLEANING, INCLUDING FITTING REQUIREMENTS FOR PIGGING, FOR APPROVAL PRIOR TO PROCEEDING.
3. THE INTERIOR SURFACES OF THE PROJECT SHALL BE EXPOSED TO THE CHLORINATING SOLUTION FOR A MINIMUM OF 24 HOURS AND THE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.
4. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE PROJECT TO BE CHLORINATED.
5. AT THE END OF THE 24-HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A CHLORINE RESIDUAL OF AT LEAST 10 PPM. MEASUREMENTS FOR CHLORINE RESIDUAL TESTS SHALL BE BY A TRAINED, QUALIFIED TESTER APPROVED BY THE DIRECTOR.
6. SHOULD THE RESULTS INDICATE ADEQUATE CHLORINATION, THE PROJECT SHALL BE THOROUGHLY FLUSHED AND FILLED WITH POTABLE WATER FROM THE EXISTING POTABLE WATER SYSTEM AND AGAIN TESTED FOR CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE TEST RESULTS INDICATE THAT THE WATER IN THE PROJECT HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.
7. FOLLOWING THE ACCEPTABLE FLUSHING OF THE HIGH CONCENTRATION CHLORINE SOLUTION, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART FROM REPRESENTATIVE POINTS IN THE PROJECT AND SUBJECTED TO MICROBIOLOGICAL TESTS PERFORMED BY A CERTIFIED LABORATORY APPROVED BY THE DEPARTMENT OF HEALTH. AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED AND TESTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE SET FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. POSITIVE RESULTS WILL NOT BE ACCEPTABLE AND THE ENTIRE CHLORINATION PROCESS WILL BE REPEATED.
8. ANALYSIS FOR RESIDUAL CHLORINE SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
9. MICROBIOLOGICAL TESTS SHALL BE MADE IN ACCORDANCE WITH "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER", AMERICAN PUBLIC HEALTH ASSOCIATION, CURRENT EDITION.
10. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

REVISED: 12/1/07

GENERAL NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE BASED ON AVAILABLE "AS-BUILT" OF RECORD CONSTRUCTION PLANS, ARE APPROXIMATE ONLY, AND THEIR ACCURACY IS NOT GUARANTEED.
2. EXISTING CONTOURS AND FEATURES ARE BASED ON TOPOGRAPHIC MAP FOR WAIEHU HEIGHTS WELL 1 REPLACEMENT PREPARED BY FUKUMOTO ENGINEERING, INC. DATED SEPTEMBER 13, 2018.
3. ELEVATIONS SHOWN ARE BASED ON U.S.G.S. BENCH MARK, A BRASS DISK (U-6) LOCATED ALONG WEST SIDE OF MARKET STREET AT THE SOUTH END OF THE WEST STEEL RAIL OF THE BRIDGE OVER WAILUKU RIVER (IAO STREAM). CEMENTED IN A DRILL HOLE ON THE TOP OF A 20 x 36-INCH BALUSTRADE, ABOUT 2-1/2 FEET HIGHER THAN THE SIDEWALK. EL.=249.10 FEET ABOVE MEAN SEA LEVEL.
4. VERIFY EXISTING GRADES BEFORE PROCEEDING WITH GRADING WORK. SHOULD ANY DISCREPANCIES BE DISCOVERED IN THE EXISTING GRADES OR DIMENSIONS GIVEN ON THE PLANS, NOTIFY THE ENGINEER BEFORE PROCEEDING ANY FURTHER WITH THE WORK. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY COST INVOLVED IN THE CORRECTION OF CONSTRUCTION PLACED DUE TO SUCH DISCREPANCIES.
5. DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES WITHIN PROJECT LIMITS BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR DAMAGES DUE TO FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
6. REPORT ANY INCONSISTENCIES WITH THE PROPOSED PLAN TO THE OWNER'S REPRESENTATIVE AND DEMOLISH, REMOVE, OR RELOCATE ALL EXISTING UTILITIES, IMPROVEMENTS, ETC. INCONSISTENT WITH THE PROPOSED PLAN AS DIRECTED BY THE OWNER'S REPRESENTATIVE AND AT THE CONTRACTOR'S EXPENSE.
7. THE LATEST REVISIONS OF THE "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION," SEPTEMBER 1984 AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," 2005 IS INCLUDED AS PART OF THESE CONSTRUCTION PLANS. OBTAIN THE LATEST REVISIONS BEFORE COMMENCING CONSTRUCTION.
8. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS AND MOUNDS, OR REMAINS SUCH AS ARTIFACTS, BURIALS, CONCENTRATION OF CHARCOAL OR SHELLS BE ENCOUNTERED DURING CONSTRUCTION WORK, CEASE WORK IN THE IMMEDIATE VICINITY OF THE FIND, AND PROTECT THE FIND FROM FURTHER DAMAGE. THE CONTRACTOR MUST IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND MITIGATION MEASURES, IF NECESSARY.
9. PURSUANT TO CHAPTER 6E OF THE HAWAII REVISED STATUTES, IN THE EVENT THAT ANY HUMAN SKELETAL REMAINS ARE INADVERTENTLY DISCOVERED DURING CONSTRUCTION, DO NOT MOVE THE REMAINS, CEASE ANY ACTIVITY IN THE IMMEDIATE AREA THAT COULD DAMAGE THE REMAINS OR THE POTENTIAL HISTORIC SITE, AND CONTACT THE DEPARTMENT OF LAND AND NATURAL RESOURCES' HISTORIC PRESERVATION DIVISION (PH: 243-1285 OR 243-4640), THE APPROPRIATE MEDICAL EXAMINER OR CORONER, AND THE POLICE DEPARTMENT (TELEPHONE: 244-6400).

GRADING NOTES

1. FINISH SPOT ELEVATIONS AND FINISH CONTOURS, AS SHOWN ON PLAN REPRESENTS FINISH GRADING. THE SITE WORK CONTRACTOR SHALL COORDINATE WITH THE LANDSCAPE CONTRACTOR THE LOCATION AND DEPTH OF TOPSOIL THE FINISH SUBGRADE SHALL REFLECT THE FINISH GRADE LESS SPECIFIED TOPSOIL DEPTH.
2. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE MEASURES OF THE BEST MANAGEMENT PRACTICE (BMP) PLAN. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN THE PUBLIC HEALTH REGULATIONS, STATE DEPARTMENT OF HEALTH, ON WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS.
3. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS, AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE STATE DEPARTMENT OF HEALTH SHALL BE PAYABLE BY THE CONTRACTOR.
4. THE CONTRACTOR, AT HIS EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE OF DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
5. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE SITE. THE CONTRACTOR SHALL INFORM THE ENGINEER OF THE LOCATION OF DISPOSAL SITES. THE DISPOSAL SITE MUST ALSO FULFILL REQUIREMENTS OF THE GRADING ORDINANCES.
6. THE CONTRACTOR SHALL NOT DEMOLISH OR CLEAR ANY STRUCTURE, SITE OR VACANT LOT WITHOUT FIRST ASCERTAINING THE PRESENCE OR ABSENCE OF RODENTS WHICH MAY ENDANGER THE PUBLIC HEALTH BY DISPERSAL FROM SUCH PREMISES. SHOULD SUCH INSPECTION REVEAL THE PRESENCE OF SUCH RODENTS, THE CONTRACTOR SHALL ERADICATE SUCH RODENTS BEFORE DEMOLISHING OR CLEARING SAID STRUCTURE, SITE OR VACANT LOT.
7. THE FOLLOWING MEASURES SHALL BE TAKEN TO CONTROL DUST AND EROSION DURING THE SITE DEVELOPMENT PERIOD:
   A. MINIMIZE TIME OF CONSTRUCTION.
   B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   C. CONSTRUCT REMAINING PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE.
   D. USE TEMPORARY AREA SPRINKLERS IN NON-ACTIVE CONSTRUCTION AREAS WHEN GROUND COVER IS REMOVED.
   E. STATION WATER TRUCK ON-SITE DURING CONSTRUCTION PERIOD TO PROVIDE FOR IMMEDIATE SPRINKLING, AS NEEDED, IN ACTIVE CONSTRUCTION AREAS (WEEKENDS AND HOLIDAYS INCLUDED).
   F. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION. IMPLEMENT AND MAINTAIN THE MEASURES OF THE BMP PLAN.
   G. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   H. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.

COMPACTION REQUIREMENTS

1. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:
   A. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 600 SQUARE YARDS PER LIFT;
   B. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;
   C. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS PER LIFT OF MATERIAL; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER PROJECT;
   D. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE; THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;
   E. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.
2. CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.
3. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE COUNTY OF ANY TESTING FAILURES AND CORRECT EACH FAILURE PRIOR TO PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION.

FUKUMOTO ENGINEERING, INC.
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Website: www.femaui.com

Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY
DWS JOB NO. 20-01
TMK: (2) 4-6-019:003
LAHAINA, MAUI, HAWAII

CONSTRUCTION NOTES

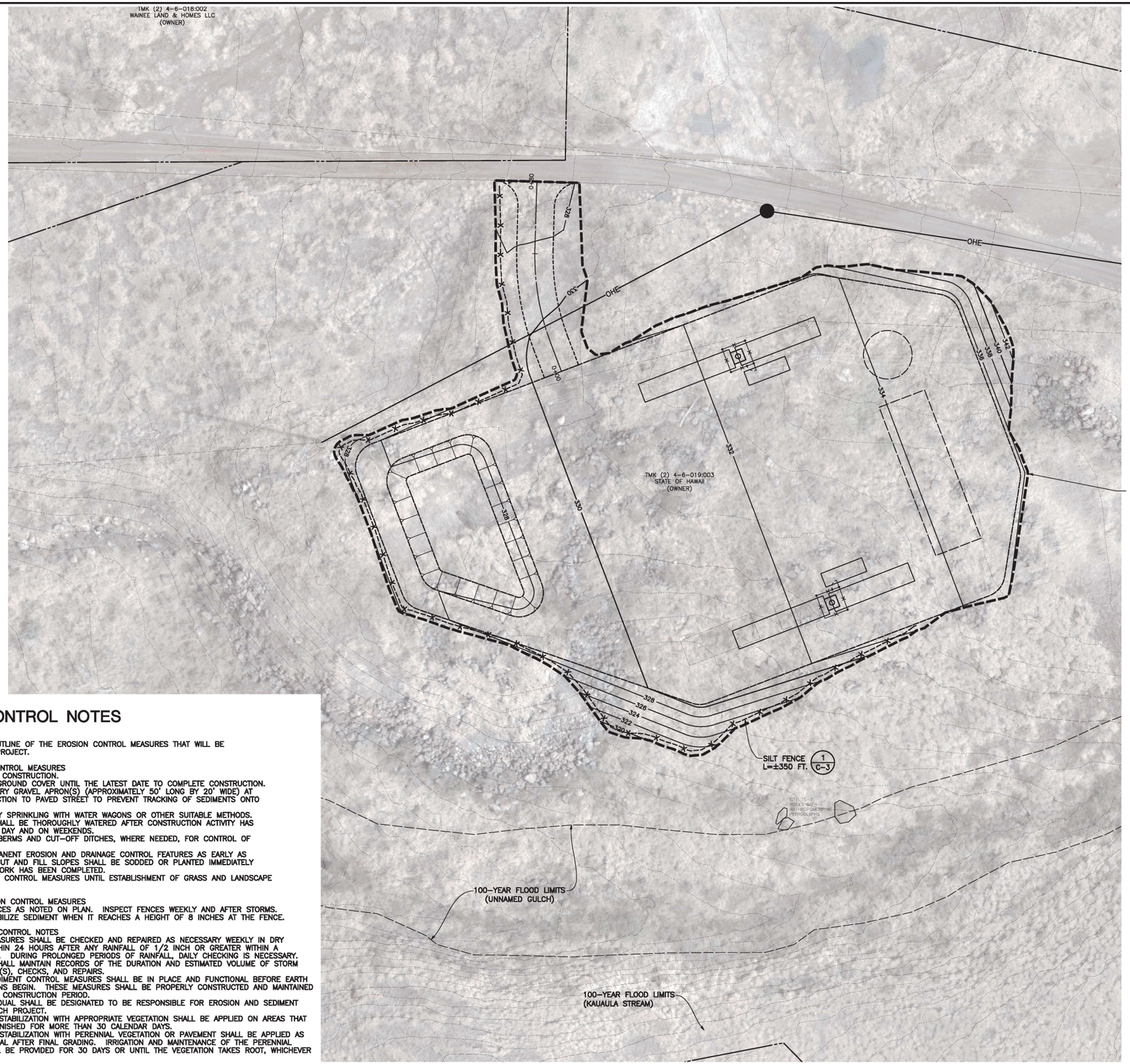
SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2026

DESIGNED BY:	S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 2, 2025
FILE NO:	COM95

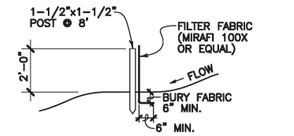
SHEET C-2
3 OF 8



EROSION CONTROL NOTES

THE FOLLOWING IS AN OUTLINE OF THE EROSION CONTROL MEASURES THAT WILL BE IMPLEMENTED FOR THIS PROJECT.

1. GENERAL EROSION CONTROL MEASURES
   - A. MINIMIZE TIME OF CONSTRUCTION.
   - B. RETAIN EXISTING GROUND COVER UNTIL THE LATEST DATE TO COMPLETE CONSTRUCTION.
   - C. PROVIDE TEMPORARY GRAVEL APRON(S) (APPROXIMATELY 50' LONG BY 20' WIDE) AT POINT OF CONNECTION TO PAVED STREET TO PREVENT TRACKING OF SEDIMENTS ONTO STREET.
   - D. CONTROL DUST BY SPRINKLING WITH WATER WAGONS OR OTHER SUITABLE METHODS. GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND ON WEEKENDS.
   - E. USE TEMPORARY BERMS AND CUT-OFF DITCHES, WHERE NEEDED, FOR CONTROL OF EROSION.
   - F. CONSTRUCT PERMANENT EROSION AND DRAINAGE CONTROL FEATURES AS EARLY AS POSSIBLE. ALL CUT AND FILL SLOPES SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED.
   - G. MAINTAIN EROSION CONTROL MEASURES UNTIL ESTABLISHMENT OF GRASS AND LANDSCAPE PLANTING.
2. SITE-SPECIFIC EROSION CONTROL MEASURES
   - A. INSTALL SILT FENCES AS NOTED ON PLAN. INSPECT FENCES WEEKLY AND AFTER STORMS. REMOVE AND STABILIZE SEDIMENT WHEN IT REACHES A HEIGHT OF 8 INCHES AT THE FENCE.
3. ADDITIONAL EROSION CONTROL NOTES
   - A. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 1/2 INCH OR GREATER WITHIN A 24-HOUR PERIOD. DURING PROLONGED PERIODS OF RAINFALL, DAILY CHECKING IS NECESSARY. THE PERMITTEE SHALL MAINTAIN RECORDS OF THE DURATION AND ESTIMATED VOLUME OF STORM WATER DISCHARGE(S), CHECKS, AND REPAIRS.
   - B. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
   - C. A SPECIFIC INDIVIDUAL SHALL BE DESIGNATED TO BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS ON EACH PROJECT.
   - D. TEMPORARY SOIL STABILIZATION WITH APPROPRIATE VEGETATION SHALL BE APPLIED ON AREAS THAT WILL REMAIN UNFINISHED FOR MORE THAN 30 CALENDAR DAYS.
   - E. PERMANENT SOIL STABILIZATION WITH PERENNIAL VEGETATION OR PAVEMENT SHALL BE APPLIED AS SOON AS PRACTICAL AFTER FINAL GRADING. IRRIGATION AND MAINTENANCE OF THE PERENNIAL VEGETATION SHALL BE PROVIDED FOR 30 DAYS OR UNTIL THE VEGETATION TAKES ROOT, WHICHEVER IS SHORTER.



1 / C-3 **SILT FENCE SECTION**
NOT TO SCALE

EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN
SCALE: 1" = 20'

SCALE IN FEET
0 10 20 40 60

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LAHAINA, MAUI, HAWAII

EROSION CONTROL BEST MANAGEMENT PRACTICES PLAN

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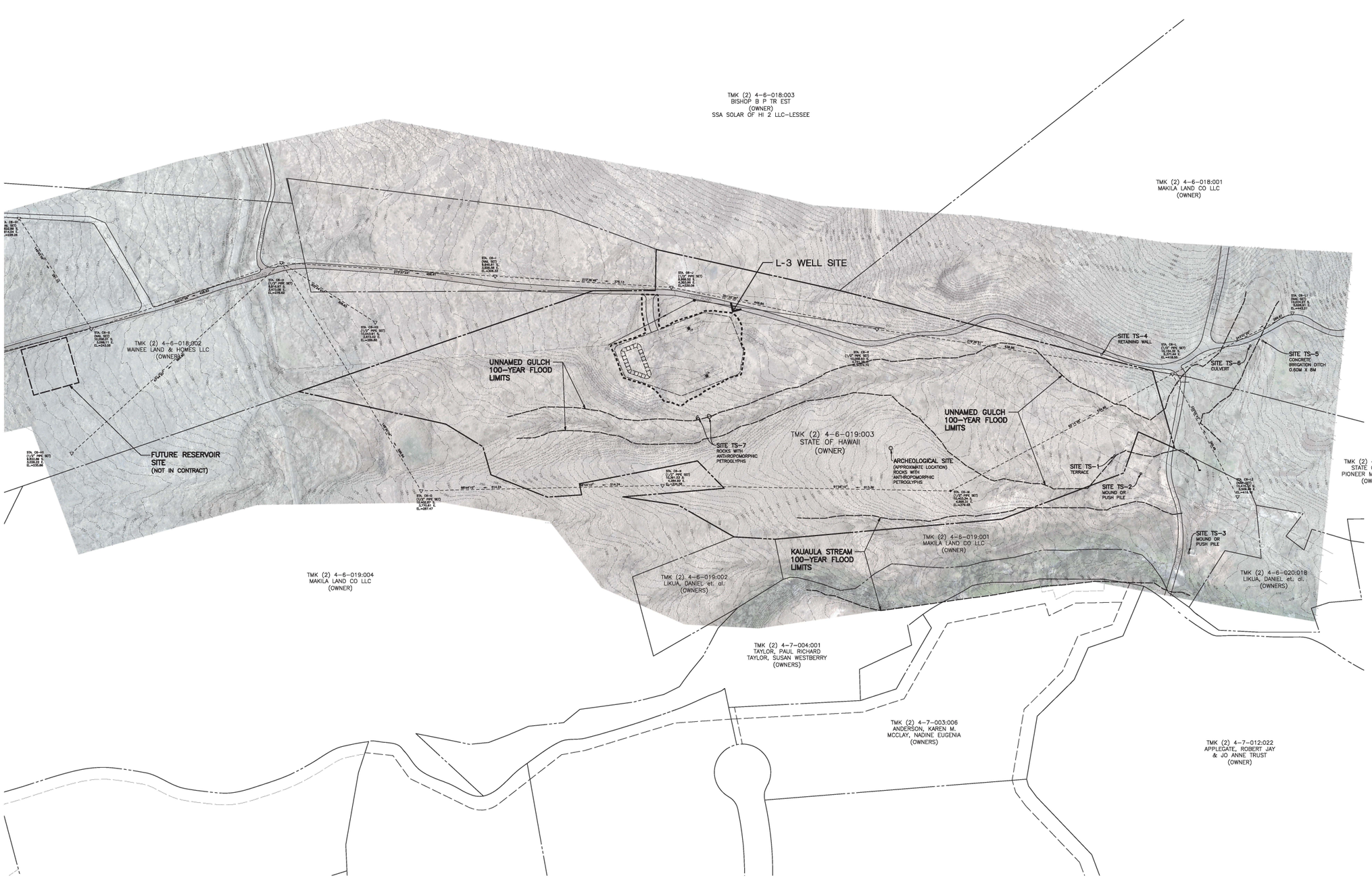

SITE PLAN
SCALE: 1" = 100'

SCALE IN FEET
0 50 100 200 300

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SITE PLAN

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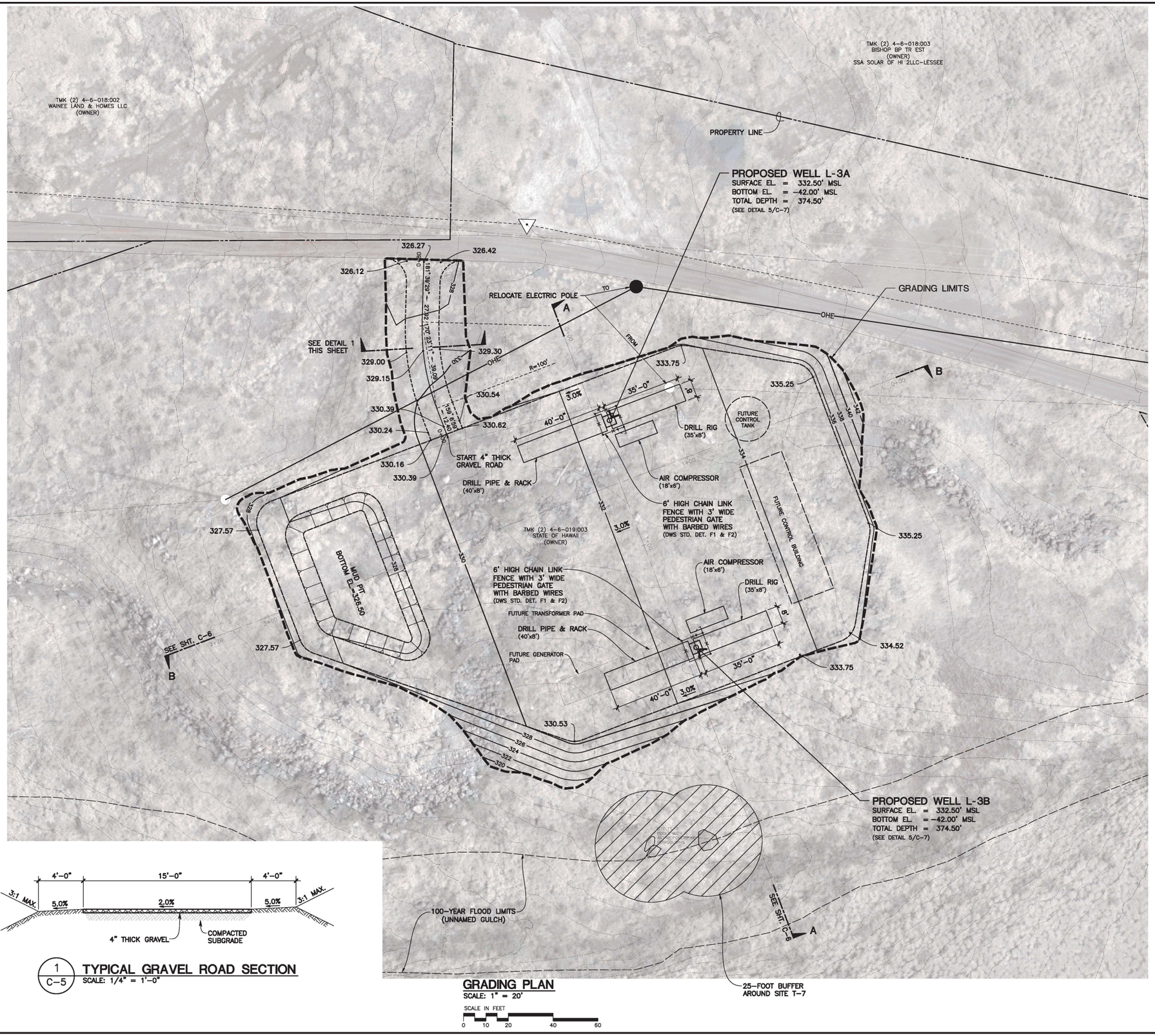

1 / C-5 **TYPICAL GRAVEL ROAD SECTION**
SCALE: 1/4" = 1'-0"

GRADING PLAN
SCALE: 1" = 20'

SCALE IN FEET
0 10 20 40 60

NOTES:
1. LOCATIONS OF EQUIPMENT (SUCH AS DRILL RIG, DRILL PIPE AND RACK, AND AIR COMPRESSOR) AND TEMPORARY FACILITIES (SUCH AS MUD PITS) SHOWN ON PLAN ARE SUGGESTED LOCATIONS ONLY. CONTRACTOR SHALL DETERMINE SIZE AND LOCATIONS OF EQUIPMENT AND TEMPORARY FACILITIES.

LEGEND:

4" GRAVEL ROAD

EARTHWORK QUANTITIES:

EXCAVATION = 2,000 CU. YDS.
EMBANKMENT = 2,000 CU. YDS.
AREA OF GRADING = 1.00 ACRE

EARTHWORK QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES.

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GRADING PLAN

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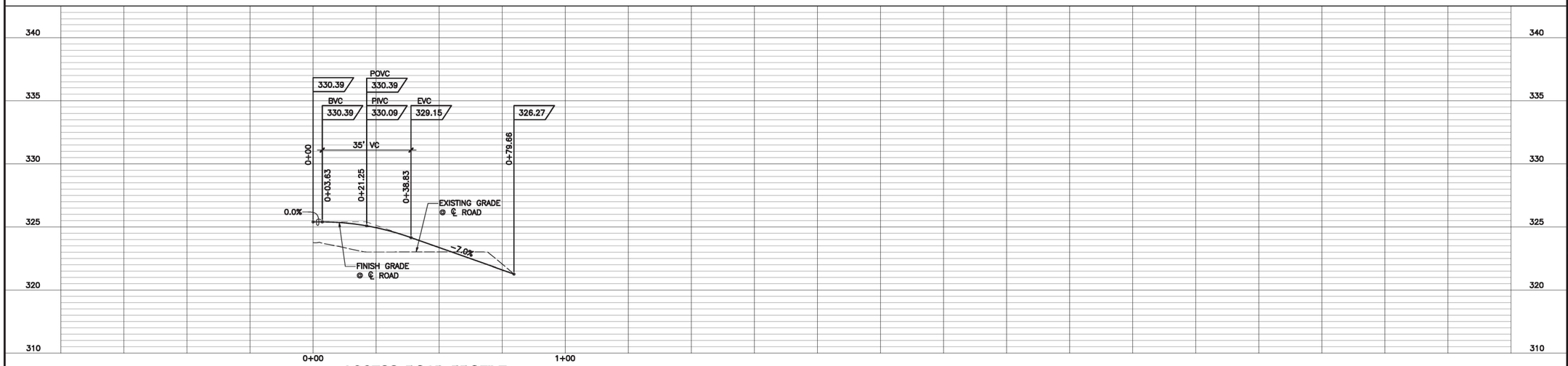
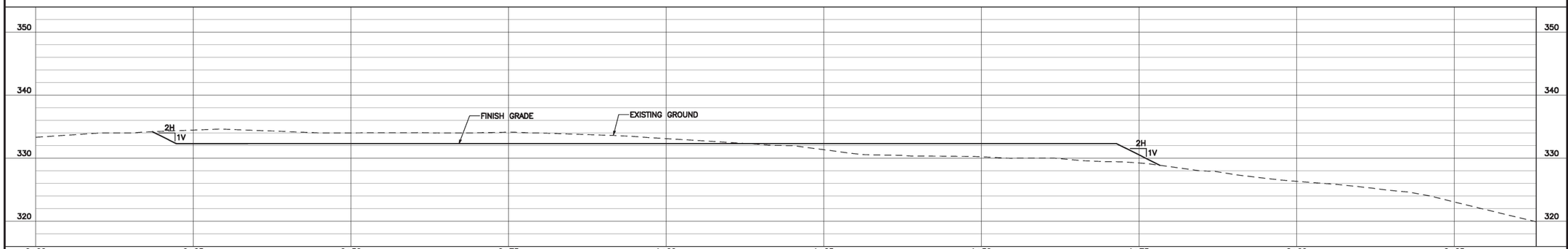


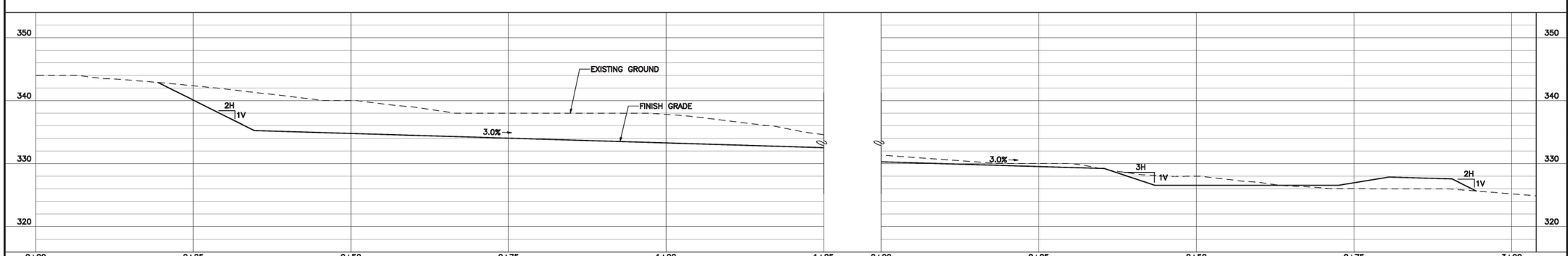
ACCESS ROAD PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 4'



SITE SECTION A-A

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



SITE SECTION B-B

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

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Prepared for:

Department of Water Supply
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

LAUNIUPOKO AQUIFER WELL DEVELOPMENT
SITE L-3 EXPLORATORY

DWS JOB NO. 20-01
TMK: (2) 4-6-019:003
LAHAINA, MAUI, HAWAII

ROAD PROFILE AND SITE SECTIONS

SEAN K. OGATA
LICENSED PROFESSIONAL ENGINEER
No. 16030-C
HAWAII, U.S.A.

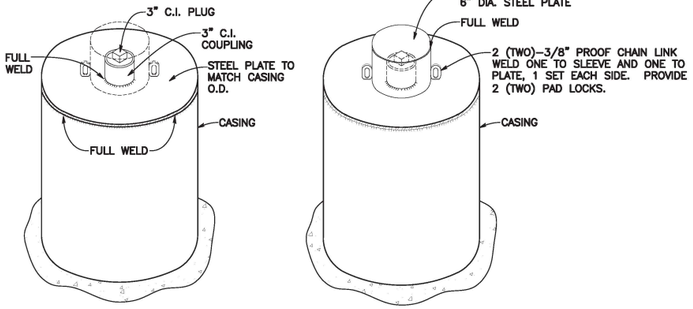
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION, AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR 16-115-2.

LICENSE EXPIRES: 04/30/2026

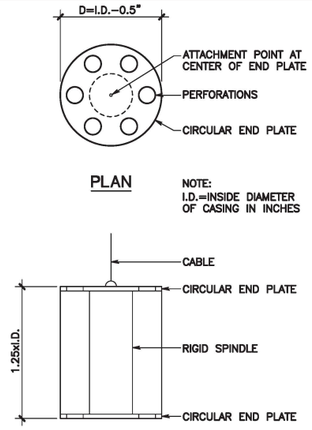
DESIGNED BY:	S.O.
DRAWN BY:	S.O., N.M.
CHECKED BY:	R.F.
DATE:	JUNE 2, 2025
FILE NO:	COM95

SHEET C-6

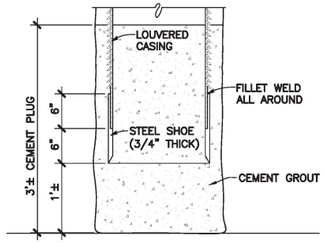
7 OF 8



1 / C-7 **WELL CAPPING DETAIL**
NOT TO SCALE



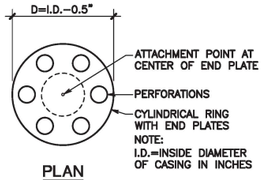
3 / C-7 **PLUMBNESS TEST PLUMMET**
NOT TO SCALE

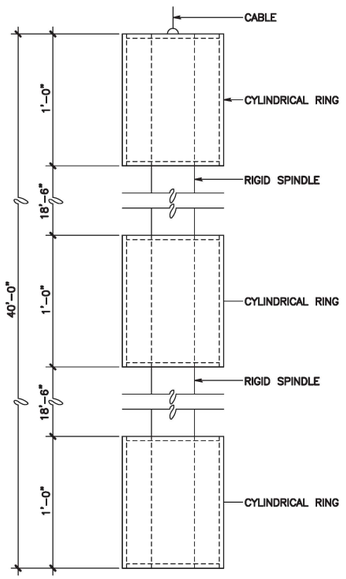


2 / C-7 **STEEL SHOE WITH CEMENT PLUG**
SCALE: 1" = 1'-0"

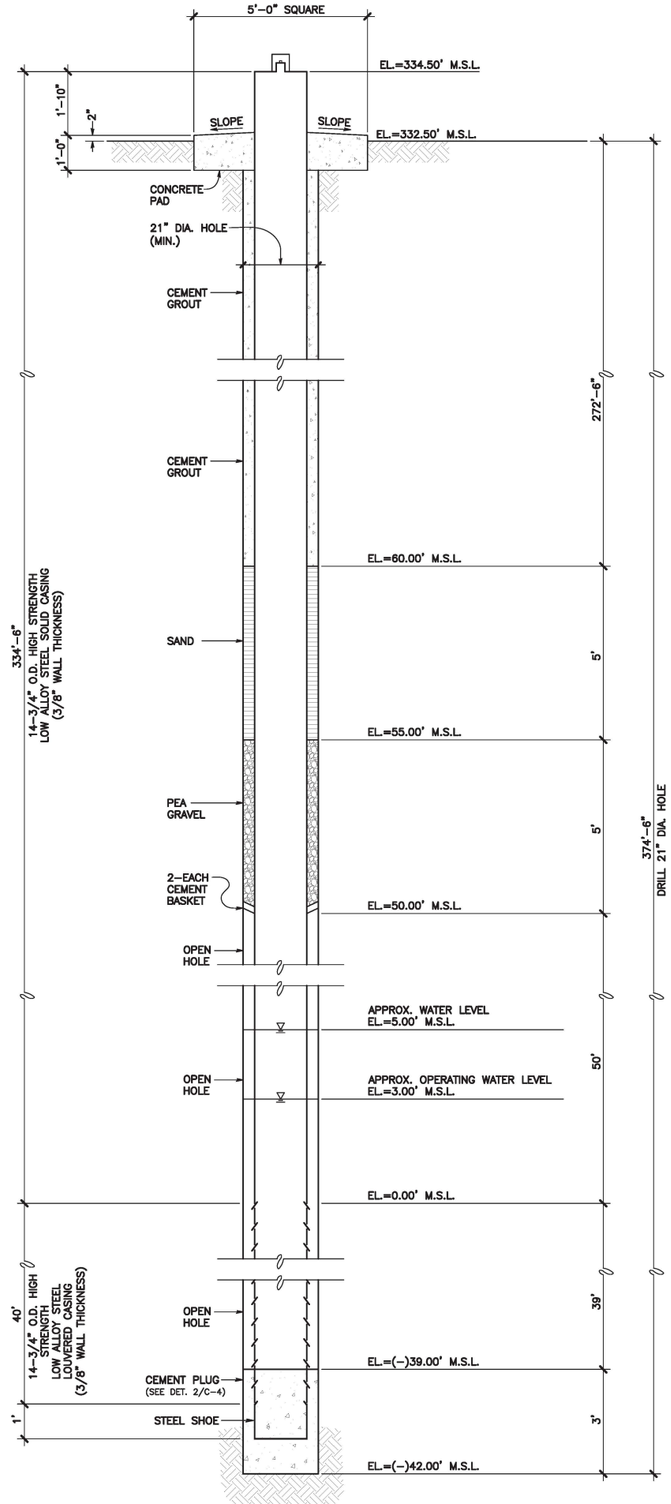
SEQUENCE OF WORK

1. DRILL 12-INCH PILOT HOLE. MEASURE WATER LEVELS WHEN AQUIFER IS ENCOUNTERED. CLEAN AND VIDEO LOG PILOT HOLE. CONTINUOUSLY CHECK PLUMBNESS WHILE DRILLING HOLE.
2. REAM PILOT HOLE AND BAIL TO REMOVE SEDIMENT TO BOTTOM OF REAMED HOLE.
3. DETERMINE AQUIFER HEAD AND SALINITY.
4. RUN PRELIMINARY PLUMBNESS AND ALIGNMENT TEST OF COMPLETED DRILLED HOLE AS DEEMED NECESSARY TO ASSURE HOLE ALIGNMENT AND PLUMBNESS.
5. RUN VIDEO LOG AFTER WELL WATER HAS CLEARED.
6. INSTALL WELL CASING AND DOUBLE CEMENT BASKETS.
7. SET WELL CASING TO FINAL DEPTH AND POUR CEMENT PLUG. RUN PRELIMINARY PLUMBNESS AND ALIGNMENT TEST OF CASED HOLE AS DEEMED NECESSARY.
8. INSTALL TEST PUMP OR VIDEO CAMERA.
9. FILL ANNULAR SPACE WITH AGGREGATE, SAND AND CEMENT GROUT. OPERATE TEST PUMP OR VIDEO CAMERA TO MONITOR OPERATIONS WHILE FILLING THE ANNULAR SPACE.
10. MEASURE STATIC WATER LEVEL.
11. DEVELOP THE WELL BY PUMP SURGING THE WELL.
12. CONDUCT STEP-DRAWDOWN TEST AS DIRECTED BY DWS.
13. CONDUCT CONSTANT-RATE (96 HOURS) TEST AS DIRECTED BY DWS.
14. OBTAIN WATER QUALITY SAMPLES DURING THE CONSTANT-RATE PUMP TEST.
15. RUN PLUMBNESS AND ALIGNMENT TEST OF THE CASED WELL IN THE PRESENCE OF DWS.
16. CAP WELL, CLEAN UP, AND DEMOBILIZE. ESTABLISH A PERMANENT BENCH. MARK ADJACENT TO THE WELL AND DETERMINE THE TOP OF CASING ELEVATION. BENCH MARK ELEVATION AND TOP OF CASING ELEVATION SHALL BE ESTABLISHED BY A LICENSED PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF HAWAII.





4 / C-7 **ALIGNMENT TEST DUMMY**
NOT TO SCALE



5 / C-7 **WELL SECTION**
SCALE: 1/2" = 1'-0

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WELL SECTION AND DETAILS

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SHEET **C-7**
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