

# KAUA'I COUNTY HOUSING AGENCY

ADAM ROVERSI, DIRECTOR



DEREK S.K. KAWAKAMI, MAYOR  
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September 23, 2024

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

Subject: Publication of the Draft Environmental Assessment for the Proposed Lima Ola Subdivision  
Off-Site Water System Improvements  
'Ele'ele, Kaua'i  
TMK (4) 2-1-001: 049 & 046

With this letter, the Kaua'i County Housing Agency hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the subject project. The DEA-AFONSI has been prepared pursuant to Chapter 343, Hawaii Revised Statutes, and Chapter 11-200.1, Hawai'i Administrative Rules.

Please publish the DEA-AFONSI in the next available issue of the State Environmental Notice. In addition to this letter, we are submitting the electronic Environmental Review Program Publication Form, and all required attachments.

If there are any questions, please contact me at (808) 241-4444.

Sincerely,

Adam P. Roversi  
Housing Director



**From:** [webmaster@hawaii.gov](mailto:webmaster@hawaii.gov)  
**To:** [DBEDT OPSD Environmental Review Program](#)  
**Subject:** New online submission for The Environmental Notice  
**Date:** Monday, September 30, 2024 2:15:35 PM

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**Action Name**

Lima Ola Subdivision Off-Site Water System Improvements

**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

**Judicial district**

Kōloa, Kaua'i

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

(4) 2-1-001:049; (4) 2-1-001: 046

**Action type**

Agency

**Other required permits and approvals**

HRS 6E Compliance, County Grubbing and Grading Permit, County Building Permit, NEPA Compliance, 24 CFR Part 58 Compliance

**Proposing/determining agency**

Kaua'i County Housing Agency

**Agency contact name**

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**Is there a consultant for this action?**

Yes

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**Consultant contact name**

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**Action summary**

The proposed project includes the design and construction of one (1) 0.3 million gallon County municipal water storage tank that would be located adjacent to the existing 0.2 million gallon County municipal water storage tank within TMK parcel (4) 2-1-001: 049. The proposed project also includes the upsizing of two existing booster pumps that serve the two existing 0.4 million gallon water storage tanks, which are located approximately 2,200 feet southwest of the existing 0.2 million gallon water tank, along Kaumuali'i Highway, within TMK parcel (4) 2-1-001: 046. The booster pumps are planned to be upsized from 120 gallons per minute to 350 gallons per minute. The planned project includes required potable water service upgrades as part of the County of Kaua'i Lima Ola affordable housing subdivision, which is located southwest of the project site.

**Reasons supporting determination**

See Section 3: Environmental Impact Significance Criteria Analysis in the DEA.

**Attached documents (signed agency letter & EA/EIS)**

- [Lima-Ola-Water-System-Improvements-DEA.pdf](#)
- [Signed-DEA-Publication-Letter.pdf](#)

**Action location map**

- [Lima-Ola-Water-Tank-Site.kmz\\_.zip](#)

**Authorized individual**

Max Solmssen

**Authorization**

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

***Draft Environmental Assessment***  
for the  
Lima Ola Subdivision Off-Site Water System  
Improvements  
*‘Ele‘ele, Kaua‘i, Hawai‘i*

***Prepared for:***  
*The County of Kauai Housing Agency*

*October 2024*

*Prepared by:*



*[www.kaimanaenv.com](http://www.kaimanaenv.com)*

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- Appendix B: Archaeological Report
- Appendix C: Early Consultation Letters and Responses
- Appendix D: Lima Ola Water Master Plan
- Appendix E: HUD Environmental Assessment

## ***List of Acronyms***

BMPs	best management practices
CDP	Census Designated Place
DEA	Draft Environmental Assessment
DOH	State of Hawai'i Department of Health
DLNR	State of Hawai'i Department of Land and Natural Resources
DOFAW	State of Hawai'i DLNR Division of Forestry and Wildlife
FEMA	Federal Emergency Management Agency
FONSI	finding of no significant impact
GHG	greenhouse gases
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
IPCC	Intergovernmental Panel on Climate Change
NOAA	National Oceanic and Atmospheric Administration
SAAQS	State Ambient Air Quality Standards
SHPD	State of Hawai'i DLNR State Historic Preservation Division
SMA	Special Management Area
TMK	Tax Map Key
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service



# 1 Introduction

This draft Environmental Assessment (DEA) was prepared in accordance with Hawai'i Revised Statutes (HRS) 343, and its implementing regulations; Hawai'i Administrative Rules (HAR) 11-200.1. This DEA also complies with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) §4321 et seq.) as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations (CFR) Parts 1500- 1508). NEPA compliance is required for this project due to potential federal funding from the United States Department of Housing and Urban Development (HUD). An EA Determinations and Compliance Findings for HUD -assisted Projects in compliance with 24 CFR Part 58 is included as Appendix E of this EA.

## 1.1 Project Information Summary

<b>Project Name:</b>	Lima Ola Subdivision Off-Site Water System Improvements
<b>Address:</b>	None
<b>Tax Map Key (TMK):</b>	(4) 2-1-001: 049 & 046
<b>Project Area Size</b>	Approximately 22,000 Square feet
<b>Document Type</b>	Draft Environmental Assessment
<b>Proposing / Approving Agency</b>	County of Kaua'i Housing Agency Contact: Adam Roversi, Director 4444 Rice Street, Suite 330 Līhu'e HI 96766 aroversi@kauai.gov (808) 241-4440
<b>Consultant:</b>	Kaimana Environmental Solutions LLC Contact: Max Solmssen, Environmental Planner PO Box 11890 Honolulu, HI 96828 max@kaimanaenv.com (808) 341-3546
<b>HRS 343 Trigger:</b>	Use of County Lands or Funds
<b>State Land Use Zoning:</b>	Agricultural
<b>County Zoning:</b>	Agricultural
<b>Flood Zone Designation:</b>	Zone X – Determined to be outside the 500-year flood plain

**Special Management Area (SMA):** Outside SMA

**Anticipated Determination:** Finding of No Significant Impact (FONSI)

**Permits/Approvals:** HRS 343 Compliance  
HRS 6E Compliance  
County Grubbing and Grading Permit  
County Building Permit  
NEPA Compliance  
24 CFR Part 58 Compliance

**Estimated Project Cost** \$5,000,000.00

**Estimated Project  
Construction Duration  
Schedule** 1 Year

## **1.2 Location and Project Description**

The project site is located on the southwest side of the Island of Kaua'i, northeast of the town of 'Ele'ele (Figure 1), and includes two Kaua'i County-owned parcels of land currently developed for municipal water tank pumping and storage. One (1) existing 0.2 million gallon municipal water storage tank is located within Tax Map Key (TMK) parcel (4) 2-1-001: 049, and two (2) 0.4 million gallon county municipal water storage tanks are located at TMK parcel (4) 2-1-001: 046 (project site). The project site is bordered to the north by Kaumuali'i Highway, across which is open land that descends to Hanapēpē Valley. The project site is bordered to the west by Kapa Dam, and to the south and east by commercial agricultural coffee fields operated by Kaua'i Coffee Company (Figure 2).

The proposed project includes the design and construction of one (1) 0.3 million gallon County municipal water storage tank that would be located adjacent to the existing 0.2 million gallon County municipal water storage tank within TMK parcel (4) 2-1-001: 049. The proposed project also includes the upsizing of two existing booster pumps that serve the two existing 0.4 million gallon water storage tanks, which are located approximately 2,200 feet southwest of the existing 0.2 million gallon water tank, along Kaumuali'i Highway, within TMK parcel (4) 2-1-001: 046. The booster pumps are planned to be upsized from 120 gallons per minute to 350 gallons per minute. The planned project includes required potable water service upgrades as part of the County of Kaua'i Lima Ola affordable housing subdivision, which is located southwest of the project site.

The Kaua'i County Housing Agency Lima Ola Workforce Housing Development is in progress and planned to consist of approximately 550 new affordable housing units comprised of both single-family and multi-family homes that will be both for rent and for sale. The development will also include open space. The Lima Ola Work Force Housing Development Final Environmental Assessment-Finding of No Significant Impact (FEA-FONSI) completed by Community Planning and Engineering in June 2016 provides the project details, as well as the projected environmental impacts from the development, as well as recommended mitigation measures (CPE, 2016).

## **1.3 Purpose and Need for the Proposed Action**

The purpose of the proposed project is to provide additional water storage capacity to support the need generated by the County of Kaua'i Lima Ola affordable housing subdivision.

**Figure 1: Project General Location Map**



Figure 2: Project Location Detail Map



## 1.4 Environmental Assessment Distribution and Early Consultation

Table 1 includes the Kaua'i County, State and Federal agencies and utility providers that were engaged for early consultation as part of the environmental review process. Table 1 also includes a distribution list of those that received the DEA publication notice, and will receive notice of subsequent decision document publications for this project. All early consultation correspondence is included in Appendix C of this DEA.

**Table 1: Environmental Assessment Distribution and Early Consultation**

Agency/Group Affiliation	Agency/Group	Early Consultation Notice Sent	Early Consultation Response Received	DEA Publication Notice Sent
Federal Agencies	Department of the Interior United States Fish and Wildlife Service	X	X	X
State of Hawai'i Agencies	Office of Planning	X	X	X
	DLNR Division of Forestry and Wildlife	X	X	X
	DLNR Land Division	X	X	X
	DLNR Engineering Division	X	X	X
	DLNR State Historic Preservation Division	X		X
	Office of Hawaiian Affairs	X		X
	Department of Transportation-Highways Division	X		X
	Department of Education	X		X

<b>Agency/Group Affiliation</b>	<b>Agency/Group</b>	<b>Early Consultation Notice Sent</b>	<b>Early Consultation Response Received</b>	<b>DEA Publication Notice Sent</b>
County of Kaua'i Agencies	Department of Water	X		X
	Transportation Agency	X	X	X
	Department of Public Works	X	X	X
	County Council	X		X
	Department of Parks and Recreation	X		X
	Planning Department	X		X
	Highways Division	X		X
	Fire Department	X		X
	Police Department	X		X
	Kaua'i Community College			
Utility Companies	Hawaiian Electric Company	X		X
	Hawaiian Telcom	X		X
	Spectrum	X		X

Agency/Group Affiliation	Agency/Group	Early Consultation Notice Sent	Early Consultation Response Received	DEA Publication Notice Sent
	Hawaii Gas	X		X
Utility Companies (cont.)	Kaua'i Island Utility Cooperative	X	X	X
	Puhi Sewer and Water Company / Aqua Engineers	X		X
Libraries/Repositories	Līhu'e Public Library			X

## 1.5 Overview of Alternatives Considered and Description of the Proposed Action

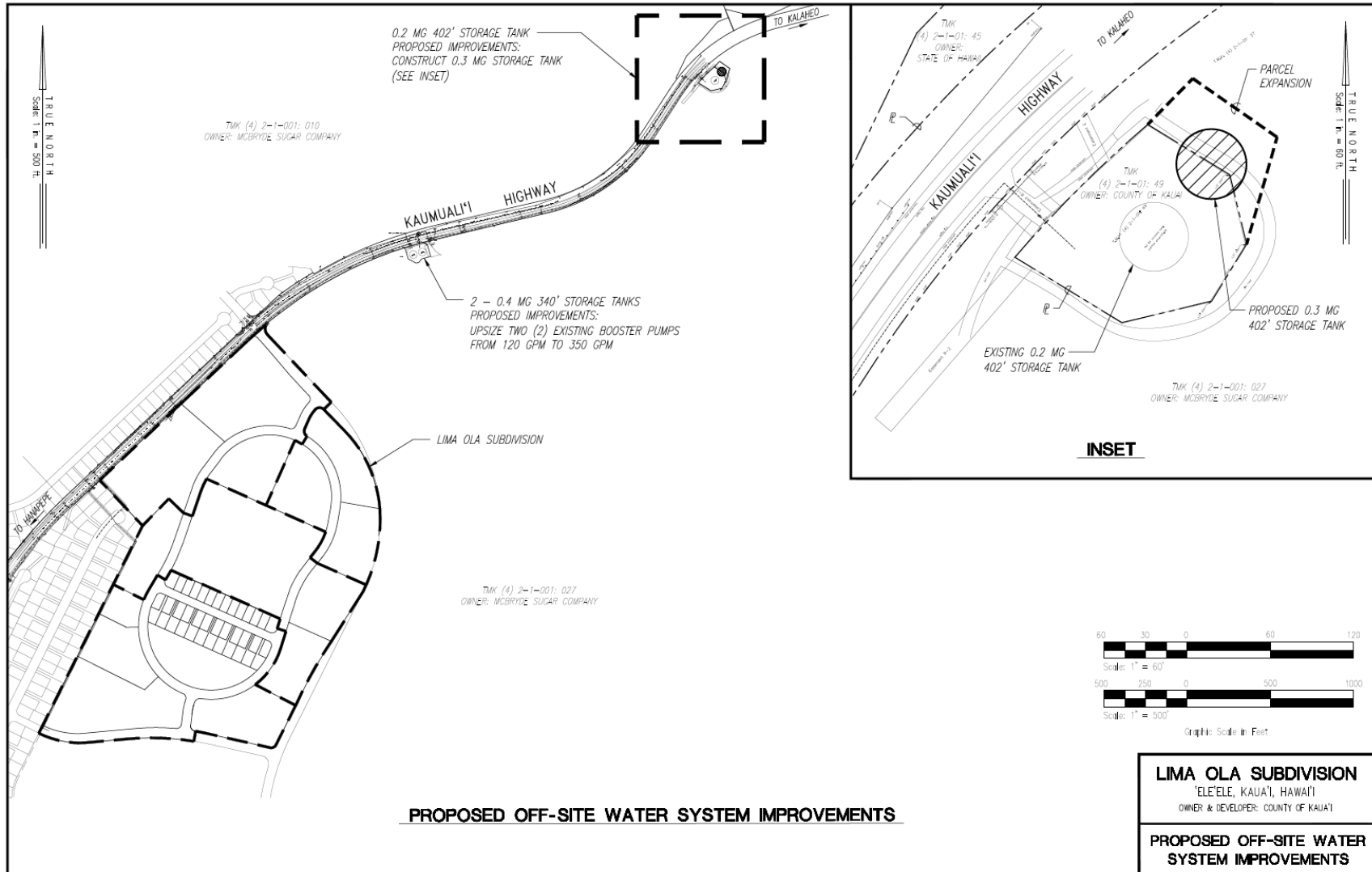
**Alternative 1: No Action** – Under Alternative 1, the proposed water system upgrades would not be implemented. Although the no action alternative does not address the project purpose and need, it was carried forward for analysis in this EA in compliance with the provisions of NEPA.

**Alternative 2: Reduced System Upgrades** – Under Alternative 2, the proposed water system upgrades would include an increase in booster pumping capacity of the existing system, but no development of a new water storage tank. This alternative was eliminated from further consideration since it would not fulfill the project purpose and need to deliver adequate potable water supply storage to the affected community.

**Alternative 3 (Proposed Action)** –The proposed water system upgrades would be implemented as planned; which would include a new water storage tank and and upsizing of two existing booster pumps (Figure 2 & Figure 3). Alternative 3 was carried forward for analysis in this EA since it best fulfills the project purpose and need to provide the required water supply to the affected community.



**Figure 3: Site Plan-The Proposed Action**



## 2 Environmental Setting, Potential Impacts, and Mitigation Measures

The environmental, social, and economic setting of the existing environment and the probable impacts of the Proposed Action, and mitigation measures are described in this section of the EA. Impacts are evaluated as to whether they constitute a “significant effect” on a particular environmental setting. Impacts are described as having No Impact, Significant Adverse Impact, or Beneficial Impact to the environment. The terms “impact” and “effect” are used synonymously in this EA. Impacts may apply to the full range of natural, aesthetic, historic, cultural, and economic resources.

Following the environmental impact analysis for all resource areas in this section, an overall summary evaluation of the environmental impact significance criteria included in HAR 11-200.1-13, including discussion of cumulative impacts, is provided at the end of this section of the EA.

### 2.1 Climate and Air Quality

#### Existing Conditions

The project site is located in a tropical zone along just northeast of 'Ele'ele on the southwest portion Kaua'i. The predominate wind pattern within the vicinity of the project area is northeast trade winds generated from the North Pacific high pressure system northeast of the Hawaiian Islands. Trade winds persist for most of the year, while winds from the south and southwest known as Kona Winds also occur (Fletcher et. al, 2002). Average annual rainfall within the vicinity of the project site is 29.53 inches (Giambelluca et. al, 2013). The average annual temperature within the vicinity of the project site is 80.6 degrees Fahrenheit (Giambelluca et. al, 2014).

Ambient air quality in an area is evaluated based on its compliance with National Ambient Air Quality Standards (NAAQS), as well as State Ambient Air Quality Standards (SAAQS). The criteria pollutants that are measured by federal and state standards include carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, ozone, and particulate matter. Based on data gathered by the State of Hawai'i DOH Clean Air Branch, the entire State of Hawai'i is in compliance (attainment) for all the above criteria pollutants, except on the Big Island during times of naturally occurring impacts from volcanic activity. There is only one DOH air quality measurement station in Niimalu, near Nawiliwili Harbor (DOH, 2024).

#### **2.1.1 Sea Level Rise and Climate Change**

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. The IPCC predicts an approximately 2 meter global sea level rise by the year 2100, as well as increased extreme weather events related to climate change (IPCC, 2022). The Pacific Islands Ocean Observing System is a tool created and managed by the University of Hawai'i, and funded in part by the National Oceanic and Atmospheric Administration (NOAA) that provides updated coastal and ocean information, tools and services. One of the tools provided by the Pacific Islands Ocean Observing System is the State of Hawai'i Sea Level Rise Viewer, which provides

an interactive mapping tool that models coastal inundation based on different sea level rise scenarios. Figure 4 shows the project site during the 3.2 foot (highest) sea level rise scenario. The project site would not be directly affected by the modeled sea level rise scenario (PacIOOS, 2024).

**Figure 4: Sea Level Rise Exposure Scenario**



### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional impact to air quality.

#### Alternative 3: Proposed Action

Dust would be generated on a short-term basis during construction site work. In order to mitigate airborne dust (particulate matter) impacts to the surrounding environment, all construction activities would need to adhere to County of Kaua'i DPW Interim Construction Best Management Practices (BMPs) for Sediment and Erosion Control. BMPs include watering active work areas and unpaved work roads; use of dust fences; establishment of a routine road cleaning and tire washing program; establishment of landscaping or hardened surface early in the construction schedule; and monitoring dust at the project boundary during construction (COK, 2004). With these mitigation measures

in place there would be no significant impact to air quality from the proposed action during construction. Once completed, it is not anticipated that there would be any significant long-term air quality impacts from the operation of the proposed water tank and booster pumps since there would be no significant source of dust or other air emissions during operation of the planned water system improvements.

## **2.2 Geological Resources**

### Existing Conditions

Lava flows of the Kōloa Series, which underlie the project site, cover about half the surface of the eastern part of Kaua'i; they form the entire floor of the Līhu'e basin except for two small kīpukas (exposed mounds or depressions left uncovered by a lava flow) of Waimea Canyon Series volcanics (Macdonald et al., 1960).

Soil at the project site includes Makaweli silty clay loam, 0 to 6% slopes (MgB). This soil is a dusky-red to dark reddish-brown, friable silty clay loam or stony silty clay loam surfaced layer with a dusky-red, friable silt loam and silty clay loam subsoil. MgB has moderate permeability, slow runoff and a slight erosion hazard (USDA, 2024)

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional impact to site soils or other geological resources.

#### Alternative 3: Proposed Action

The proposed action would result in short-term less than significant impacts to soils during construction from grading, site work, utility, and water tank installation. Soils would be temporarily excavated and stockpiled onsite during the construction period. Exposed soils are susceptible to erosion, especially if it rains heavily during site work periods.

Adverse impacts from soil erosion and runoff would be minimized as a result of erosion and sedimentation control measures that would be implemented during construction. Proposed construction would need to comply with Kaua'i County BMP standards addressing soil and erosion control (e.g., silt fencing, covering and protecting soil stockpiles with tarps and filter socks, surface revegetation as soon as possible) (COK, 2004). These mitigation measures would minimize soil migration from the proposed construction area. The topography of the project site would remain similar to existing conditions following construction.

All work shall comply with all applicable provisions of the Kaua'i County Sediment and Erosion Control Ordinance No. 808 (Chapter 22, Article 7 of the Kaua'i County Code) to safeguard public health, safety, and welfare, to protect property, and to control soil erosion and sedimentation.

Once completed, the proposed water tank would not include a significant amount of hardened surfaces, if any. The project site may need appropriate drainage features in compliance with County code (i.e., drywells, swales and drainage culverts). As a result, soil and topography impacts are anticipated to be short-term and insignificant.

## 2.3 Noise

### Existing Conditions

The project site is located in a rural area along the Kaumuali'i Highway, which produces the highest level of noise in the area from traffic. Vehicles and heavy equipment involved in the operation of Kaua'i Coffee Company are present in the area from time to time, and emit noise during periodically. 'Ele'ele Heights subdivision is located to the southwest of the project site, and emits normal residential noise. There are no other significant human-generated noise sources in the area since directly surrounding land use include coffee fields and undeveloped land.

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or noise-generating activity would occur, and there would be no additional impact to noise receptors at or surrounding the project area.

#### Alternative 3: Proposed Action

Under the proposed action, short-term noise impacts from construction activities would occur. Development of the water tank would involve excavation, grading, and use of typical mechanized construction equipment/tools. Table 2 below shows typical construction noise levels by phase.

Based on the maximum generalized outdoor noise levels at the nearest residences to the project site ('Ele'ele Heights), the HDOH Community Noise Rule criteria is not anticipated to be exceeded during construction. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc.

Maximum noise levels at any one receptor will be short-term and vary with the phase of construction and equipment actually used on site. Therefore, significant construction noise impacts are not expected at any receptor during the construction of the proposed water tank and booster pump upgrades.

There would be no significant long-term noise impacts from the operation of proposed water tank and booster pumps.

**Table 2: Typical Construction Phase Noise Levels**

Construction Phase	Noise Level at 50 Feet ( $L_{eq}$ dBA)
Ground Clearing	84
Excavation	89
Foundation	78
Structure Erection	87
Finishing	89

$L_{eq}$  dBA = equivalent continuous sound level in decibels

## 2.4 Biological Resources

### Existing Conditions

LeGrande Biological Surveys Inc. conducted a biological resources survey of the project site that included a field inspection and review of relevant publicly available literature and data relevant to the biological resources in and near the project site. Evaluated resources included previous survey reports, environmental assessments and environmental impact statements, public datasets, scientific journals and reports, as well as available, unpublished data that are relevant to the natural history and ecology of the area. In addition, available geospatial data, aerial photographs, and topographic maps of the area were reviewed to identify occurrences of federally or state listed or otherwise rare species, or habitats that could harbor these species.

A field survey of the project area was conducted by a trained biologist on February 27, 2024. The field survey methodology included inspection of the project site and recordation of the existing plant and animal species and/or species habitats observed. The survey found that vegetation at the project area is dominated by introduced (non-native) plant species. Coffee plantation and weedy scrub species dominate the site. Two native plant species were documented at the project site, both questionably indigenous; pōpolo and 'uhaloa. Both of these species are considered widespread throughout the Hawaiian Islands.

A total of 12 bird species, representing 8 separate families, were recorded during the station count. Avian diversity and densities were in keeping with the location and vegetation present within the study site. Three species—Scaly-breasted munia (*Lonchura punctulata*), Zebra Dove (*Geopelia striata*), and Cattle Egret (*Bulbucus ibis*) were the most abundant species observed. No terrestrial mammalian species were detected during this survey. It is most likely that non-native animals such as dogs (*Canis lupus familiaris*), cats (*Felis catus*), and pigs (*Sus scrofa*) transit the general area from time to time.

No federally or state protected species were observed in the project area during the biological survey. Although not observed in the project area during the survey, several federally or state listed animal species may occasionally occur in or traverse the project area. No designated critical habitat occurs in the project area (LeGrande, 2024).

## Potential Impacts and Mitigation Measures

### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional impact to biological species within or surrounding the project area.

### Alternative 3: Proposed Action

#### **Plants**

The implementation of invasive species minimization measures to avoid the unintentional introduction or transport of new invasive species to the area during water tank construction is recommended. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting for excessive dirt, debris, plant materials, and invasive or harmful non-native species as appropriate. Consult with Kaua'i Invasive Species Committee if needed.

To minimize spread of the fungal pathogen responsible for Rapid 'Ōhi'a Death, follow the most recent Rapid Ōhi'a Death decontamination protocols recommended by USFWS and DOFAW.

#### **Wildlife**

All the animal species recorded in the project area are not native to the Hawaiian Islands. However, as described above, several listed wildlife species have the potential to occur in or transit through the project area. The following general measures are recommended to avoid and minimize potential impacts to listed wildlife species:

Establish a wildlife education and observation program for all construction and operational personnel. Staff should be trained to identify listed wildlife that may be found on-site (including listed waterbirds and seabirds, and the Hawaiian goose) and to take appropriate steps if listed wildlife species are found.

If downed listed species are observed at the project area, notify USFWS and DOFAW. Implement speed limits on site to reduce the risk of collision to listed wildlife.

In accordance with Section 7 of the Endangered Species Act, consultation with the USFWS, including a request for species list, has been initiated. The Endangered Species Act applies due to federal HUD funding.

The USFWS IPaC portal produced the following 11 animal species: One reptile species, Green sea turtle (*Chelonia mydas*), one mammalian species Hawaiian hoary bat (*Lasiurus cinereus semotus*), and eight avian species were listed: Band-rumped Storm-Petrel (*Oceanodroma castro*), Hawaiian Duck (*Anas wyvilliana*), Hawaiian Common Gallinule (*Gallinula galeata sandvicensis*), Hawaiian Coot (*Fulica americana alai*), Hawaiian Goose (*Branta sandvicensis*), Hawaiian Petrel (*Pterodroma sandwichensis*), Hawaiian Stilt (*Himantopus mexicanus knudseni*), and Newell's Townsends Shearwater (*Puffinus auricularis newelli*) (USFWS, 2024).

Of the 10 species identified in the formal IPaC as potentially being present in the project area or could potentially be impacted by construction; one, Green sea turtle, is not present

and there is no suitable habitat to support the species. The following identified species were not documented during the survey but are discussed below.

### **Nēnē**

Nēnē geese were not observed within the project area or in the general surrounding areas. The habitat is not conducive for foraging and/or loafing. Generally human impacts to this species revolve around vehicular interactions, human feeding, and disturbance to nesting birds, eggs, chicks, and goslings. These potential threats can be minimized to the maximum extent practicable by implementing the following minimization measures:

- Don't feed birds especially if they approach for handouts.
- Secure all food rubbish in close trash receptacles.
- Establish a 15 mile an hour speed limit within the site.

### **Listed Water Birds**

None of the four extant endemic endangered waterbird species or subspecies were observed at the project site. They are Hawaiian Duck, Hawaiian Coot (*Fulica alai*), the Hawaiian endemic sub-species of both the Common Gallinule, and the Black-necked Stilt. The drainage canal to the southwest of the project site was surveyed for any signs of these species as irrigation canals are often used for foraging, loafing and possibly nesting by these species. No waterbirds were observed within or near the project area during the survey. Potential human impacts to these four species during clearing and grubbing are the same as those posed by these activities to Nēnē.

### **Listed Seabirds**

It is likely that the endangered Hawaiian Petrel, Band-rumped Storm-Petrel (*Hydrobates castro*), and the threatened Newell's Shearwater (*Puffinus newelli*) over-fly the project area between April and the middle of December each year in small numbers. The primary cause of mortality in Hawaiian Petrels, Newell's Shearwaters and Band-rumped Storm-Petrels in Hawai'i is thought to be predation by alien mammalian species at the nesting colonies. Collision with manmade structures is considered the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with man-made structures and, if not killed outright, become easy targets of opportunity for feral mammals.

These species have been recovered along roadways and in facilities adjacent to the project area. No suitable nesting habitat exists within or close to the project area for any of these three seabird species. The principal potential impact that current habitat modifications or changes pose to protected seabirds is an increased threat that birds will be downed after becoming disoriented by lights. The two ways outdoor lighting can pose a threat to nocturnally flying seabirds is if: 1) during construction it is deemed expedient or necessary to conduct nighttime construction activities; or, 2) following build-out, security lighting is operated during the seabird nesting season.

If night-time construction activity or equipment maintenance is proposed during any construction phases of the project, all associated lights should be shielded, and when



large flood/work lights are used, they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground. Deleterious impacts to transiting seabirds can be avoided if construction occurs during daylight hours and all outdoor lighting installed is fully "dark sky compliant" in accordance with State DLNR definitions. DLNR recommends avoiding construction-related nighttime lighting between September 15 and December 15.

### **Hawaiian Hoary Bat**

It is probable that the 'ōpe'ape'a – the endemic Hawaiian hoary bat (*Lasiurus cinereus semotus*) overfly the project area on a seasonal basis as they are regularly recorded in the lowland areas on Kaua'i that still contain trees. The removal of coffee trees within the project area should not have adverse affects on bats as they are all smaller in stature than the typical tree size that bats utilize for roosting. As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. However, during the pupping season, females carrying their pups may be less able to vacate a roost site if the tree is felled. Further, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled.

Potential adverse impacts from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 m (15 ft) between June 1 and September 15, the period in which bats may have pups. Do not use barbed wire fencing.

### **Coconut rhinoceros beetle**

The Coconut rhinoceros beetle (*Oryctes rhinoceros*) is an invasive beetle species from South East Asia that has become established on O'ahu and is now spreading to other Islands in Hawai'i. The beetles feed on palm species and are a threat to our coconut trees as well as native Pritchardia species and other ornamental palms. The Coconut Rhinoceros Beetle Response ([crbhawaii.org](http://crbhawaii.org)) recommends best management practices including limiting mulch, compost, and decaying plant material build up in thick piles or layers as it creates breeding material for the beetle larvae. Spreading mulch 2 inches in depth or less helps to keep the material dry which is not favorable for the beetle larvae.

## **2.5 Water Resources**

### Existing Conditions

#### *Surface Water*

There are no natural surface water features within close proximity to the project site. Several human-made irrigation ditches and the Kapa Reservoir are located in proximity to the project site; Pump Ditch 2 runs directly east of the portion of the project site planned for booster pump upgrades, and the Kapa Reservoir is located directly west of this same portion of the project site. Pump Ditch 3 runs approximately 150 feet south of the proposed new water tank build site (Figure 2).

The Hanapēpē River is located 0.27 miles northwest of the project site, in Hanapēpē Valley. And Wahiawa Stream is located approximately 0.59 miles southeast of the project site.

### *Groundwater*

The project area is associated with two underlying aquifers (upper and lower aquifer). The aquifers are part of the Waimea aquifer sector, within the Hanapēpē system. The upper aquifer is classified as basal (fresh water in contact with seawater), unconfined, and is a flank aquifer type. This aquifer has potential use for drinking water, is fresh, irreplaceable, and has a high vulnerability to contamination. The lower aquifer is part of the same aquifer sector and system, and is classified as basal, confined, dike type. This lower aquifer has potential use for drinking water, is fresh, irreplaceable and has a low vulnerability to contamination (Mink and Lau, 1992).

Based on the project site topography, the groundwater flow may be towards the southwest. Mean annual rainfall at the project site is approximately 22 inches (NOAA, 2024).

### *Flood Plains*

The project site is located in Federal Emergency Management Agency (FEMA) Flood Zone X: area of minimal flood hazard (FEMA, 2024).

### *Tsunami Hazards*

The project site is located in the Safe Zone, at an elevation well above (outside) the Extreme Tsunami Evacuation Zone, and the Tsunami Evacuation Zone (Figure 5, NOAA, 2024).

### *Potential Impacts and Mitigation Measures*

#### *Surface Water*

Construction activities have the potential to result in short-term impacts to surface water quality since soils will be disturbed and may be stockpiled temporarily onsite during construction, which could lead to sediment stormwater runoff on and offsite. Other construction site pollutants may include fertilizers, pesticides, oil and grease, concrete truck washout, and construction debris.

In order to mitigate sediment and other pollutant runoff from construction activities, the contractor will be required to install and maintain construction BMPs in compliance with Kaua'i County BMP standards. Stormwater BMPs include, but are not limited to; sediment basins/ traps; filter fabric silt fences; straw bale, sandbag, or gravel bag barriers; stormwater drain inlet protection, and stabilized construction entrances (COK, 2004). The project will also comply with State water quality regulations HAR Chapters 11-54 and 11-55.

**Figure 5: Tsunami Evacuation Zone Map**

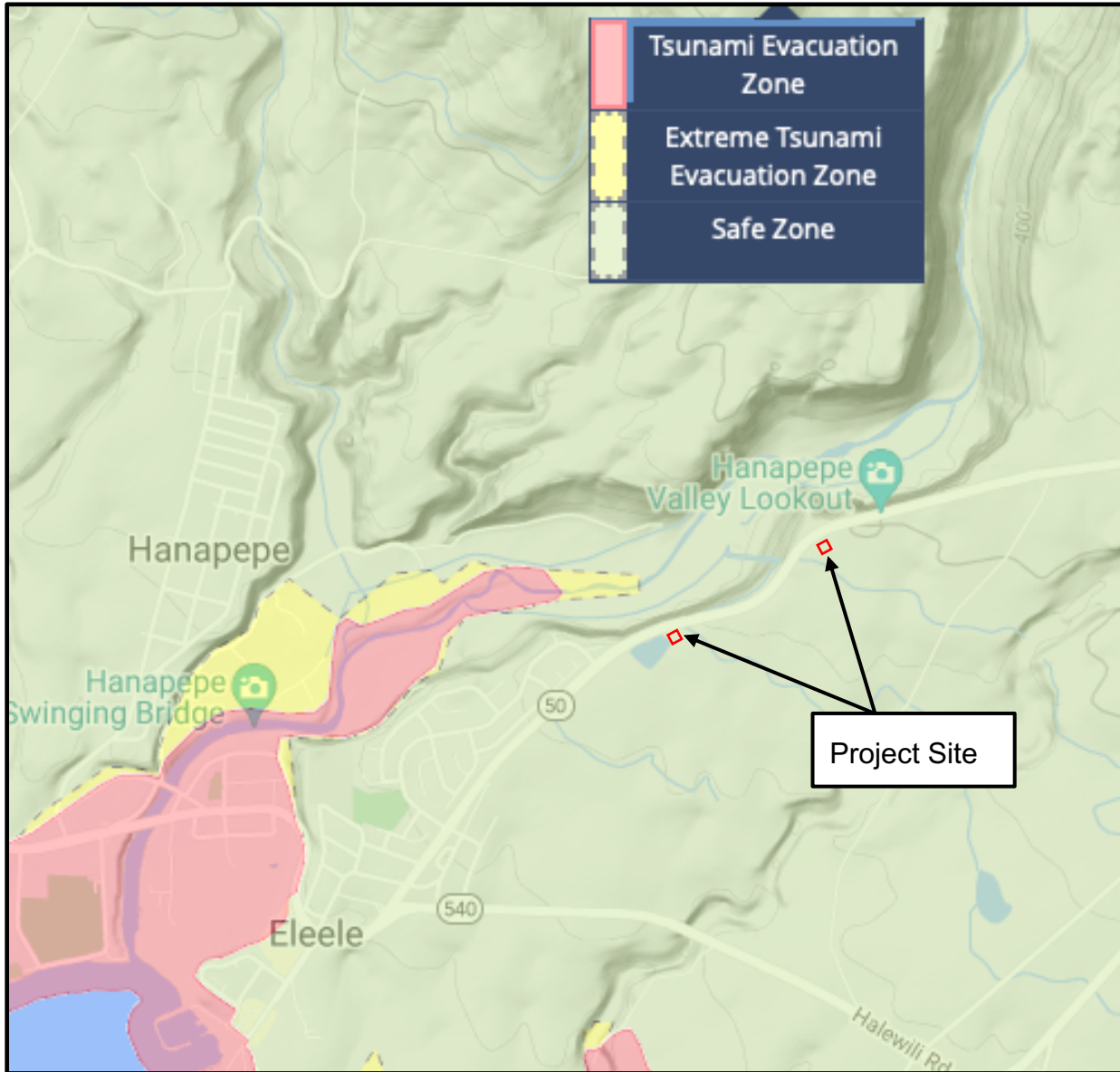


Figure Reference: NOAA, 2024

A permanent stormwater management system would be implemented at the proposed development that would adequately manage stormwater in accordance with County rules.

The proposed project would not result in increased risk of tsunami danger to the affected human environment since it would be constructed outside the Tsunami Evacuation Area in accordance with the Kaua'i County Building Code.

#### *Groundwater*

The proposed project would include minor grading and compaction to prepare the foundational support for the proposed water tank. Site grading for the proposed development would occur well above groundwater level.

During construction the contractor would need to supply sanitary portable toilets that would be serviced regularly.

According to the Lima Ola Water Master Plan (Appendix D), the proposed water tank and booster pumps would draw water from the existing Hanapēpē-'Ele'ele Water System wells that currently provide potable water service to the area. The wells and transmission lines are managed and operated by the Kaua'i County Department of Water. Currently the existing water demand for the Hanapēpē-'Ele'ele Water System is approximately 830,960 gallons per day on average (CPE, 2019).

At full build out, it is estimated that the proposed Lima Ola Development would increase the water demand of the Hanapēpē-'Ele'ele Water System by approximately 304,380 gallons per day on an average. The existing pumping capacity and source availability are adequate to accommodate the demand through Phase 2 of the Lima Ola Development. With the additional water storage tank and booster pumps planned as part of the proposed action, there would be adequate pumping capacity and storage through buildout of the Lima Ola Development. However, the source availability for subsequent phases after Phase 2 would need to be re-evaluated when planning for each phase is implemented (CPE, 2019).

If additional source and/or capacity is needed for subsequent phases, then a well permit application would need to be submitted to the County of Kaua'i Department of Water, the State DOH, and the State DLNR Commission on Water Resource Management to assure that any new source (i.e., new water well) is allowed and compliant with county rules, as well as HAR 13-168: Water Use, Wells, and Stream Diversion Works.

Since development of any additional source and storage will be closely analyzed and regulated by the County of Kaua'i Department of Water, State DOH, and the State DLNR Commission on Water Resource Management, no significant impact to the underlying groundwater resources are anticipated from the proposed action.

During construction of the proposed water tank and booster pumps, the contractor would need to follow the County of Kaua'i Department of Water Administrative Rules relating to potable water development. This would mitigate potential contamination of the water supply when bringing the proposed water system upgrades on line.

The following are mitigation measures are recommended by the State Commission on Water Resources Management:

- *BMPs for stormwater management are recommended to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>*
- *There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.*

## 2.6 Solid and Hazardous Waste

### Existing Conditions

There is no solid waste currently generated at the project site. Since a portion of the project site has been used for commercial agricultural fields, it is possible that soils onsite may contain elevated levels of pesticides and/or arsenic. It is recommended that soil is tested for these target chemicals prior to disturbance. There are no other known sources of hazardous materials/wastes at the project site.

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional solid or hazardous waste generated at the project site.

#### Alternative 3: Proposed Action

During construction of the proposed water tank, native soil will be exposed and generated from grading activities. Construction materials, such as concrete, sheet metal, paints and coatings will also be used onsite during construction. Since the project site has been used for commercial agricultural fields, it is possible that soils onsite may contain elevated levels of pesticides and/or arsenic. It is recommended that soil is tested for these target chemicals prior to disturbance. If soil is shown to contain elevated levels of these target chemicals, worker and environmental protection measures must be implemented in accordance with DOH and OSHA rules.

Construction vehicles and earth moving equipment fueled by petroleum products will be used onsite. The contractor would need to conduct regular inspections and maintenance of vehicles and equipment to assure that no petroleum spills or leaks occur. Any excess soil and construction materials generated onsite will be recycled or properly disposed at the Kekaha Landfill or another approved facility in accordance with County rules.

Once in operation, the proposed action would not generate or store any significant quantities of hazardous materials. Small quantities of petroleum, paints and coatings may be utilized by County Department of Water maintenance staff. All potentially hazardous materials would need to be properly stored out of the sun/elements in flammable lockers within secure designated maintenance areas. The proposed water infrastructure improvements would not generate any significant quantities of solid waste. There would be no significant short-term or long-term impacts to the affected environment from solid or hazardous waste.

## 2.7 Traffic, Access and Parking

### Existing Conditions

The project site is located along Kaunualii Highway, which is a main transportation corridor from the west and southwest side of Kaua'i to job centers on the south and eastern portions of Kaua'i County. There are no public access roads to the project site, which include secure county water facilities.

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### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no additional vehicular trips would occur to or from the project site, and there would be no additional impact to traffic volume from activities at the project site.

#### Alternative 3: Proposed Action

During construction of the proposed water system improvements, there may be short traffic delays to allow trucks to deliver construction materials to the project site. However, these delays are projected to be short-term and insignificant. Once in operation, the only vehicles allowed onsite would be County Department of Water employees and/or their designated contractors. Therefore, the proposed action would not result in any significant additional traffic impacts to the local traffic network.

## **2.8 Historic and Cultural Resources**

### Existing Conditions

An Archaeological Literature Review and Field Inspection was conducted by Pacific Legacy Historic Preservation from January through March 2024. This consisted of a pedestrian field inspection of the project site and a review of State Historic Preservation Division (SHPD) and other published archaeological records within the vicinity of the project site.

The archaeological literature review found that the dry plains of 'Ele'ele, in which the proposed project area is located, formed a peripheral zone within the traditional Hawaiian settlement and land use patterns of Hanapēpē Ahupua'a, which focused along Hanapēpē River. Intensive disturbance of the dry plains of 'Ele'ele began in the late nineteenth century with the establishment of the 'Ele'ele Plantation, and subsequently the McBryde Sugar Company, which operated from 1899 to 1996 (Pacific Legacy, 2024)

The field inspection did not identify any potential historic properties within, or directly surrounding the project area (Pacific Legacy, 2024). The Archaeological Literature Review and Field Inspection Report is included as Appendix B of this EA.

The project site includes County-owned secured public water facilities that do not include any public lands used for Native Hawaiian or other cultural practices.

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional impact to any potential historical or cultural resources at or surrounding the project site.

#### Alternative 3: Proposed Action

The Archaeological Literature Review and Field Inspection Report did not find evidence of any potential existing historical or cultural resources at or surrounding the project site.

Therefore, no archaeological monitoring, or other mitigation measures are recommended during construction of the proposed water tank, where ground disturbance is planned.

Since U.S. federal funds are being sought for the proposed project, compliance with the U.S. National Historical Preservation Act (NHPA) is required. The County Housing Agency has initiated consultation with the State SHPD and other key stakeholders in accordance with Section 106 of the NHPA prior to project approval.

There are no adverse impacts anticipated to historical or cultural resources/practices due to the proposed project.

## **2.9 Socioeconomic Resources**

### Existing Conditions

The project site is located within Census Tract 407.02 that includes Kalaheo and 'Ele'ele. The population of this Census Tract as of the 2020 Census was 6,315. 77.9 percent of the Census Tract population is aged 18 and over, and 21.3 percent of the population is aged 65 and over (US Census Bureau, 2020).

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no beneficial or adverse socioeconomic impacts.

#### Alternative 3: Proposed Action

The proposed project would result in the creation of short-term jobs during the construction of the proposed water tank, and booster pump upgrades. Once in operation, the water system upgrades would create additional potable water storage and transmission capabilities to County residents in the area.

The proposed project is not anticipated to result in any short or long-term adverse impacts to socioeconomic conditions since it would not cause loss of any jobs or housing, and would not result in tax revenue loss. The project would have beneficial economic and social impacts since it would result in job creation and needed potable water service infrastructure development.

## **2.10 Recreational Resources**

### Existing Conditions

The project site is currently used as County-owned secured public water facilities that do not include any public parks or recreational facilities, or access to any public or recreational facilities. The closest County park is 'Ele'ele Park, located approximately 0.77 miles southwest of the project site. The Hanapēpē Valley Lookout is located approximately 938 feet northeast of the project site, along Kaumuali'i Highway.

## Potential Impacts and Mitigation Measures

### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no impact to recreational resources.

### Alternative 3: Proposed Action

Since the project site includes County-owned secured public water facilities that do not include any public parks or recreational facilities, or access to any public or recreational facilities, the proposed action would not result in any impact to existing recreational resources within the vicinity of the project site.

## **2.11 Visual and Scenic Resources**

### Existing Conditions

The project site is located in gently sloping area along Kaumuali'i Highway. The visual environment at and surrounding project site includes views of commercial coffee trees to the east and south, and high trees and shrubs to the north. The Hanapēpē Valley Lookout is located approximately 938 feet northeast of the project site, along Kaumuali'i Highway, which includes views down to Hanapēpē Valley, as well as views of the Kaua'i central mountains in the distance. Port Allen Harbor and the Pacific Ocean are visible in the distance to the southwest. Powerlines are visible running along Kaumuali'i Highway, and the three existing Kaua'i County potable water tanks and pump houses are visible at the project site.

### Potential Impacts and Mitigation Measures

#### Alternative 1: No Action

Under the no action alternative no construction or land disturbance would occur, and there would be no additional buildings or development that would impact view plains in the area.

#### Alternative 3: Proposed Action

During construction, heavy equipment, trucks and construction materials would be visible at the project site from the highway. However, these impacts would be short-term, and dust fences around the work site would reduce visual distractions caused by construction. Once complete, the proposed 0.3 million-gallon water tank would be visible from Kaumuali'i Highway and the adjacent coffee fields. This would represent a change to the existing visual environment, however it would not represent a significant visual impact since there are existing similar sized water tanks and pump houses already present within the project site, and since the tank would not block any significant views of the mountains or ocean in the distance. Therefore, there are no significant impacts anticipated to visual and scenic resources from the proposed project.

## **2.12 Utilities and Infrastructure**

The project site includes County municipal water pumping and storage areas. The County water system is powered by existing overhead electric lines. Potable water lines and a private septic wastewater tank are also present at the project site, within the pump house



that services one bathroom used by County Department of Water maintenance workers onsite. There are no planned utility upgrades as part of the proposed action.

Kaua'i Island Utility Cooperative (KIUC) requests that when electrical service is requested for this project, that the service be installed underground from existing KIUC facilities or extended underground if new electrical facilities are to be installed within the property. Underground electrical facilities will reduce the chances of threatened Newell Shearwater seabird collision on new overhead lines. In addition, should there be a requirement for KIUC to install overhead electric poles, the height of the poles above ground shall not be higher than 45 feet.

### **2.13 Cumulative and Secondary Impacts**

HAR 11-200.1 defines cumulative impact as “[t]he impact on the environment that 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” (HAR 11-200.1-2).

The proposed water service infrastructure upgrades are planned as part of the Kaua'i County Housing Agency Lima Ola Affordable Housing Development, which is a stand alone project being initiated based on the needs of the community. The proposed action would represent an incremental increase in long-term resource use. However, the proposed action would not represent a significant source of greenhouse gas emissions. There are no significant adverse cumulative impacts anticipated from the proposed action.

### **2.14 Relationship to Plans and Policies**

This section of the EA analyzes the proposed project in relation to local and State plans and policies. These land use plans and policies include the Hawai'i State Plan, Hawai'i State Land Use Districts Zoning, Kaua'i County Zoning Code, and the General Plan for the County of Kaua'i. The project site is within the State Agricultural land use district (Figure 6). The project site parcel is located within the County Agricultural Zoning District (Figure 7).

The Kaua'i County Housing Agency is in the process of expanding county ownership of TMK Parcel (4) 2-1-001: 049 to include a portion of adjacent TMK Parcel (4) 2-1-001: 027 in order to make room for the new 0.3 million gallon water tank. The parcel expansion area is shown in Figure 3. Table 3 provides an analysis of the proposed action in relation to the policies and objectives of the Hawai'i State Plan.

**Figure 6: State Land Use Map**



Source: [histategis.maps.arcgis.com](http://histategis.maps.arcgis.com)

**Figure 7: County Zoning Map**



Source: [kauaigis.maps.arcgis.com](http://kauaigis.maps.arcgis.com)

### 2.14.1 Hawai'i State Plan

**Table 3: Hawai'i State Plan Analysis**

Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<b>HRS 226-1: Findings and Purpose</b>			
<b>HRS 226-2: Definitions</b>			
<b>HRS 226-3: Overall Theme</b>			
<b>HRS 226-4: State Goals</b> In order to guarantee, 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: A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations. 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. Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.	<b>X</b>		
<b>Discussion:</b> The proposed development would increase self reliance and self determination for local community members by providing essential potable water service to the affected community.			
<b>HRS 226-5: Objectives and Policies for Population</b> 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.	<b>X</b>		
Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.	<b>X</b>		
Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs-and desires.	<b>X</b>		
Promote increased opportunities for Hawai'i's people to pursue their socioeconomic aspirations throughout the islands	<b>X</b>		
Encourage research activities and public awareness programs to foster and understanding of Hawai'i's limited capacity to accommodate population			<b>X</b>

Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
needs and to address concerns resulting from an increase in Hawai'i's population.			
Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among states, provided that such actions do not prevent the reunion of immediate family members.			X
Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			X
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.	X		
<b>Discussion:</b> The proposed project includes vital infrastructure development that will provide the adjacent affordable housing subdivision with adequate potable water storage in a central location where existing utilities, housing, jobs and other services are readily available in close proximity. The proposed project would promote an increase in economic activities and employment opportunities by creating an increase in available potable water in the area.			
<b>Chapter 226-6 Objectives and policies for the economy in general</b>			
Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.	X		
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			X
These objectives shall be achieved through implementation of the following Policies:			
Promote and encourage entrepreneurship within Hawai'i by residents and nonresidents of the State.			X
Expand Hawai'i'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.			X
Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people			X

<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
Transform and maintain Hawai'i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			<b>X</b>
Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawai'i			<b>X</b>
Seek broader outlets for new or expanded Hawai'i business investments.			<b>X</b>
Expand existing markets and penetrate new markets for Hawai'i's products and services.			<b>X</b>
Assure that the basic economic needs of Hawai'i's people are maintained in the event of disruptions in overseas transportation.			<b>X</b>
Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	<b>X</b>		
Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai'i's small-scale producers, manufacturers, and distributors.			<b>X</b>
Encourage labor-intensive activities that are economically satisfying, and which offer opportunities for upward mobility.			<b>X</b>
Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawai'i.			<b>X</b>
Foster greater cooperation and coordination between the government and private sectors in developing Hawai'i's employment and economic growth opportunities.			<b>X</b>
Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			<b>X</b>
Maintain acceptable working conditions and standards for Hawai'i's workers.			<b>X</b>
Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.			<b>X</b>
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.			<b>X</b>
Encourage businesses that have favorable financial multiplier effects within Hawai'i's economy.			<b>X</b>

<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			<b>X</b>
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, potential growth industries in particular.			<b>X</b>
Foster a business climate in Hawai'i, 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.			<b>X</b>
<b>Discussion:</b> The proposed development would represent vital infrastructure development that is necessary for proper planned development in accordance with State goals.			
<b>HAR 226-7: Objectives and policies for the economy - Agriculture</b>			
Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
Viability of Hawai'i's sugar and pineapple industries.			<b>X</b>
Growth and development of diversified agriculture throughout the State.			<b>X</b>
An agriculture industry that continues to constitute a dynamic and essential component of Hawai'i's strategic, economic, and social well-being.			<b>X</b>
To achieve the agriculture objectives, the following policies shall be implemented:			
Establish a clear direction for Hawai'i's agriculture through stakeholder commitment and advocacy.			<b>X</b>
Encourage agriculture by making best use of natural resources.			<b>X</b>
Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.			<b>X</b>
Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			<b>X</b>
Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai'i's economy.			<b>X</b>
Seek the enactment and retention of federal and state legislation that benefits Hawai'i's agricultural industries			<b>X</b>

<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis</b> <b>Part I: Overall Themes, Goals, Objectives and Policies</b> <b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	S	N/S	N/A
Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai'i's producers and consumer markets locally, on the continental United States, and internationally.			X
Support research and development activities that provide greater efficiency and economic productivity in agriculture.			X
Enhance agricultural growth by providing public incentives and encouraging private initiatives.			X
Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			X
Increase the attractiveness and opportunities for an agricultural education and livelihood.			X
Expand Hawai'i'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.			X
Promote economically competitive activities that increase Hawai'i's agricultural self-sufficiency, including the increased purchase and use of Hawai'i-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			X
Promote and assist in the establishment of sound financial programs for diversified agriculture.			X
Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			X
Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			X
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.			X
Increase and develop small-scale farms.			X
Discussion: Not applicable to the proposed project.			



<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>HAR 226-8: Objectives and policies for the economy- visitor industry</b>			
<b>Objective:</b> 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 Hawai'i's economy.			X
<b>Policies</b>			
Support and assist in the promotion of Hawai'i's visitor attractions and facilities			X
Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.			X
Improve the quality of existing visitor destination areas by utilizing Hawai'i's strengths in science and technology.			X
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.			X
Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.			X
Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.			X
Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.			X
Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.			X
Discussion: Not applicable to the proposed project.			
<b>Chapter 226-9 Objective and policies for the economy – federal expenditures</b>			
<b>Objective:</b> 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 Hawai'i's economy	X		
<b>Policies</b>			
Encourage the sustained flow of federal expenditures in Hawai'i that generates long-term government civilian employment;	X		
Promote Hawai'i's supportive role in national defense, in a manner consistent with Hawai'i's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean			X

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engineering, aerospace research and development, and related dual-use technology sectors in Hawai'i's economy;			
Promote the development of federally supported activities in Hawai'i that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment;	X		
Increase opportunities for entry and advancement of Hawai'i's people into federal government service;			X
Promote federal use of local commodities, services, and facilities available in Hawai'i;			X
Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i;	X		
Pursue the return of federally controlled lands in Hawai'i 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			X
Discussion: The development of the proposed project is likely to be funded by federal funds. Therefore, federal investment will result in increased infrastructure development that would serve the local community.			
<b>Chapter 226-10 Objective and policies for the economy – potential growth and innovative activities.</b>			
<b>Objective:</b> 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 Hawai'i's economic base.			X
<b>Policies</b>			
Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawai'i's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors;			X
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 Hawai'i through the export of services or products or substitution of imported services or products;			X
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;			X
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;			X

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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;			X
Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people;			X
Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts;			X
Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste;			X
Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State;			X
Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawai'i's social, economic, physical, and environmental objectives;			X
Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research;			X
Develop, promote, and support research and educational and training programs that will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i;			X
Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawai'i;			X
Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai'i's social, economic, physical, and environmental objectives;			X
Increase research and development of businesses and services in the telecommunications and information industries;			X
Foster the research and development of nonfossil fuel and energy efficient modes of transportation;			X
Recognize and promote health care and health care information technology as growth industries			X
<b>Discussion:</b> Not applicable to the proposed project			
<b>Chapter 226-10.5 Objectives and policies for the economy – information industry</b>			
<b>Objective:</b> 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 Hawai'i as a leader in broadband and wireless communications and applications in the Pacific Region.			X
<b>Policies</b>			
Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai'i and between Hawai'i and the world, and			X

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make high speed communication available to all residents and businesses in Hawai'i;			
Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai'i to accommodate future growth and innovation in Hawai'i's economy;			X
Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawai'i;			X
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 Hawai'i, using technology to communicate with their headquarters, offices, or customers located out-of state;			X
Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			X
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 Hawai'i's people;			X
Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the information industry;			X
Foster a recognition of the contribution of the information industry to Hawai'i's economy;			X
Assist in the promotion of Hawai'i as a broker, creator, and processor of information in the Pacific.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-11 Objectives and policies for the physical environment – land based, shoreline, and marine resources</b>			
<b>Objectives:</b> 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:			X
Prudent use of Hawai'i's land-based, shoreline, and marine resources.			X
Effective protection of Hawai'i's unique and fragile environmental resources			X
<b>Policies</b>			
Exercise an overall conservation ethic in the use of Hawai'i's natural resources.			X
Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.			X
Take into account the physical attributes of areas when planning and designing activities and facilities.	X		
Manage natural resources and environs to encourage their beneficial and	X		

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multiple use without generating costly or irreparable environmental damage.			
Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.	X		
Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.	X		
Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			X
Pursue compatible relationships among activities, facilities, and natural resources.	X		
Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			X
<b>Discussion:</b> The proposed project includes expansion of vital natural resource use (potable water). All development shall be closely coordinated with, and approved by the County Department of Water, and any other applicable State and Federal agencies to assure that the pumping and storage of potable water is executed without significant impacts to the environment.			
<b>Chapter 226-12 Objective and policies for the physical environment – scenic, natural beauty, and historic resources.</b>			
<b>Objective:</b> Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources			X
<b>Policies</b>			
Promote the preservation and restoration of significant natural and historic Resources.			X
Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			X
Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.			X
Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.			X
Encourage the design of developments and activities that complement the natural beauty of the islands.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-13 Objectives and policies for the physical environment – land, air, and water quality.</b>			
<b>Objectives:</b> Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:			

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Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.	X		
Greater public awareness and appreciation of Hawai'i's environmental resources.			X
<b>Policies</b>			
Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.			X
Promote the proper management of Hawai'i's land and water resources.	X		
Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	X		
Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.	X		
Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	X		
Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.	X		
Encourage urban developments in close proximity to existing services and facilities.	X		
Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	X		
<b>Discussion:</b> Development of the proposed project would be completed to carefully manage water resources in accordance with County and State regulations. The project site is located outside the Extreme Tsunami Evacuation Zone, and no natural waterways pass through the project site.			
<b>Chapter 226-14 Objective and policies for facility systems – in general</b>			
<b>Objective:</b> Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives	X		
<b>Policies</b>			
Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	X		
Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	X		
Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	X		

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Pursue alternative methods of financing programs and projects and cost saving techniques in the planning, construction, and maintenance of facility systems.			X
<b>Analysis:</b> The proposed project represents the proper management of water resources by developing water system infrastructure in accordance with the underlying aquifer sustainable yield.			
<b>Chapter 226-15 Objectives and policies for facility systems – solid and liquid waste</b>			
<b>Objectives:</b> Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives			X
Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.			X
Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.			X
<b>Policies</b>			
Encourage the adequate development of sewerage facilities that complement planned growth.			X
Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			X
Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-16 Objective and policies for facility systems – water</b>			
<b>Objective:</b> 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	X		
<b>Policies</b>			
Coordinate development of land use activities with existing and potential water supply.	X		
Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.	X		
Reclaim and encourage the productive use of runoff water and wastewater discharges.			X
Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	X		
Support water supply services to areas experiencing critical water problems.			X

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Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.	<b>X</b>		
<b>Discussion:</b> The proposed water system improvements project is based on research, consultation with the County Department of Water, and the County Department of Water Rules to ensure that water resource use is managed in a sustainable manner.			
<b>Chapter 226-17 Objectives and policies for facility systems – transportation</b>			
<b>Objectives:</b> Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:			
An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.			<b>X</b>
A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State			<b>X</b>
<b>Policies</b>			
Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;			<b>X</b>
Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;			<b>X</b>
Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			<b>X</b>
Provide for improved accessibility to shipping, docking, and storage Facilities;			<b>X</b>
Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			<b>X</b>
Encourage transportation systems that serve to accommodate present and future development needs of communities;			<b>X</b>
Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods			<b>X</b>
Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			<b>X</b>
Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			<b>X</b>
Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment;			<b>X</b>
Encourage safe and convenient use of low-cost, energy-efficient, nonpolluting means of transportation;			<b>X</b>
Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives;			<b>X</b>



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Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-18 Objectives and policies for facility systems – energy.</b>			
<b>Objectives:</b> 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:			
Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			X
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.			X
Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawai'i's dependence on imported fuels for electrical generation and ground transportation.			X
Greater diversification of energy generation in the face of threats to Hawai'i's energy supplies and systems;			X
Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use;			X
Utility models that make the social and financial interests of Hawai'i's utility customers a priority.			X
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.			X
<b>Policies</b>			
Support research and development as well as promote the use of renewable energy sources;			X
Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			X
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;			X
Promote all cost-effective conservation of power and fuel supplies through measures, including: <ul style="list-style-type: none"> <li>• Development of cost-effective demand-side management programs; <input type="checkbox"/></li> <li>• Education;</li> <li>• Adoption of energy-efficient practices and technologies; and <input type="checkbox"/></li> <li>• Increasing energy efficiency and decreasing energy use in public infrastructure</li> </ul>			X

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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;			X
Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			X
Promote alternate fuels and transportation energy efficiency;			X
Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			X
Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives;			X
Provide priority handling and processing for all state and county permits required for renewable energy projects;			X
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 are located on public trust land as an affordable and reliable source of firm power for Hawai'i.			X
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 Hawai'i.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-18.5 Objectives and policies for facility systems – telecommunications</b>			
<b>Objectives</b>			
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.			X
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.			X
<b>Policies</b>			
Facilitate research and development of telecommunications systems and resources;			X
Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			X
Promote efficient management and use of existing telecommunications systems and services;			X
Facilitate the development of education and training of telecommunications personnel.			X

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<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-19 Objectives and policies for socio-cultural advancement – housing.</b>			
<b>Objectives:</b> Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			
Greater opportunities for Hawai'i'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 Hawai'i's population.	X		
The orderly development of residential areas sensitive to community needs and other land uses.			X
The development and provision of affordable rental housing by the State to meet the housing needs of Hawai'i's people.	X		
<b>Policies</b>			
Effectively accommodate the housing needs of Hawai'i's people.	X		
Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.	X		
Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.	X		
Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.	X		
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.	X		
Facilitate the use of available vacant, developable, and underutilized urban lands for housing.	X		
Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the community.	X		
Promote research and development of methods to reduce the cost of housing construction in Hawai'i.	X		
<b>Discussion:</b> the proposed project would provide vital infrastructure support to a County affordable housing project that would offer much needed housing units located in a central location close to jobs, public transportation, schools and other essential services, such as health care, grocery stores and restaurants.			

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<b>Chapter 226-20 Objectives and policies for socio-cultural advancement – health</b>			
<b>Objectives:</b> Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:			
Fulfillment of basic individual health needs of the general public.			X
Maintenance of sanitary and environmentally healthful conditions in Hawai'i's communities.			X
Elimination of health disparities by identifying and addressing social determinants of health.			X
<b>Policies</b>			
Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			X
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.			X
Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			X
Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			X
Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			X
Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			X
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.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-21 Objectives and policies for Socio-cultural advancement – education.</b>			
<b>Objective:</b> 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			

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<b>Policies</b>			
Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			X
Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.			X
Provide appropriate educational opportunities for groups with special needs.			X
Promote educational programs which enhance understanding of Hawai'i's cultural heritage.			X
Provide higher educational opportunities that enable Hawai'i's people to adapt to changing employment demands.			X
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.			X
Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			X
Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence.			X
Support research programs and activities that enhance the education programs of the State.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-22 Objective and policies for socio-cultural advancement – social services</b>			
<b>Objective:</b> 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.			X
<b>Policies</b>			
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.			X
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.			X
Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawai'i's communities.			X
Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			X

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Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			X
Promote programs which assist people in need of family planning services to enable them to meet their needs			X
<b>Discussion:</b> Not applicable to the proposed proeject.			
<b>Chapter 226-23 Objective and policies for socio-cultural advancement – leisure</b>			
<b>Policies</b>			
<b>Objective:</b> 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.			X
Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			X
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.			X
Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			X
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.			X
Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.			X
Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			X
Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai'i's people.			X
Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			X
Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai'i's population to participate in the creative arts.			X
Assure adequate access to significant natural and cultural resources in public ownership.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-24 Objective and policies for socio-cultural advancement – individual rights and personal well-being</b>			

<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>Objective:</b> 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.			X
<b>Policies</b>			
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.			X
Uphold and protect the national and state constitutional rights of every individual.			X
Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			X
Ensure equal opportunities for individual participation in society.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-25 Objective and policies for socio-cultural advancement – culture.</b>			
<b>Objective:</b> 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 Hawai'i's people.			X
<b>Policies</b>			
Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.			X
Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai'i's people and which are sensitive and responsive to family and community needs.			X
Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai'i.			X
Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawai'i's people and visitors.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-26 Objectives and policies for socio-cultural advancement – public safety</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			
Assurance of public safety and adequate protection of life and property for all people.			X

<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
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.			X
Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's people.			X
<b>Policies (Public Safety)</b>			
Ensure that public safety programs are effective and responsive to community needs.			X
Encourage increased community awareness and participation in public safety programs.			X
<b>Policies (Public Safety-Criminal Justice)</b>			
Support criminal justice programs aimed at preventing and curtailing criminal activities.			X
Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			X
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.			X
<b>Policies (Public Safety-Emergency Management)</b>			
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.			X
Enhance the coordination between emergency management programs throughout the State.			X
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-27 Objectives and policies for socio-cultural advancement – government</b>			
<b>Objectives:</b> Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:			
Efficient, effective, and responsive government services at all levels in the State.			X
Fiscal integrity, responsibility, and efficiency in the state government and county governments.			X
<b>Policies</b>			
Provide for necessary public goods and services not assumed by the private sector.			X
Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response			X



<b>Hawai'i Revised Statutes Chapter 226- Hawai'i State Plan Analysis Part I: Overall Themes, Goals, Objectives and Policies S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
Minimize the size of government to that necessary to be effective.			X
Stimulate the responsibility in citizens to productively participate in government for a better Hawai'i.			X
Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			X
Provide for a balanced fiscal budget.			X
Improve the fiscal budgeting and management system of the State.			X
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.			X
<b>Discussion:</b> Not applicable to the proposed project.			

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>Chapter 226-101: Purpose.</b> The purpose of this part is to establish overall priority guidelines to address areas of statewide concern			
<b>Chapter 226-103: Economic priority guidelines</b>			
Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i'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.			X
(A) Encourage investments which:			
(i) Reflect long term commitments to the State;			X
(ii) Rely on economic linkages within the local economy;			X
(iii) Diversify the economy;			X
(iv) Reinvest in the local economy;			X
(v) Are sensitive to community needs and priorities;			X
(vi) Demonstrate a commitment to provide management opportunities to Hawai'i residents; and			X
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(i) Present or former residents acting as entrepreneurs or principals;			X
(ii) Academic support from an institution of higher education in Hawai'i;			X
(iii) Investment interest from Hawai'i residents;			X
(iv) Resources unique to Hawai'i that are required for innovative activity; and			X
(v) Complementary or supportive industries or government programs or projects.			X
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			X
(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.			X
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			X
(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.			X
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawai'i's small-scale producers, manufacturers, and distributors.			X
(7) Continue to seek legislation to protect Hawai'i from transportation interruptions between Hawai'i and the continental United States.			X
(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 Hawai'i's unique location and available physical and human resources			X
(B) A clean industry that would have minimal adverse effects on Hawai'i's environment.			X
(C) An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.			X
(D) An industry that would provide reasonable income and steady employment			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.			X
(10) Enhance the quality of Hawai'i's labor force and develop and maintain career opportunities for Hawai'i'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.			X
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			X
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			X
(D) Promote career opportunities in all industries for Hawai'i's people by encouraging firms doing business in the State to hire residents.			X
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities.			X
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			X
<b>(b) Priority guidelines to promote the economic health and quality of the visitor industry:</b>			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawai'i's residents and visitors.			X
(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.			X
(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.			X
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.			X
(5) Develop and maintain career opportunities in the visitor industry for Hawai'i's people, with emphasis on managerial positions.			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(6) Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.			X
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			X
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			X
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			X
<b>(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:</b>			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			X
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.			X
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			X
<b>(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:</b>			
(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.			X
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			X
(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.			X
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			X
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawai'i's agricultural community.			X
(6) Seek favorable freight rates for Hawai'i's agricultural products from interisland and overseas transportation operators.			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			X
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			X
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			X
(10) Support the continuation of land currently in use for diversified agriculture.			X
(11) Encourage residents and visitors to support Hawai'i's farmers by purchasing locally grown food and food products.			X
<b>(e) Priority guidelines for water use and development:</b>			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			X
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.			X
(3) Increase the support for research and development of economically feasible alternative water sources.			X
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			X
<b>(f) Priority guidelines for energy use and development:</b>			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.			X
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			X
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			X
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.			X
<b>(g) Priority guidelines to promote the development of the information industry:</b>			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability that will serve			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
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as the foundation of and catalyst for overall economic growth and diversification in Hawai'i.			
(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.			X
(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.			X
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			X
(5) Encourage research activities, including legal research in the information and telecommunications fields.			X
(6) Support promotional activities to market Hawai'i's information industry services.			X
(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.			X
<b>Discussion:</b> Not applicable for the proposed project.			
<b>Chapter 226-104: Population growth and land resources priority guidelines</b>			
<b>(a) Priority guidelines to effect desired statewide growth and distribution:</b>			
(1) Encourage planning and resource management to ensure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.	X		
2) Manage a growth rate for Hawai'i's economy that will parallel future employment needs for Hawai'i's people.	X		
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.			X
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.	X		

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(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.	X		
(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.	X		
(7) Support the development of high technology parks on the neighbor islands.			X
<b>(b) Priority guidelines for regional growth distribution and land resource utilization:</b>			
(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.	X		
2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			X
(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.	X		
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			X
(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.			X
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			X
(7) Pursue rehabilitation of appropriate urban areas.			X
(8) Support the redevelopment of Kaka'ako into a viable residential, industrial, and commercial community.			X
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	X		
(10) Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
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.			<b>X</b>
(12) Utilize Hawai'i'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.			<b>X</b>
(13) Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.			<b>X</b>
<b>Discussion:</b> The proposed project would include infrastructure development within a developed area within close proximity to jobs, and other critical service centers. All water development use would be conducted in accordance with County and State sustainability regulatory guidelines.			
<b>Chapter 226-105: Crime and criminal justice.</b>			
<b>Priority guidelines in the area of crime and criminal justice:</b>			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			<b>X</b>
(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.			<b>X</b>
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			<b>X</b>
(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.			<b>X</b>
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			<b>X</b>
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			<b>X</b>



<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-106: Affordable housing</b>			
<b>Priority guidelines for the provision of affordable housing</b>			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.	X		
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			X
(3) Improve information and analysis relative to land availability and suitability for housing.			X
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawai'i's low- and moderate income households, gap-group households, and residents with special needs.			X
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai'i's people for the purchase of initial owner-occupied housing.	X		
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			X
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			X
(8) Give higher priority to the provision of quality housing that is affordable for Hawai'i's residents and less priority to development of housing intended primarily for individuals outside of Hawai'i.	X		
<b>Discussion:</b> The proposed project would include infrastructure improvements in support of a government-funded low income housing development that would provide low and moderate income families and individuals with much needed affordable housing.			
<b>Chapter 226-107: Quality education</b>			
<b>Priority guidelines to promote quality education:</b>			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			X
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			X
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			X

<b>Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities;			<b>X</b>
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			<b>X</b>
(A) The electronic exchange of information			<b>X</b>
(B) Statewide electronic mail; and			<b>X</b>
(C) Access to the Internet.			<b>X</b>
(6) Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			<b>X</b>
(7) Pursue the establishment of Hawai'i's public and private universities and colleges as research and training centers of the Pacific;			<b>X</b>
(8) Develop resources and programs for early childhood education;			<b>X</b>
(9) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			<b>X</b>
(10) Strengthen and expand educational programs and services for students with special needs.			<b>X</b>
<b>Discussion:</b> Not applicable to the proposed project.			
<b>Chapter 226-108: Sustainability</b>			
<b>Priority guidelines and principles to promote sustainability shall include:</b>			
(1) Encouraging balanced economic, social, community, and environmental priorities;	<b>X</b>		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;	<b>X</b>		
(3) Promoting a diversified and dynamic economy;			<b>X</b>
(4) Encouraging respect for the host culture;			<b>X</b>
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;	<b>X</b>		
(6) Considering the principles of the ahupua'a system; and			<b>X</b>
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai'i.	<b>X</b>		

Hawai'i State Plan, HRS Chapter 226 – Part III. Priority Guidelines <b>S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	S	N/S	N/A
<b>Discussion:</b> The proposed project would practice sustainable practices by adhering to current Kaua'i County building codes and State rules with regards to water consumption.			
<b>CHAPTER 226-109: Climate change adaptation</b>			
<b>Priority guidelines and principles to promote climate change adaptation shall include:</b>			
(1) Ensure that Hawai'i's people are educated, informed, and aware of the impacts climate change may have on their communities;			X
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			X
(3) Invest in continued monitoring and research of Hawai'i's climate and the impacts of climate change on the State;			X
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			X
(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;			X
(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;			X
(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;			X
(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;			X
(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			X
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.			X
<b>Discussion:</b> Not applicable to the proposed project.			

### **2.14.2 State of Hawai'i Land Use Law Chapter 205, HRS**

Chapter 205, HRS promulgates the State Land Use Law. This law is intended to preserve, protect, and encourage the development of lands in the State of Hawai'i for uses that are best suited to the public health and welfare of its people. The LUC classifies all land into four districts: Urban, Conservation, Agriculture, and Rural.

Discussion: The project site is designated within the State LUC Agricultural District. The proposed project includes municipal potable water development, which is allowed in the Agricultural District, per Chapter 205-4.5 (7). Therefore, the Proposed Action would comply with its State LUC designation.

### **2.14.3 Hawai'i 2050 Sustainability Plan**

The long-term strategy of the Hawai'i 2050 Sustainability Plan, Charting a Course for the Decade of Action (2020-2030) (Sustainability 2050 Plan) includes a number of Sustainability Development Goals that focus on key areas of sustainable planning for Hawai'i's future. Below are sustainability goals that the proposed project would support:

#### **Sustainability Goal 1: No Poverty**

This sustainability goal works to address the struggle of many Hawaii residents to afford housing, utilities, transportation, healthcare, and food.

#### **Sustainability Goal 11: Sustainable Cities and Communities**

This sustainability goal works to make cities and human settlements inclusive, safe, resilient, and sustainable. The core tenets of an "inclusive, safe, resilient, and sustainable" city or community include affordable housing, access to public spaces, sustainable transportation systems, including public transport...

The Sustainability 2050 Plan goes on to list the 2021-2030 Recommended Actions.

One of the Recommended Actions is to Advance Equity. Strategy 25 within this Recommended Action includes the recommendation to continue to improve economic and social sustainability of individuals through access to affordable housing. And Strategy 29 recommends integrating land use planning to address Hawai'i's competing uses of land to mutually obtain local food production goals, affordable housing needs, sustainable energy goals, and conservation.

**Discussion :** The proposed development would provide much needed affordable housing to Hawai'i residents. The proposed development would be designed and constructed in compliance with Kaua'i County Code, which requires the responsible and sustainable development, use and management of natural resources; such as water, electricity and visual and scenic resources.

The proposed action would improve climate resilience by increasing potable water storage capacity. The proposed action would support the advancement of sustainable communities since the Lima Ola development that it will service is located within a central location adjacent to a town center and existing housing in 'Ele'ele and Hanapēpē. The proposed action would support advancement of equity since it is a key component in a

County affordable housing project that would provide below market rate housing to qualified Kaua'i County residents. The proposed action would work to protect and manage watersheds since this water system development would be closely managed and regulated by the County Department of Water and the State DOH and Commission on Water Resource Management to assure proper use and management of existing groundwater resources.

#### **2.14.4 Hawai'i Coastal Zone Management Program**

The Coastal Zone Management Act of 1972 (16 USC §1451), as amended through Public Law 104-150, created the coastal management program and the National Estuarine Research Reserve system. The coastal states are authorized to develop and implement a state coastal zone management (CZM) program. Hawai'i CZM Program received federal approval in the late 1970's. The objectives of the Hawai'i CZM Program, HRS §205A-2, are to protect valuable and vulnerable coastal resources such as coastal ecosystems, special scenic and cultural values and recreational opportunities. The objectives of the program are also to reduce coastal hazards and to improve the review process for activities proposed within the coastal zone.

The Hawai'i CZM law requires each County to designate and administer the SMA within the State's coastal areas that extends inland from the shoreline. Development within the SMA is subject to County approval to ensure the proposal is consistent with the policies and objectives of the Hawai'i CZM Program. The following are objectives of the Hawai'i CZM Program and the Project's impacts relative to the State CZM objectives and policies:

#### **Objectives**

(1) Recreational resources;

(A) Provide coastal recreational opportunities accessible to the public.

**Discussion:** Not applicable since the project site is located outside the shoreline and SMA Area.

(2) Historic resources;

(A) 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.

**Discussion:** An archaeological survey and background research was completed for the proposed project as part of the EA process. Consultation with SHPD and local Native Hawaiian groups has been initiated, and will continue throughout the planning and development process to comply with HRS 6E, as well as Section 106 of the U.S. NHPA, since federal funding are being sought.

(3) Scenic and open space resources;

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

**Discussion:** The proposed project will not significantly impact any existing open spaces.

(4) Coastal ecosystems;

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

**Discussion:** Not applicable since the proposed project is not proposed at or near the coastal shoreline area/SMA.

(5) Economic uses;

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

**Discussion:** The proposed project is planned in a suitable central location readily accessible to the local community.

(6) Coastal hazards;

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

**Discussion:** The proposed project site is located outside the tsunami evacuation zone and the State SMA. The project site is located within FEMA Flood Zone X: Area of minimal flood hazard. During construction, BMPs will be implemented to reduce/eliminate any on or off-site runoff/pollution.

(7) Managing development;

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

**Discussion:** The proposed project is going through the environmental review process in compliance with the State Hawai'i Environmental Policy Act. A public review/comment period will be conducted during the environmental review process, which will allow for public participation/agency communication.

(8) Public participation;

- (A) Stimulate public awareness, education, and participation in coastal management.

**Discussion:** As stated above, the proposed project is going through the environmental review process and will include a public review/comment period, which will allow for public participation/agency communication. Additional public awareness and education in matters of coastal management are not applicable to the proposed project.

9) Beach protection;

- (A) Protect beaches for public use and recreation.

**Discussion:** Not applicable for the proposed project which is located outside the shoreline/SMA.

10) Marine resources;

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

**Discussion:** Not applicable for the proposed project which is located outside the shoreline/SMA.

**Policies**

(1) Recreational resources;

- (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 uses 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 nonpoint 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.

**Discussion:** None of the policies are applicable to the proposed project since it would not include the creation or conversion of recreational areas.

(2) Historic resources;

- (A) Identify and analyze significant archaeological 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.

**Discussion:** An archaeological survey and background research was completed as part of the environmental review process to ensure proper analysis, information retention and protection of any historic or cultural resources. No evidence of potential historic resources are expected to present at or in close proximity to the project site.

(3) Scenic and open space resources;

- (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 that are not coastal dependent to locate in inland areas.

**Discussion:** The proposed water tank would be compatible with the existing visual environment since it would be sited next to an existing water tank, and would not significantly impact any view planes in the area .

(4) Coastal ecosystems;

- (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.



**Discussion:** The proposed project represents a technical water quality planning approach that balances development need with available sustainable yield.

5) Economic uses;

(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.

**Discussion:** Not applicable since the proposed development is not proposed in the shoreline area/SMA.

(6) Coastal hazards;

(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.

**Discussion:** The proposed project site is located outside the tsunami evacuation zone and the SMA. The project site is located within FEMA Flood Zone X: Area of minimal flooding.

(7) Managing development;

(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.

**Discussion:** Not applicable since the proposed development is not proposed in the shoreline area/SMA

(8) Public participation;

(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.

**Discussion:** A public review/comment period will be conducted during the environmental review process, which will allow for public participation/agency communication.

(9) Beach protection;

(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.

**Discussion:** Not applicable since the proposed project is not planned in the shoreline/SMA.

(10) Marine resources;

(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.

**Discussion:** Not applicable since the proposed project is not planned in the shoreline/SMA.

### **2.14.5 The General Plan for The County of Kaua'i**

The General Plan for the County of Kaua'i was updated in 2018 and provides broad goals, objectives, policies, and implementing actions that outline the direction of the County's future. The General Plan provides the policy framework for future development within Kaua'i County.

Section 1.4 of the Kaua'i County General Plan includes the following policies to guide future growth that are relevant to the proposed project:

*Policy #1: Manage Growth to Preserve Rural Character*

*Policy #2: Provide Affordable Housing While Facilitating a Diversity of Privately-Developed Housing for Local Families*

*Policy #4: Design Healthy and Complete Neighborhoods*

*Policy #6: Reduce the Cost of Living*

*Policy #10: Help Business Thrive*

*Policy: 14: Prepare for Climate Change*

**Discussion:** The proposed project would support the Lima Ola development, which will be located adjacent to existing housing, a commercial center and public transportation. The proposed action supports an affordable housing project that will reduce the cost of living for low-income Kaua'i residents by reducing housing cost. The proposed action would result in new construction jobs, and is sited in a location away from the shoreline, and outside flood zones where climate change impacts are generally less severe.

Section 2.1 of the General Plan includes the following Future Land Use Objectives:

- 1. To accommodate Kaua'i's projected population growth and housing needs.*
- 2. To meet future housing needs through "missing middle" housing types that are affordable by design and located near job centers.*
- 3. To protect rural character by ensuring new growth is designed to be compact and focused around existing town centers.*
- 4. To manage land use and development in a manner that respects the unique character of a place.*
- 5. To locate residential growth in and near major jobs centers.*
- 6. To increase overall community health through design that supports safe and accessible parks, streets, and other shared spaces.*
- 7. To increase resiliency by limiting development in areas impacted by future sea level rise.*

**Discussion:** The proposed project supports development of affordable housing adjacent to the urban mixed use area of 'Ele'ele. The project site is located well above the shoreline area, increasing its future resiliency to sea level rise impacts.

### 2.14.6 'Ele'ele and Port Allen Town Plan

Within the West Kaua'i Community Plan, dated October 30, 2020, the 'Ele'ele and Port Allen Town Plan discusses the planned growth in this area, that includes the Lima Ola affordable housing development.

**Discussion:** The proposed project is congruent with the goals of the 'Ele'ele and Port Allen Town Plan since the proposed development includes the creation of the needed potable water storage required for development of Lima Ola.

## 3 Environmental Impact Significance Criteria Analysis

HAR 11-200.1-13 includes an environmental significance criteria assessment that requires the agency or applicant conducting an EA or EIS to screen a proposed project against 13 environmental significance criteria. The 11-200.1-13 environmental significance criteria assessment for this project is presented below:

*(1) Irrevocably commit a natural, cultural, or historic resource*

**Discussion:** Based on the environmental studies completed, there are no known significant natural, historic or cultural resources present at the project site that would be committed.

*(2) Curtail the range of beneficial uses of the environment*

**Discussion:** It is not anticipated that the proposed project would curtail beneficial uses of the affected environment since it would include a relatively small footprint on secured County-owned land.

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

**Discussion:** The proposed project would not conflict with any State environmental policies or long-term goals. The proposed development would be planned and constructed in accordance with County and State laws and procedures. This EA represents compliance with State environmental regulation HRS 343. And the proposed project would comply with HRS 344: State Environmental Policy since there would be no misuse or overuse of natural resources, or pollution to the environment, which would help to safeguard the State's unique natural environmental characteristics.

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

**Discussion:** The proposed project would have a beneficial effect on the economic welfare of the community and State since it would result in construction jobs, as well as as provide much needed water system development required for affordable housing that would lower economic costs for Kaua'i residents. There are no known significant cultural practices that occur at the project site that would be impacted.

*(5) Have a substantial adverse effect on public health*

**Discussion:** The proposed project would not have a substantial adverse effect on public health since it would result in providing potable water service to the local community.

*(6) Involve adverse secondary impacts, such as population changes or effects on public facilities*

**Discussion:** The proposed project would provide additional water storage, allowing for the development of Lima Ola, which would result in a population increase as new residents move to the Lima Ola housing development. However, this growth is in line with the County General Plan, as well as the West Kaua'i Community Plan, as discussed above in this section.

*(7) Involve a substantial degradation of environmental quality*

**Discussion:** The proposed project is not anticipated to involve a substantial degradation of environmental quality. During construction, BMPs will be implemented to reduce/eliminate sediment and construction material runoff. The operation of the water system improvements would not result in any significant emissions or use /generate hazardous materials, and would incorporate stormwater management elements to reduce/eliminate runoff to the affected environment.

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

**Discussion:** The proposed project supports the stand-alone Lima Ola affordable housing project initiated by the County Housing Agency, and would not result in adverse effects on the environment, or commitment for larger actions.

*(9) Have a substantial adverse effect on a rare, threatened or endangered species, or its habitat*

**Discussion:** The proposed project is not anticipated to have an effect on any sensitive biological resources or habitat. A biological resources survey of the project area, including background research into the surrounding area was conducted for the proposed project. The mitigation measures discussed earlier in this EA would reduce any potential impacts to sensitive biological resources to a level of insignificance.

*(10) Have a substantial adverse effect on air or water quality or ambient noise levels*

**Discussion:** The proposed project is not anticipated to have a substantial adverse effect on air or water quality or ambient noise levels. During construction, there is the potential for temporary, short-term impacts on existing air quality, noise conditions in the immediate vicinity of the project site. Construction work would comply with County regulations during construction and would implement BMPs to minimize temporary impacts. Once in operation, there would be no significant air emissions, water runoff or noise pollution from the water system upgrade facilities.

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

**Discussion:** The proposed project site is not located in a sensitive area such as the SMA or shoreline area. It is located outside the Tsunami Evacuation Zone, and is located in FEMA Flood Zone X: Area of Minimal Flood Hazard. There are no geologic hazards, or waterways located at the project site.

*(12) Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or state plans or studies*

**Discussion:** During construction, dust fences, construction materials and equipment would be visible. However, these impacts would be short-term, and dust fences around the work site would reduce visual distractions caused by construction. Once complete, the proposed water tank would be situated adjacent to an existing water tank, and would not impact any vistas or view planes in the area.

*(13) Require substantial energy consumption or emit substantial greenhouse gases*

**Discussion:** The proposed water system improvements would use electricity to power pumps. However, there would be no significant GHG emissions generated from the proposed development.

### **3.1 Project Environmental Determination**

Based on the research, studies and outreach conducted as part of this DEA, it is determined that the proposed project would not result in a significant environmental impact. Therefore, a finding of no significant impact (FONSI) is anticipated for this project.

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# ***Appendix A: Biological Resources Survey Report***

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# **A Natural Resources Assessment for the Proposed Lima Ola Subdivision Off-Site Water System Improvements, 'Ele'ele, Island of Kaua'i**

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## Introduction

TMK (4) 2-1-01:49 owned by the County of Kaua'i, located in 'Ele'ele on the island of Kaua'i is proposed for a new water tank build. The project area is located just to the southeast of Kaumuali'i Highway. LeGrande Biological Surveys Inc. (LBSInc) was tasked with providing a report outlining the current plant and animal species extant within the Project Area (PA) and providing recommendations for native species that are located within the parcel as well as any that could possibly be utilizing the habitat.

## Site Description

The PA parcel is located on the south shore of Kaua'i Island and is dominated by the existing water tank and surrounding coffee fields. Figure 1 shows a drawing of the PA with boundaries and location in proximity to Kaumuali'i Highway. Soils are defined as Makaweli silty clay loam (MgB) for the entirety of the PA (NRCS 2024).

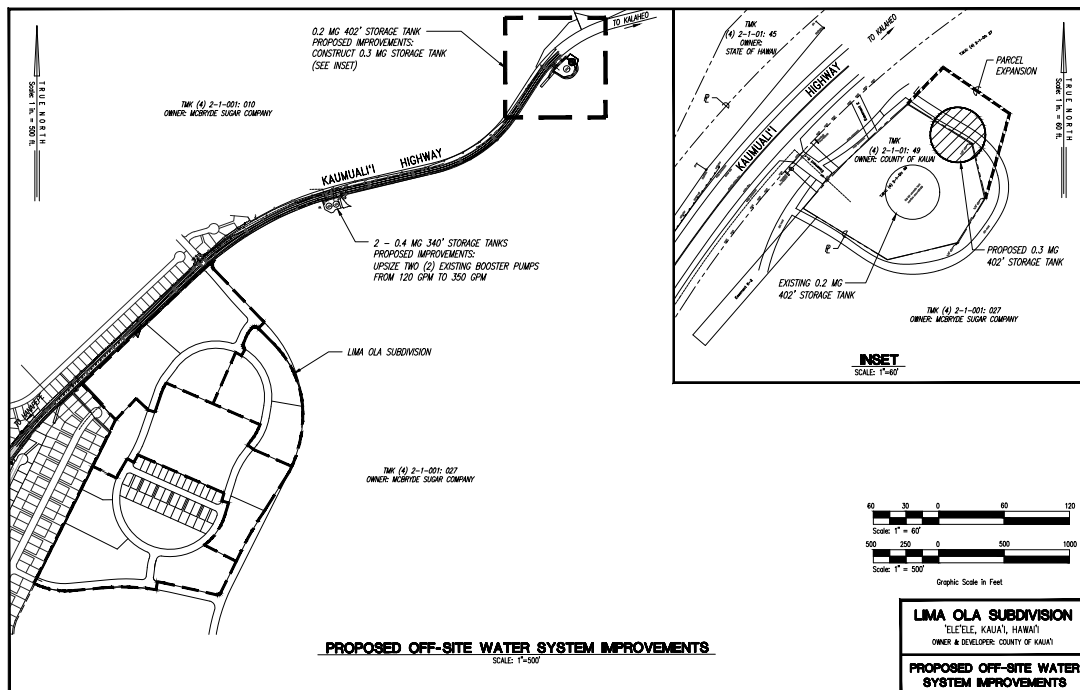


Figure 1. New Lima Ola watertank location enlarged at inset.

## Methods

### Botanical Survey

Maya LeGrande surveyed the PA on February 27, 2024. Plant species were identified as they were encountered during meandering walking transects through the PA and along boundaries. Notes were made on plant associations and distribution, disturbances, topography, substrate type, exposure, and drainage. Species names follow *Manual of the Flowering Plants of Hawai'i* (Wagner, Herbst, & Sohmer, 1990; Wagner & Herbst, 1999) for native and naturalized flowering plants, and *A Tropical Garden Flora* (Staples & Herbst, 2005) for ornamental plants. More recent name changes for naturalized plant species follow Imada (2019). A full plant species list is provided in Table 1.

### Terrestrial Vertebrates Survey

#### *Avian Survey*

A bird survey was conducted in the morning hours of February 27, 2024. Birds were identified by visual observations aided by Leica 8 X 42 binoculars, and by listening for vocalizations. Two six-minute avian point-count stations were sighted at the western and eastern ends the PA. Weather conditions were ideal with unlimited visibility, no precipitation, and winds at about 15 kilometers per hour. The avian phylogenetic order and nomenclature used in this report follows the AOU *Check-List of North and Middle American Birds* 2023, and the 64th supplement to the checklist (Chesser et al., 2023).

#### *Mammalian Survey*

A list was made of any mammals encountered during the survey. Indicators of mammalian presence, such as tracks, scat, and additional signs were noted. Mammalian phylogenetic order and nomenclature follow *Mammal Species of the World* (Wilson and Reeder, 2005).



Figure 2. Kaumuali'i Highway on the right with Guinea grass hedgeline and access road opening to the PA.



Figure 3. Access gate to PA with dirt access road and non-native grasses and shrubs on either side.

## Results

### Vegetation

The vegetation is dominated by introduced (non-native) plant species over the entire PA. The coffee plantation and weedy scrub species dominate the site. A total of 41 plant species (Table 1) were documented with two being native (indigenous) and the remaining 39 non-native. The following section describes the dominant species.

### Flora

The access entrance along Kaumuali'i Highway is dominated by a hedge of Guinea grass (*Megathyrsus maximus*), koa haole (*Leucaena leucocephala*) shrubs and Java plum (*Syzygium cumini*). Various additional weedy species along the roadsides include natal redtop (*Melinis repens*), bermuda grass (*Cynodon dactylon*), little bell (*Ipomoea triloba*), spiny amaranth (*Amaranthus spinosus*), castor bean (*Ricinus communis*), and false ragweed (*Parthenium hysterophorus*). The area within the chain link fence that encompasses the existing water tank is almost exclusively populated with swollen fingergrass (*Chloris barbata*). Vines of balsam pear (*Momordica charantia*) were also observed within the fenced area. The two indigenous species, pōpolo (*Solanum americanum*) and 'uhaloa (*Waltheria indica*), were observed infrequently along the dirt access roads. Rows of coffee (*Coffea arabica*) plants are growing in the eastern section of the PA.



Figure 4. Guinea grass dominates the agricultural roadsides to the west.

Table 1. Plant Species Observed at the Lima Ola Water Tank Project Area

<b>Monocotyledons</b>		
CYPERACEAE		
<i>Cyperus rotundus</i> L.	nut grass	Nat
POACEAE		
<i>Cenchrus ciliaris</i> L.	buffelgrass	Nat
<i>Chloris barbata</i> Sw.	swollen fingergrass	Nat
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	Nat
<i>Leptochloa virgata</i> (L.) P.Beauv.	sprangletop	Nat
<i>Megathyrsus maximus</i> (Jacq.) B.K. Simon & W.L. Jacobs	Guinea grass	Nat
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop	Nat
<b>Dicotyledons</b>		
AMARANTHACEAE		
<i>Amaranthus spinosus</i> L.	spiny amaranth	Nat
ASTERACEAE (COMPOSITAE)		
<i>Bidens pilosa</i> L.	Spanish needle	Nat
<i>Conyza bonariensis</i> (L.) Cronq.	hairy horseweed	Nat
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	redflower ragweed	Nat
<i>Emilia fosbergii</i> Nicolson	pualele	Nat
<i>Parthenium hysterophorus</i> L.	false ragweed	Nat
<i>Sonchus oleraceus</i> L.	sow thistle	Nat
<i>Tridax procumbens</i> L.	coat buttons	Nat
<i>Verbesina encelioides</i> (Cav.) Benth.&Hook.	golden crown-beard	Nat
<i>Youngia japonica</i> (L.) DC.	Oriental hawksbeard	Nat
BORAGINACEAE		
<i>Heliotropium procumbens</i> Mill. var. <i>depressum</i> (Cham.) Fosberg		Nat
CONVOLVULACEAE		
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	---	Nat
<i>Ipomoea triloba</i> L.	little bell	Nat
CUCURBITACEAE		
<i>Momordica charantia</i> L.	balsam pear	Nat
EUPHORBIACEAE		
<i>Euphorbia hirta</i> L.	garden spurge	Nat
<i>Euphorbia prostrata</i> Alton	prostrate spurge	Nat
<i>Ricinus communis</i> L.	castor bean	Nat

FABACEAE		
<i>Canavalia cathartica</i> Thouars	maunaloa	Nat
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	Nat
<i>Crotalaria incana</i> L.	fuzzy rattlepod	Nat
<i>Desmanthus pernambucanus</i> (L.) Thell.	slender mimosa	Nat
<i>Leucaena leucocephala</i> (Lam.) de Wit subsp. <i>leucocephala</i>	koa haole	Nat
<i>Senna occidentalis</i> (L.) Link	coffee senna	Nat
LAMIACEAE		
<i>Leonotis nepetifolia</i> (L.) R.Br.	lion's ear	Nat
<i>Mesophaerum pectinatum</i> (L.) Kuntze	comb hyptis	Nat
MALVACEAE		
<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon	Nat
<i>Malvastrum coromandelianum</i> (L.) Garke	false mallow	Nat
<i>Sida rhombifolia</i> L.	Cuba jute	Nat
<i>Sidastrum micranthum</i> (A.St.- Hill.)Fryxell	-	Nat
MYRTACEAE		
<i>Syzygium cumini</i> (L.) Skeels	Java plum	Nat
NYCTAGINACEAE		
<i>Boerhavia coccinea</i> Mill.	scarlet boerhavia	Nat
RUBIACEAE		
<i>Coffea arabica</i> L.	arabian coffee	Nat
SOLANACEAE		
<i>Solanum americanum</i> Mill.	pōpolo	Ind?
STERCULIACEAE		
<i>Waltheria indica</i> L.	'uhaloa	Ind?

#### Legend to Table 1

STATUS = distributional status for the Hawaiian Islands:

**Ind?**= questionably indigenous to Hawai'i, data is unclear as the exact arrival in the Hawaiian Islands.

**Nat** = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.





Figure 5. Guinea grass and koa haole between the highway and PA.  
Existing water tank fencing to the right.

## Avian Fauna

A total of 12 bird species, representing 8 separate families, were recorded during the station count (Table 2). No additional species were recorded while transiting the site between survey points.

Avian diversity and densities were in keeping with the location and vegetation present within the study site. Three species—Scaly-breasted munia (*Lonchura punctulata*), Zebra Dove (*Geopelia striata*), and Cattle Egret (*Bulbucus ibis*) were the most abundant species observed.

## Mammalian Fauna

No terrestrial mammalian species were detected during this survey. It is most likely that non-native animals such as dogs (*Canis lupus familiaris*), cats (*Felis catus*), and pigs (*Sus scrofa*) transit the general area from time to time.

Table 2. Avian Species Detected- Lima Ola Water Tank Project Area-  
February 2024

Common Name	Species	Order Family	Status
		COLUMBIFORMES	
		COLUMBIDAE - Pigeons & Doves	
Spotted Dove	<i>Streptopelia chinensis</i>		A
Zebra Dove	<i>Geopelia striata</i>		A
Mourning Dove	<i>Zenaida macroura</i>		A
		PELECANIFORMES	
		ARDEIDAE - Herons, Bitterns & Allies	
Cattle Egret	<i>Bubulcus ibis</i>		A
		PASSERIFORMES	
		CETTIIDAE - Cettia Warblers & Allies	
Japanese Bush-Warbler	<i>Horomis diphone</i>		A
		ZOSTEROPIDAE - White-eyes	
Warbling White-eye	<i>Zosterops japonicus</i>		A
		STURNIDAE - Starlings	
Common Myna	<i>Acridotheres tristis</i>		A
		MUSICAPIDAE - Old World Flycatchers	
White-rumped Shama	<i>Copsychus malabaricus</i>		A
		ESTRILDIDAE - Estrildid Finches	
African Silverbill	<i>Euodice cantans</i>		A
Scaly-breasted Munia	<i>Lonchura punctulata</i>		A
Common Waxbill	<i>Estrilda astrild</i>		A
		PASSERIDAE - Old World Sparrows	
House Sparrow	<i>Passer domesticus</i>		A

### Legend to Table 1

**Status**

A Alien – introduced by humans, naturalized

## Discussion and Recommendations

Recommendations are partly based on U.S. Fish and Wildlife Service, Animal Avoidance and Minimization Measures (USFWS-PIFWO, 2022). Implementation of the recommendations (provided below as bulleted items) by the Project contractor will minimize potential impacts to listed species to the maximum extent practicable.

## Floral Resources

Native plant habitat within the proposed project area has been highly modified by human activities and various agricultural uses over time and is presently dominated by the coffee plantation and non-native species. Two native species were documented at the site, both questionably indigenous; pōpolo and ‘uhaloa. Both of these species are considered widespread throughout the Hawaiian Islands. None of the plant species observed are listed as endangered or threatened under either the federal or State of Hawai‘i endangered species statutes. (HDLNR, 1998; USFWS 2024b).

None of the fourteen Endangered plant species listed by the informal USFWS Information for Planning and Consultation (IPaC) for the PA location were observed during the survey. A formal IPaC was generated on 6/18/2024 (USFWS 2024-1) with the same list of federally protected species whose historical or present range includes the Project Area but are not necessarily found within the Project Area. They are; ‘aiea (*Nothocestrum latifolium*), ‘āwikiwiki (*Canavalia napaliensis* and *C. pubescens*), Carter’s panicgrass (*Panicum faurei* var. *carteri*), dwarf iliau (*Wilkesia hobdyi*), honohono (*Haplostachys haplostachya*), ‘ihi (*Portulaca villosa*), makou (*Peucedanum sandwicense*), ‘ohai (*Sesbania tomentosa*), *Schiedea spergulina* var. *leiopoda* and *S. spergulina* var. *spergulina*, *Spermolepis hawaiiensis*, uhihi (*Mezoneuron kavaiense*), and *Microlepia strigosa* var. *mauiensis* (USFWS, 2024). Owing to the highly degraded nature of the site, none of these species were expected in the area.

## Faunal Resources

We consulted with the USFWS IPaC portal (USFWS 2024 & 2024-1)– The list produced the following 11 animal species: One reptile species, Green sea turtle (*Chelodonia mydas*), one mammalian species Hawaiian hoary bat (*Lasiurus cinsereus semotus*), and eight avian species were listed: Band-rumped Storm-Petrel (*Oceanodroma castro*), Hawaiian Duck (*Anas wyvilliana*), Hawaiian Common Gallinule (*Gallinula galeata sandwicensis*), Hawaiian Coot (*Fulica americana alai*), Hawaiian Goose (*Branta sandwicensis*), Hawaiian Petrel (*Pterodroma sandwichensis*), Hawaiian Stilt (*Himantopus mexicanus knudseni*), and Newell’s Townsends Shearwater (*Puffinus auricularis newelli*) (USFWS, 2024).

Of the 10 species identified in the formal IPaC as potentially being present in the PA or could potentially be impacted by construction; one, Green sea turtle, is not present and there is no suitable habitat to support the species. The following nine species were not documented during the survey but are discussed in the following three sections.

## Avian Resources

### ***Nēnē***

Nēnē were not observed within the PA or in the general surrounding areas. The habitat is not conducive for foraging and/or loafing. Generally human impacts to this species revolve around vehicular interactions, human feeding, and disturbance to nesting birds, eggs, chicks, and goslings. These potential threats can be minimized to the maximum extent practicable by implementing the following minimization measures:

- Don't feed birds especially if they approach for handouts.
- Secure all food rubbish in close trash receptacles.
- Establish a 15 mile an hour speed limit within the site.

### ***Waterbirds***

None of the four extant endemic endangered waterbird species or subspecies were recorded on the site. They are Hawaiian Duck, Hawaiian Coot (*Fulica alai*)<sup>1</sup>, the Hawaiian endemic sub-species of both the Common Gallinule, and the Black-necked Stilt. The drainage canal to the southwest (outside of the PA) was surveyed for any signs of these species as irrigation canals are often used for foraging, loafing and possibly nesting by these species. No waterbirds were observed within or near the PA during this survey. Potential human impacts to these four species during clearing and grubbing are the same as those posed by these activities to Nēnē.

### ***Seabirds***

It is likely that the endangered Hawaiian Petrel, Band-rumped Storm-Petrel (*Hydrobates castro*), and the threatened Newell's Shearwater (*Puffinus newelli*) over-fly the PA between April and the middle of December each year in small numbers. The primary cause of mortality in Hawaiian Petrels, Newell's Shearwaters and Band-rumped Storm-Petrels in Hawai'i is thought to be predation by alien mammalian species at the nesting colonies (USFWS, 1983; Simons and Hodges, 1998; Ainley et al., 2001). Collision with man-made structures is considered the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with man-made structures and, if not killed outright, become easy targets of opportunity for feral mammals (Hadley, 1961; Telfer, 1979; Sincok, 1981; Reed et al., 1985; Telfer et al., 1987; Cooper and Day, 1998; Podolsky et al., 1998; Ainley et al.,

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<sup>1</sup> In this report we use the most current names for all avian species follow: AOU Check-List of North and Middle American Birds 2021, and the 63rd supplement to the checklist (Chesser et al., 2021, 2022).

2001; Hue et al., 2001; Day et al., 2003). These species have been recovered along roadways and in facilities adjacent to the PA (SOS, 2023). No suitable nesting habitat exists within or close to the PA for any of these three seabird species.

The principal potential impact that current habitat modifications or changes pose to protected seabirds is an increased threat that birds will be downed after becoming disoriented by lights. The two ways outdoor lighting can pose a threat to nocturnally flying seabirds is if: 1) during construction it is deemed expedient or necessary to conduct night-time construction activities; or, 2) following build-out, security lighting is operated during the seabird nesting season.

- If night-time construction activity or equipment maintenance is proposed during any construction phases of the project, all associated lights should be shielded, and when large flood/work lights are used, they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground (Reed et al., 1985; Tellfer et al., 1987). Deleterious impacts to transiting seabirds can be avoided if construction occurs during daylight hours and all outdoor lighting installed is fully “dark sky compliant” (HDLNR-DOFAW, 2016). DLNR recommends avoiding construction-related night-time lighting between September 15 and December 15 (DLNR, 2016).

## Mammalian Resources

The findings of the mammalian survey are consistent with the location and habitat present on the property. Although no rodents were recorded it is likely that some of the four established Muridae found on Kaua’i Island—roof rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), Polynesian rat (*Rattus exulans hawaiiensis*), and European house mouse (*Mus musculus domesticus*) use resources within the general PA on a seasonal basis. These introduced rodents are deleterious to native ecosystems and native faunal species.

No mammalian species currently protected or proposed for protection under either the federal or State of Hawai’i endangered species programs were detected during this survey (DLNR, 2015; USFWS, nd-a).

### ***Hawaiian hoary bat***

It is probable that the ‘ōpe‘ape‘a – the endemic Hawaiian hoary bat (*Lasiurus cinereus semotus*), currently recognized as an endemic species *Lasiurus semotus* (Pinzari et al. 2020) overfly the PA on a seasonal basis as they are regularly recorded in the lowland areas on Kaua’i that still contain trees (Pinzari et al. 2020; David, 2023). The removal of coffee trees within the PA should not have adverse affects on bats as they are all smaller in stature than the typical tree size that bats utilize for roosting. As bats use

multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. However, during the pupping season, females carrying their pups may be less able to vacate a roost site if the tree is felled. Further, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled.

- Potential adverse impacts from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 m (15 ft) between June 1 and September 15, the period in which bats may have pups.
- Do not use barbed wire fencing.

## Other Resources of Potential Concern

### ***Critical Habitat***

No federally delineated Critical Habitat for any species occurs within the PA (USFWS, 2024c). There is no equivalent designation under State of Hawai'i endangered species statutes.

### ***Coconut rhinoceros beetle***

The Coconut rhinoceros beetle (CRB) *Oryctes rhinoceros* is an invasive beetle species from South East Asia that has become established on O'ahu and is now spreading to other Islands in Hawai'i. The beetles feed on palm species and are a threat to our coconut trees as well as native *Pritchardia* species and other ornamental palms. The Coconut Rhinoceros Beetle Response ([crbhawaii.org](http://crbhawaii.org)) recommends best management practices including limiting mulch, compost, and decaying plant material build up in thick piles or layers as it creates breeding material for the CRB larvae. Spreading mulch 2 inches in depth or less helps to keep the material dry which is not favorable for the beetle larvae.









### ***Wetlands/Riparian Habitat***

Our surveys did not include wetland delineations but we did observe and note wetland indicators within the PA and none were noted. The irrigation canal, shown on the National Wetland Inventory (NWI) map (figure 6), was surveyed outside of the western project boundary and appeared to be mostly dry at the time. No significant flora or fauna was observed in the canal area.



March 3, 2024

**Wetlands**

- |   |                                |   |                                   |   |          |
|---|--------------------------------|---|-----------------------------------|---|----------|
|  | Estuarine and Marine Deepwater |  | Freshwater Emergent Wetland       |  | Lake     |
|  | Estuarine and Marine Wetland   |  | Freshwater Forested/Shrub Wetland |  | Other    |
|   |                                |  | Freshwater Pond                   |  | Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)  
This page was produced by the NWI mapper

Figure 6. USFWS NWI wetland map showing an irrigation canal to the southwest of the existing water tank at the project area.

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## ***Appendix B: Archaeological Report***



**LITERATURE REVIEW AND FIELD INSPECTION  
FOR THE PROPOSED OFF-SITE WATER SYSTEM  
IMPROVEMENTS PROJECT FOR THE  
LIMA OLA SUBDIVISION,  
‘ELE‘ELE, HANAPĒPĒ AHUPUA‘A,  
KONA MOKU, KAUA‘I ISLAND**

**[TMK: (4) 2-1-001:027 (POR.)]**



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*Pacific Legacy: Exploring the past, informing the present, enriching the future.*

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**LITERATURE REVIEW AND FIELD INSPECTION  
FOR THE PROPOSED OFF-SITE WATER SYSTEM  
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LIMA OLA SUBDIVISION,  
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**[TMK: (4) 2-1-001:027 (POR.)]**

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## ABSTRACT

At the request of Kaimana Environmental Solutions, LLC, Pacific Legacy, Inc. conducted a Literature Review and Field Inspection (LRFI) for the proposed Off-Site Water System Improvements Project for the Lima Ola Subdivision in ‘Ele‘ele, Hanapēpē Ahupua‘a, Kona Moku, Kaua‘i Island [TMK: (4) 2-1-001:027 (por.)]. The purpose of the LRFI was to investigate previous land use of the proposed project area and to determine whether any undocumented historic properties exist in the proposed project area.

The investigation was two-fold, consisting of historical background research and a field inspection:

1. Background research involved a review of historical documents; historical maps and aerial photographs; reference materials, including online databases; and archaeological reports produced in the vicinity of the proposed project area.
2. A one-day field inspection was carried out by two Pacific Legacy archaeologists with the purpose of determining whether undocumented historic properties exist within the proposed project area.

The literature review found that the dry plains of ‘Ele‘ele, in which the proposed project area is located, formed a peripheral zone within the traditional Hawaiian settlement and land use patterns of Hanapēpē Ahupua‘a, which focused along Hanapēpē River. Intensive disturbance of the dry plains of ‘Ele‘ele began in the late nineteenth century with the establishment of the ‘Ele‘ele Plantation, and subsequently the McBryde Sugar Company, which operated from 1899 to 1996. The field inspection did not identify any potential historic properties within the 18,700-sq. ft proposed project area. The proposed project area is currently planted with commercial coffee.



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*Note: In this report, the spellings and the use of diacritical marks (glottal stops and macrons) follow conventions issued by Pukui and Elbert (1986) and Pukui et al. (1974) with limited exceptions – spellings and diacritical marks are used as the original sources used them in quotations, titles, and proprietary names. English translations for Hawaiian words are derived from Pukui and Elbert (1986) unless otherwise specified.*

**Cover Image:** Rows of commercial coffee within the proposed project area (view to west).

## 1.0 INTRODUCTION

At the request of Kaimana Environmental Solutions, LLC, Pacific Legacy, Inc. conducted a Literature Review and Field Inspection (LRFI) for the proposed Off-Site Water System Improvements Project for the Lima Ola Subdivision in ‘Ele‘ele, Hanapēpē Ahupua‘a, Kona Moku, Kaua‘i Island, TMK: (4) 2-1-001:027 (por.) (Figure 1 through Figure 3).

The purpose of this LRFI was to investigate previous land use of the proposed project area and to determine whether any undocumented historic properties exist in the proposed project area. The work was also designed to facilitate historic preservation review by the State Historic Preservation Division (SHPD) under Hawai‘i Revised Statutes (HRS) Chapter 6E.

### 1.1 METHODS & SCOPE

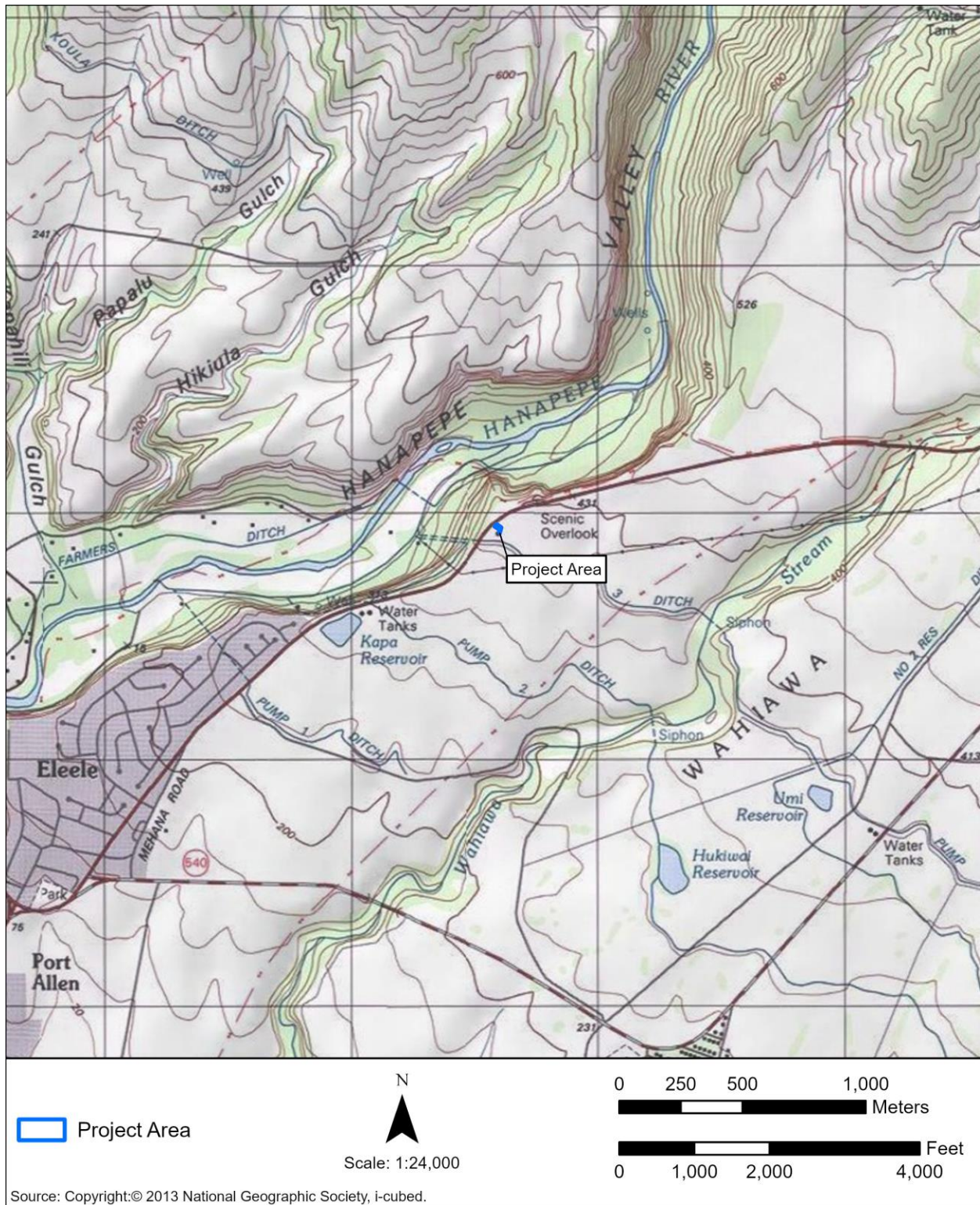
The background research conducted for this LRFI involved a review of historical documents, historical maps and aerial photographs, and reference materials. Relevant archaeological reports were obtained from the SHPD library. Historical maps were obtained from the Hawai‘i State Department of Accounting and General Services (DAGS) and Pacific Legacy’s internal database. Online sources of information included the United States Department of Agriculture (USDA), the Office of Hawaiian Affairs’ (OHA) Kīpuka and Papakilo Databases, Ancestral Visions of ‘Āina (AVA) Konohiki, and Waihona ‘Āina.

In addition to background research, Pacific Legacy, Inc. conducted a one-day field inspection on February 16, 2024. The inspection was conducted by Pacific Legacy archaeologists Ena Sroat, B.A., and Emmaline Irvine, M.A., under the overall supervision of Mara Mulrooney, Ph.D. (Principal Investigator). The field inspection consisted of a reconnaissance pedestrian survey and photo documentation of the proposed project area.

### 1.2 PROJECT BACKGROUND

The proposed Off-Site Water System Improvements Project will provide increased water capacity for the Lima Ola Subdivision. The Lima Ola Subdivision is located along the south side of Kaumuali‘i Highway within the ‘ili (land division) of ‘Ele‘ele. It was developed between 2020 and 2024 as part of the County of Kaua‘i’s Lima Ola Workforce Housing Development Project, envisioned to provide affordable housing units of both single-family and multi-family homes to working families and seniors. An Environmental Assessment (EA) was prepared for the Lima Ola Workforce Housing Development Project in 2016. The EA included a Cultural Impact Assessment (CIA) (Dagher and Spear 2014) and an Archaeological Inventory Survey (AIS) (Powell and Dega 2017).

The proposed project area is located approximately 230 m (755 ft) northeast of the Lima Ola Subdivision along the south side of Kaumuali‘i Highway on a portion of a parcel currently owned by the Kauai Coffee Company. The project will entail the installation of a new 0.3 MG (million gallon) 402’ water storage tank immediately northeast of an existing 0.2 MG 402’ water storage tank, substantially increasing the water supply capacity for the subdivision. Installation of the new tank will necessitate a 18,700-sq. ft expansion to the northeast of the land parcel containing the current water tank (Figure 4).



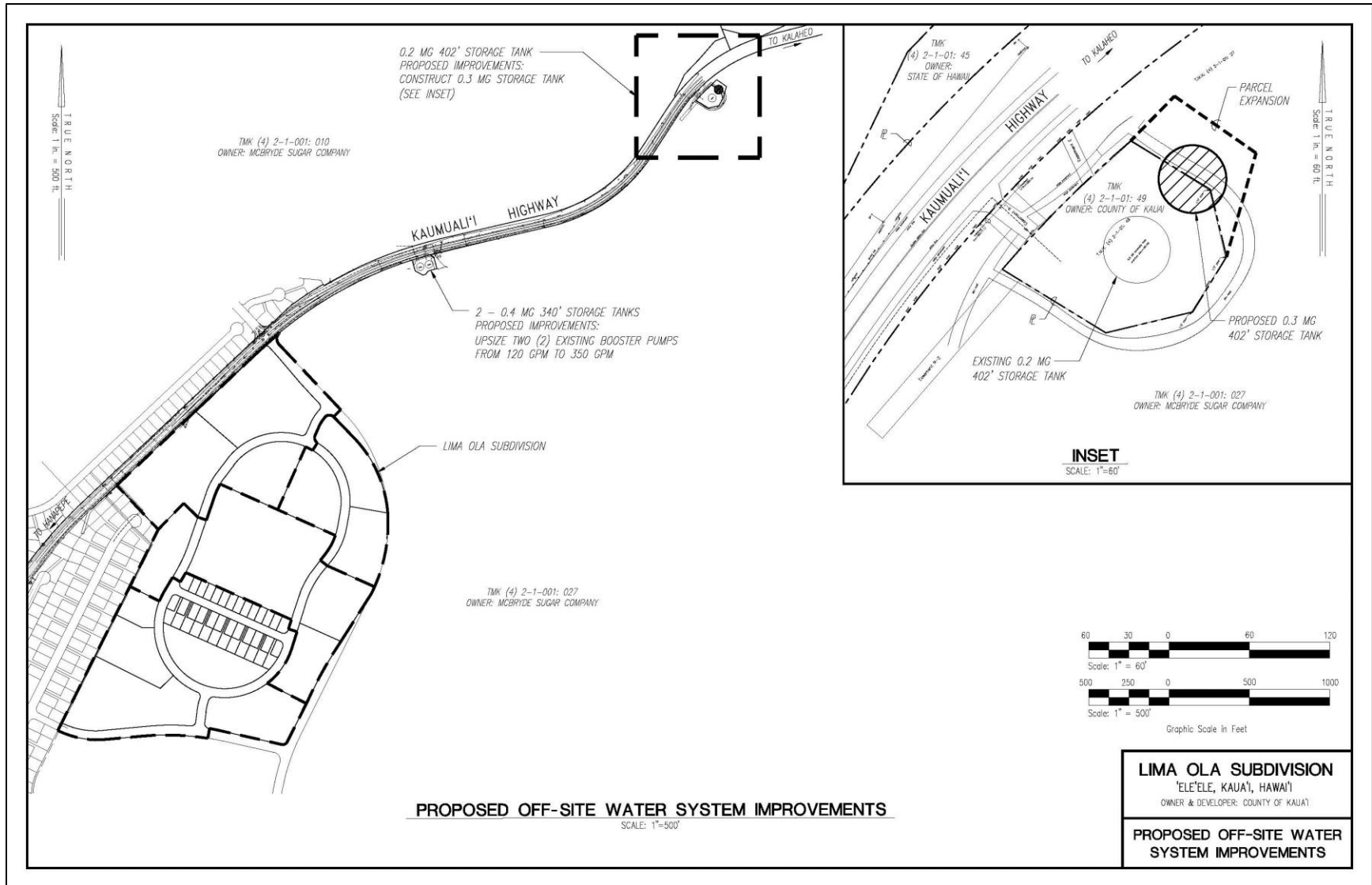
**Figure 1. Location of the proposed Off-Site Water System Improvements Project Area, ‘Ele‘ele, Hanapēpē Ahupua‘a (base map: National Geographic Society 2013).**



**Figure 2. Location of the proposed Off-Site Water System Improvements Project Area (base map: Esri World Imagery 2021).**



**Figure 3. Location of the proposed Off-Site Water System Improvements Project Area within TMK: (4) 2-1-001:027 (source: State of Hawai‘i, Department of Accounting and General Services, Land Survey Division, Esri World Imagery 2021).**



**Figure 4. Site plans for the proposed Off-Site Water System Improvements Project (courtesy of Kaimana Environmental Solutions, LLC, 2024).**

Literature Review and Field Inspection  
Off-Site Water System Improvements Project  
'Ele'ele, Hanapēpē Ahupua'a, Kaua'i Island  
March 2024

### 1.3 PROJECT LOCATION AND ENVIRONMENT

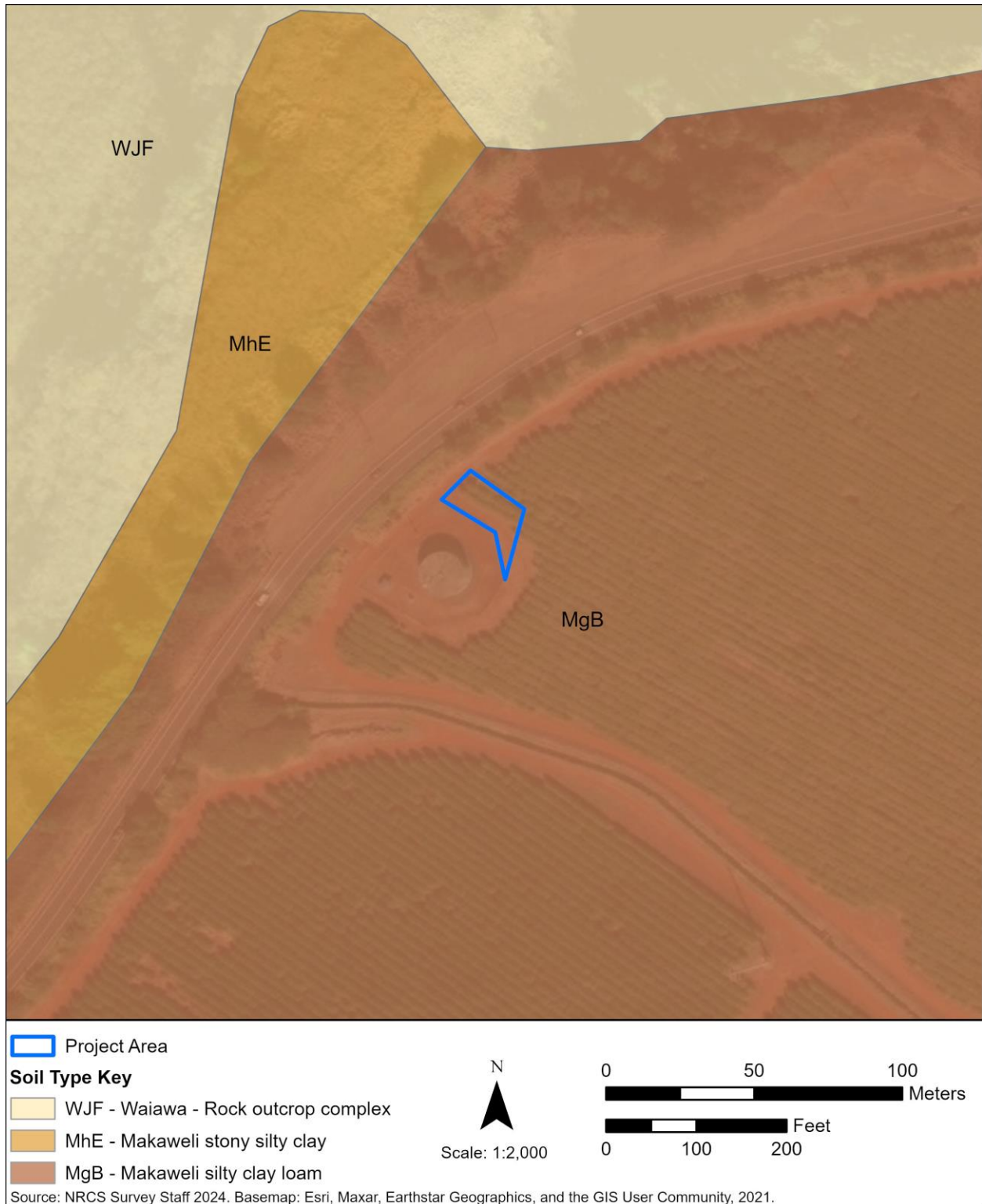
The proposed project area is located on the south side of the island of Kaua‘i within the *ahupua‘a* (land division) of Hanapēpē within the *moku* (island district) of Kona. It is situated on the *makai* (ocean) side of Kaumuali‘i Highway approximately 230 m northeast of the Lima Ola Subdivision.

The proposed project area topography consists of a gently sloping plain flanked on the north by a *pali* (cliff) that drops to the Hanapēpē Valley floor and Hanapēpē River, and on the south by a gulch containing Wahiawa Stream. These freshwater resources are largely fed by rainfall within the mountain interior of the island (ca. 9989 millimeters [mm], or 393 in., per year). The proposed project area receives only roughly 925 mm (36 in.) of rainfall per year, with the driest months consisting of April through September (1.59–2.45 in. per month) and the wettest months consisting of October through March (3.66–4.84 in. per month) (Giambelluca et al. 2013).

According to the U.S. Department of Agriculture (USDA) Soil Survey for Kaua‘i and the State of Hawai‘i’s Natural Resources Conservation Service (NRCS), the soils within the proposed project area consist of Makaweli silty clay loam, 0 to 6 percent slopes (MgB) (Figure 5). Makaweli silty clay loam is found on hill slopes and is considered “Prime farmland if irrigated” (USDA Web Soil Survey 2022, MgB:1).

Vegetation observed in the proposed project area includes non-native grasses and weeds as well as coffee (Rubiaceae) trees associated with the Kauai Coffee Company. Native plant species are absent within the proposed project area surroundings due to post-Contact land alterations for previous sugar cane production.





**Figure 5. Map of soil types within the vicinity of the proposed Off-Site Water System Improvements Project Area (data from Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture 2024).**

## 2.0 BACKGROUND RESEARCH

The proposed project area is located within the *‘ili* (smaller land division, often within an *ahupua‘a*) of ‘Ele‘ele, within Hanapēpē Ahupua‘a in the *moku* of Kona on the south side of Kaua‘i. Hanapēpē Ahupua‘a is centrally situated within Kona Moku and is bounded by Wahiawa Ahupua‘a on the east and Makaweli Ahupua‘a on the west.

Hanapēpē Ahupua‘a encompasses the entire length of the Hanapēpē River, the third longest river on the island. The waters of Hanapēpē River originate on Kawaikini, the highest peak of Mount Wai‘ale‘ale, and empty into Hanapēpē Bay. The copious fresh water flowing from the summit and numerous side valleys forms a series of great waterfalls interspersed with flatter regions and bracketed by steep *pali*. This resource of fresh water along with rich alluvial soils provided optimal conditions for the cultivation of wetland *kalo* (taro; *Colocasia esculenta*), the staple Hawaiian food crop.

In 1824, Reverend Hiram Bingham visited the island of Kaua‘i and described the lush and cultivated setting of Hanapēpē:

For the first half mile from the sea, the valley seems sterile, and is little cultivated, but has a pleasant grove of cocoanut trees. The rest of the valley, more fertile and more cultivated, is sprinkled with trees and shrubs, embracing a few orange trees, and being walled up on the east and west by bold, precipitous bluffs, rising higher and higher towards the mountains, from fifty feet to fifteen hundred, appears from one of the *palis*, like an extensive, well-watered plantation, interspersed with *kalo* beds and one hundred and forty cottages, and furnishes employment and sustenance to some seven hundred inhabitants. (Bingham 1847:219)

According to E.S. Craighill and Elizabeth Green Handy, who travelled throughout the Hawaiian Islands and studied Hawaiian agricultural practices in the mid-twentieth century:

Next to Waimea, Hanapepe Valley must in ancient times have supported the largest population in the *kona* section. It is a magnificent steep-walled valley winding far into the uplands, but flatlands along the large streams offer ideal locations for wet taro for six miles or more inland...Bennett, who explored Hanapepe for some distance inland, reports that “the taro terraces are everywhere that the land is irrigable.” (Handy and Handy 1972:429)

In 1964 we were able to explore the whole length of Hanapepe Valley, which is about nine miles long, from its mouth to the waterfall at the head. As far in as seven miles, every level area along the rushing stream showed traces of old *lo‘i* and house sites. The steep sides of the small gulches and valleys down which little streams cascade, were, wherever we examined them, built up with tier upon tier of stone-faced *lo‘i*, some of them with walls five or more feet high. *Auwai* tapped the streams above the highest *lo‘i* and the water then ran down over successive stepped terraces. (Handy and Handy 1972:431)

The *‘ili* of ‘Ele‘ele, literally translated as “black” (Pukui et al. 1974:27), is located along the eastern side of Hanapēpē Ahupua‘a (Figure 6 through Figure 11). It encompasses a portion of the Hanapēpē River coastal floodplain, zigzagging from the eastern bank to the western bank and back, the cliffs along the eastern edge of the river, and the dry plateau on the eastern boundary with Wahiawa Ahupua‘a (see Figure 11).

According to an 1872 survey (see Figure 6) and associated 1873 petition to define the boundaries of ‘Ele‘ele by John Dominis on behalf of the recently deceased King Kamehameha V (Lot Kapuāiwa), the ‘ili was demarcated by several prominent landmarks:

Commences at a rocky point on the sea shore at the junction of Kuiloa [‘Ili] Boundary and called Kupuhili, and thence mauka along the Hanapepe river and Boundary of Kuiloa to a place on the river bank called Palemo. Thence turning East to an old Auwai that formerly led to a fish pond Kualaau. Thence through rice fields to a hole in the side of the Pale [pali] called Nihouana. Thence up in a straight line to top of ridge and mauka along ridge to Kaneohia. Thence continuing along top of ridge and pale [pali] to opposite and down to a large hole in side of cliff called Heana. Thence to an old Heau [heiau] where the Boundary again joins the Mauka or NE corner of Kuiloa at a place called Kaluea where there is a large Pride of India tree. Thence across the Hanapepe river to Hailiili. Thence up along the old bed of river to loi [lo‘i] Puuhau. Thence to Kuhuna. Thence to ridge of stones across river called Waipa. Thence to head of auwai of Eleele at a place called Akeahi. Thence up face of high cliff to top of ridge and along ridge and pale [pali] to Rowells stone wall and following said stone wall to junction with the Boundary of Wahiawa. Thence makai along the Wahiawa Boundary in all its windings and turnings to a rocky point on the sea shore called Kenakua and then West along sea shore to Kupuhele the place of commencement. (Certificate of the Boundaries of the Land of Eleele, District of Waimea, Island of Kauai, as verified by the Fourth Judicial Circuit 1873; see Appendix A)

The proposed project area is located within the eastern, or upper plateau, portion of ‘Ele‘ele. This area was described in the informal notes of the 1872 land surveyor, Janus Gay, as “chiefly adapted for grazing purposes” and “very stony” (Gay 1873:4). This notation echoes an earlier description of the coastal plateau lands of southern Kaua‘i by Charles Wilkes of the United States Exploring Expedition, which visited the Hawaiian Islands annually during the years 1838-1842:

The whole distance between Koloa and Waimea was found to be a series of sunburnt hills and barren plains, sloping gradually from the base of the mountains to the ocean, and now and then intersected with ravines, or, as they are called in the Hawaiian Islands, “gulches.” Only a few coarse grasses are met with, quite unfit for pasture. (Wilkes 1845:64-65)

In 1824, the dry plains of ‘Ele‘ele were the site of an uprising of Kaua‘i *ali‘i* (chiefs) led by George Humehume, son of the recently deceased Kaumuali‘i, the last independent *mō‘ī* (ruler) of Kaua‘i. The Kaua‘i forces desired to restore the sovereignty of Kaua‘i Island, which had been absorbed into the Kingdom of Hawai‘i under Kamehameha I in 1810:

Fittingly, on the plains of ‘Ele‘ele, “black,” the battle that ended the separate kingdom of Kaua‘i was fought. On one side were the Kaua‘i chiefs still loyal to their dead king Kaumuali‘i, armed with wooden war clubs, spears, daggers, and slings. Opposite them were the Kamehameha forces armed with rifles and cannon. In August 1824 the two armies fought. The Kaua‘i army was destroyed, and for two weeks before amnesty was declared the Kamehameha forces sought out all the *ali‘i* they could find and killed them—men, women, and children. (Bingham 1847, as paraphrased in Wichman 1998:30)

During the 1848 Mahele instituted by King Kamehameha III (Kauikeaouli), wherein traditional Hawaiian land tenure was converted to property ownership based on Western legal principles, the *ahupua‘a* of Hanapēpē was claimed by Kamehameha III. However, the ‘ili of ‘Ele‘ele, which

constituted an *‘ili kūpono* (an *‘ili* independent of the *ahupua‘a* in which it is situated), was awarded to Mataio Kekūanaō‘a as Land Commission Award (LCA) 7712, *‘āpana* (parcel) 5. Kekūanaō‘a was a high chief of Hawai‘i Island and third husband of Kīna‘u, a daughter of Kamehameha I by Kaheiheimālie (Hammatt 1990:7). Upon his death in 1868, ‘Ele‘ele passed to his son, Kamehameha V.

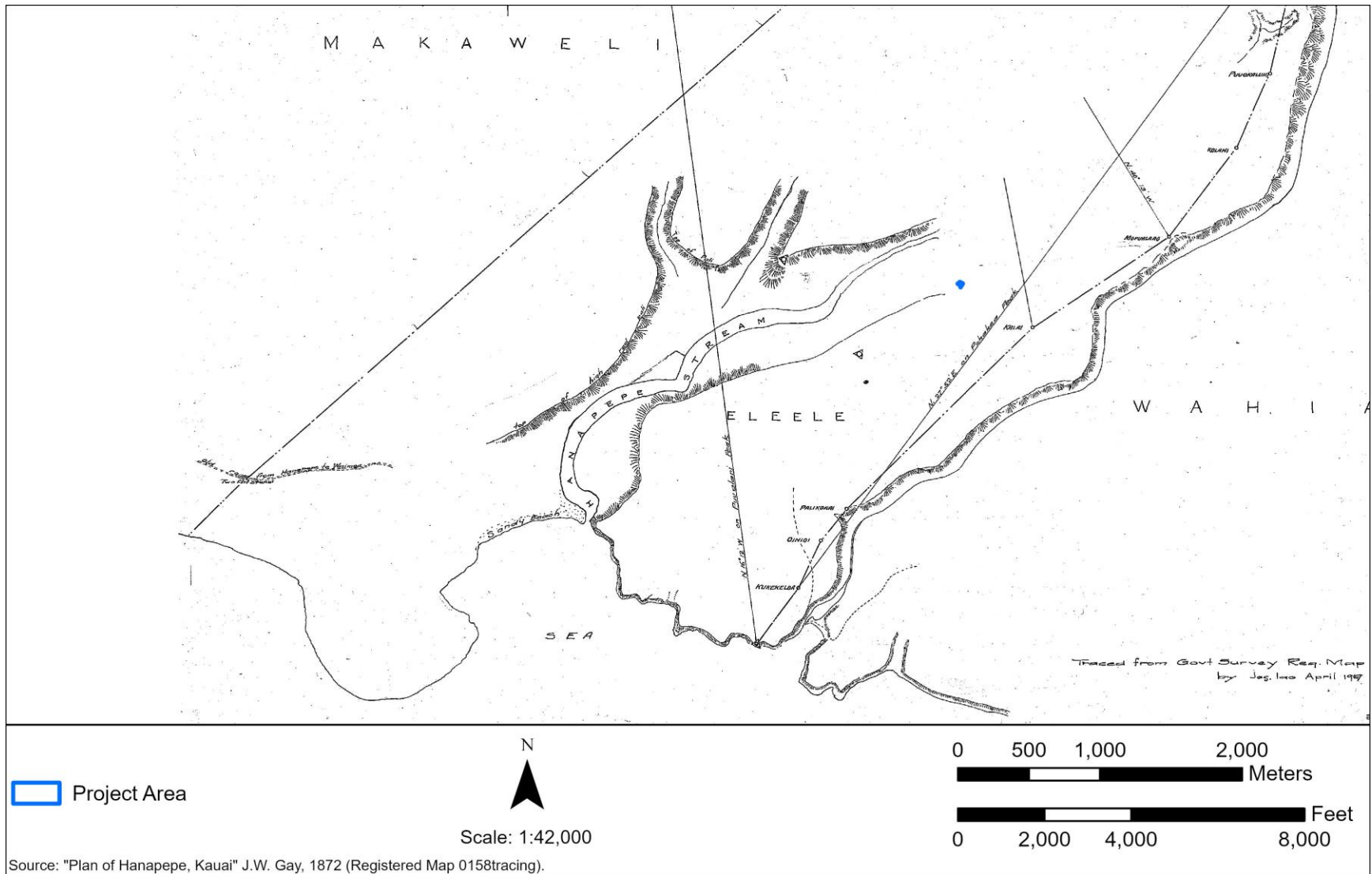
Between ca. 1863 and 1873, the *‘ili* of ‘Ele‘ele was leased by Valdemar Knudsen (Interior Department 1873; memo available on Papakilo Database). Knudsen, a Norwegian, settled at Waiawa, Kaua‘i in 1856 and became a prominent rancher and sugar plantation entrepreneur with multiple leases of land, totaling approximately 100,000 acres, across southern Kaua‘i (Greipsland 2016).

In 1884, Bernice Pauahi Bishop, heiress of the Kamehameha lands across the archipelago, sold the *‘ili* of ‘Ele‘ele to August Dreier and Elizabeth McBryde. Dreier, a German engineer, settled on Kaua‘i in 1866. After working at the Lihue Plantation, he transferred his knowledge to opening a sugar venture in Kōloa and eventually the establishment of the ‘Ele‘ele Plantation, with 50% split ownership (Young 2023). Elizabeth McBryde was the widow of Duncan McBryde, a Scotsman, who in 1874 had established a large ranch in Wahiawa Ahupua‘a. By 1889, ‘Ele‘ele Plantation produced an estimated crop value of \$200,000, which was comparable to the outputs of Grove Farm Plantation and Kekaha Sugar Mill, also located on the south coast of Kaua‘i (Thrum 1889:29).

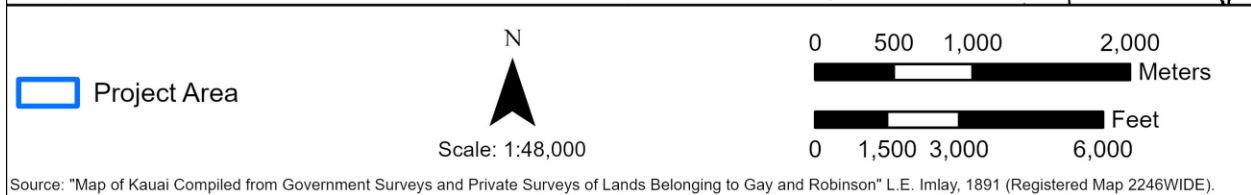
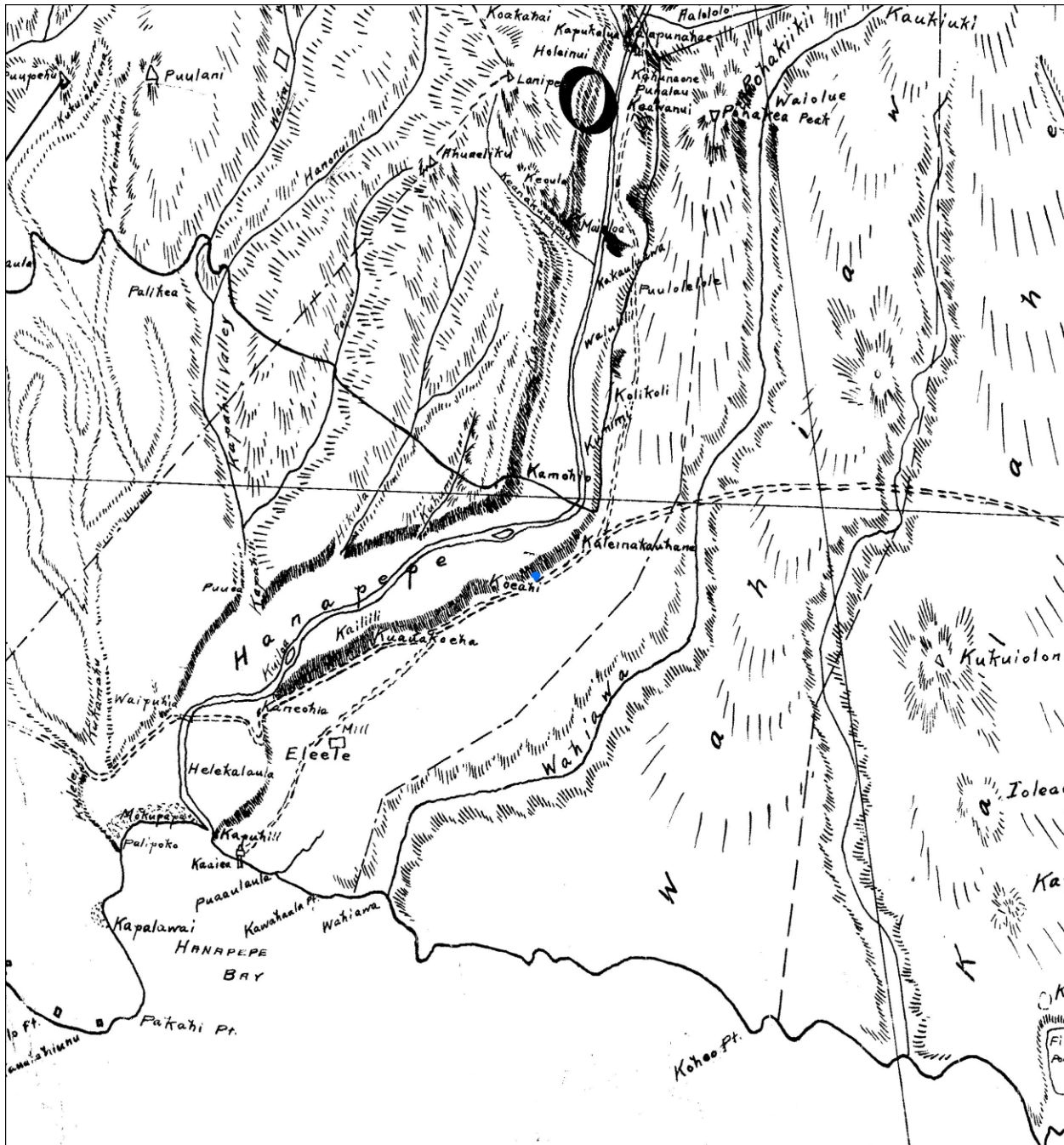
In 1889, McBryde Sugar Company was formed by the merger of ‘Ele‘ele Plantation, the McBryde ranch, and Koloa Agricultural Company (Dorrance 2000:36; Soboleski 2023). In 1899, through a series of legal transactions, Walter Dillingham gained control of the lands stretching from ‘Ele‘ele to Kōloa and intensified the agricultural infrastructure for cane production (see Figure 9 and Figure 10). In 1909, the operation was acquired by Alexander and Baldwin Corporation (Sandison 1956 in Dagher and Spear 2014:16-17).

Twentieth-century sugar cane production in ‘Ele‘ele involved massive land clearance and the installation of a vast irrigation system, including the creation of reservoirs, water ditches, and piping, as well as a power line system originating from a hydroelectric plant constructed in 1906 in Wainiha Valley. In order to transport the cane and necessary machinery, the harbor of ‘Ele‘ele, known as ‘Ele‘ele Landing until 1950 when it was renamed Port Allen, was greatly expanded and upgraded, including the dredging of the harbor and the construction of a pier and breakwater in 1939. Rail infrastructure constructed by the Kaua‘i Railway Company connected Port Allen with various plantation locations (Stroup 1950:35; Soboleski 2023).

Twentieth-century world events brought many difficulties to the Hawai‘i sugar industry with the outbreak of World Wars I and II and resultant labor shortages, along with other economic and political transformations. Following Hurricane Iwa in 1982, the McBryde Sugar Company began to diversify its crops, planting macadamia and coffee trees in addition to sugar cane. Hurricane Iniki in 1992 inflicted devastating losses across the island of Kaua‘i, including the sugar cane fields of the McBryde Sugar Company. In 1996, the McBryde Sugar Company closed down. Today, these plantation lands are cultivated by the Kauai Coffee Company (Kauai Coffee 2019).

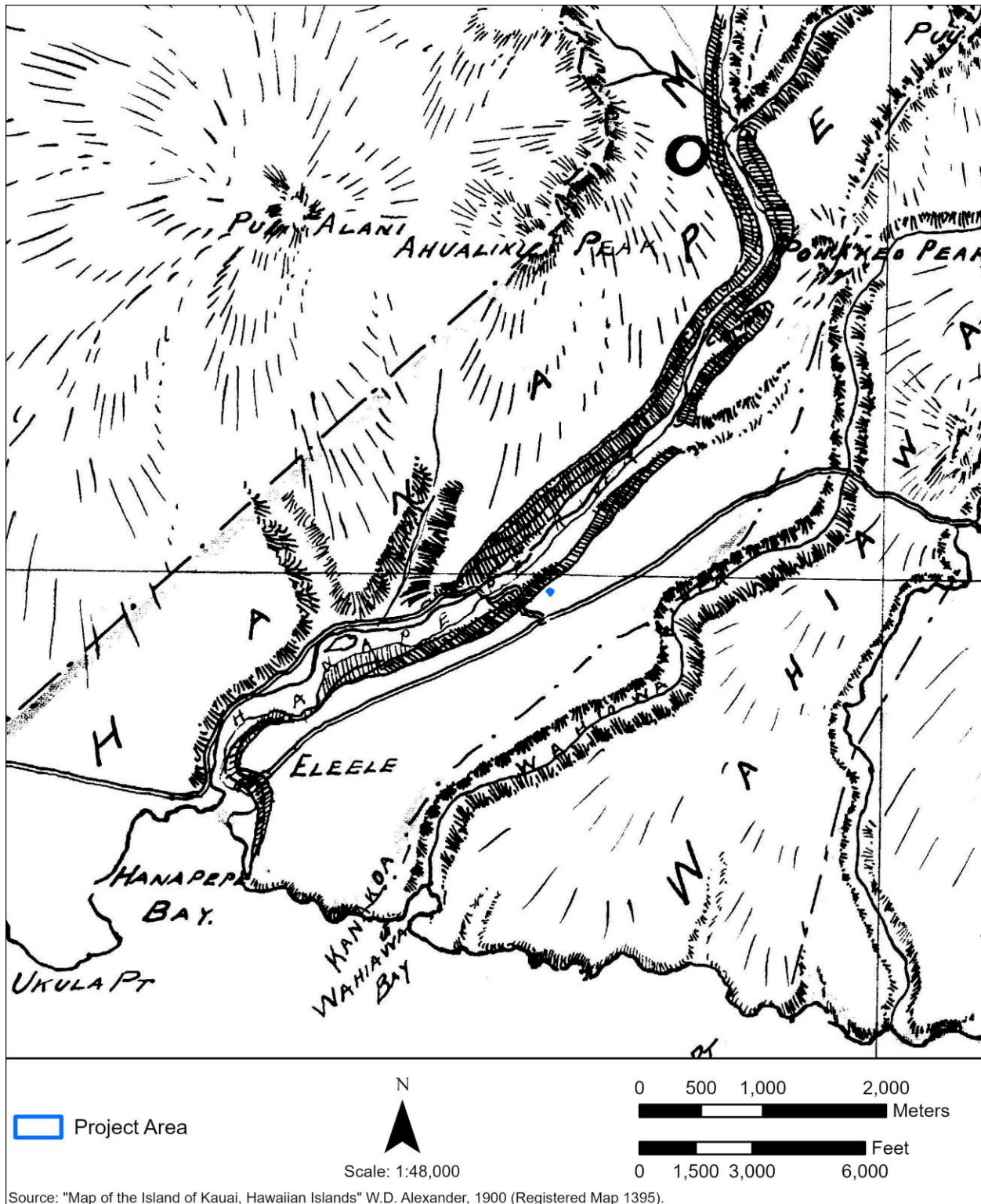


**Figure 6. 1872 map of Hanapēpē Valley (portion) by J.W. Gay, showing the proposed Off-Site Water System Improvements Project Area within 'Ele'ele.**

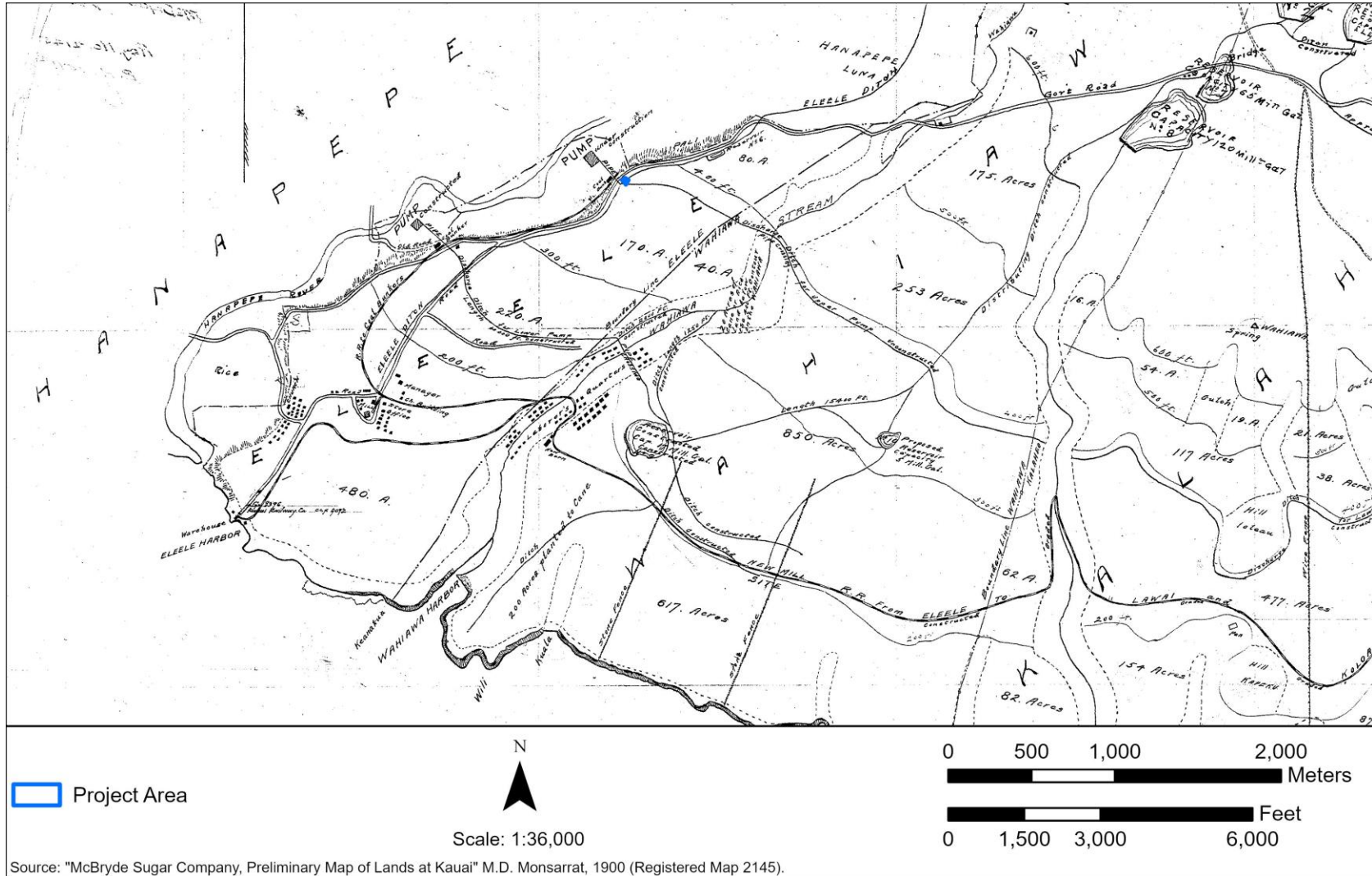


Source: "Map of Kauai Compiled from Government Surveys and Private Surveys of Lands Belonging to Gay and Robinson" L.E. Imlay, 1891 (Registered Map 2246WIDE).

**Figure 7. 1891 map of Kaua'i Island (portion) by L.E. Imlay, showing the proposed Off-Site Water System Improvements Project Area located on the plain of 'Ele'ele near the Hanapēpē Valley escarpment and mauka of a place named "Koeahi."**

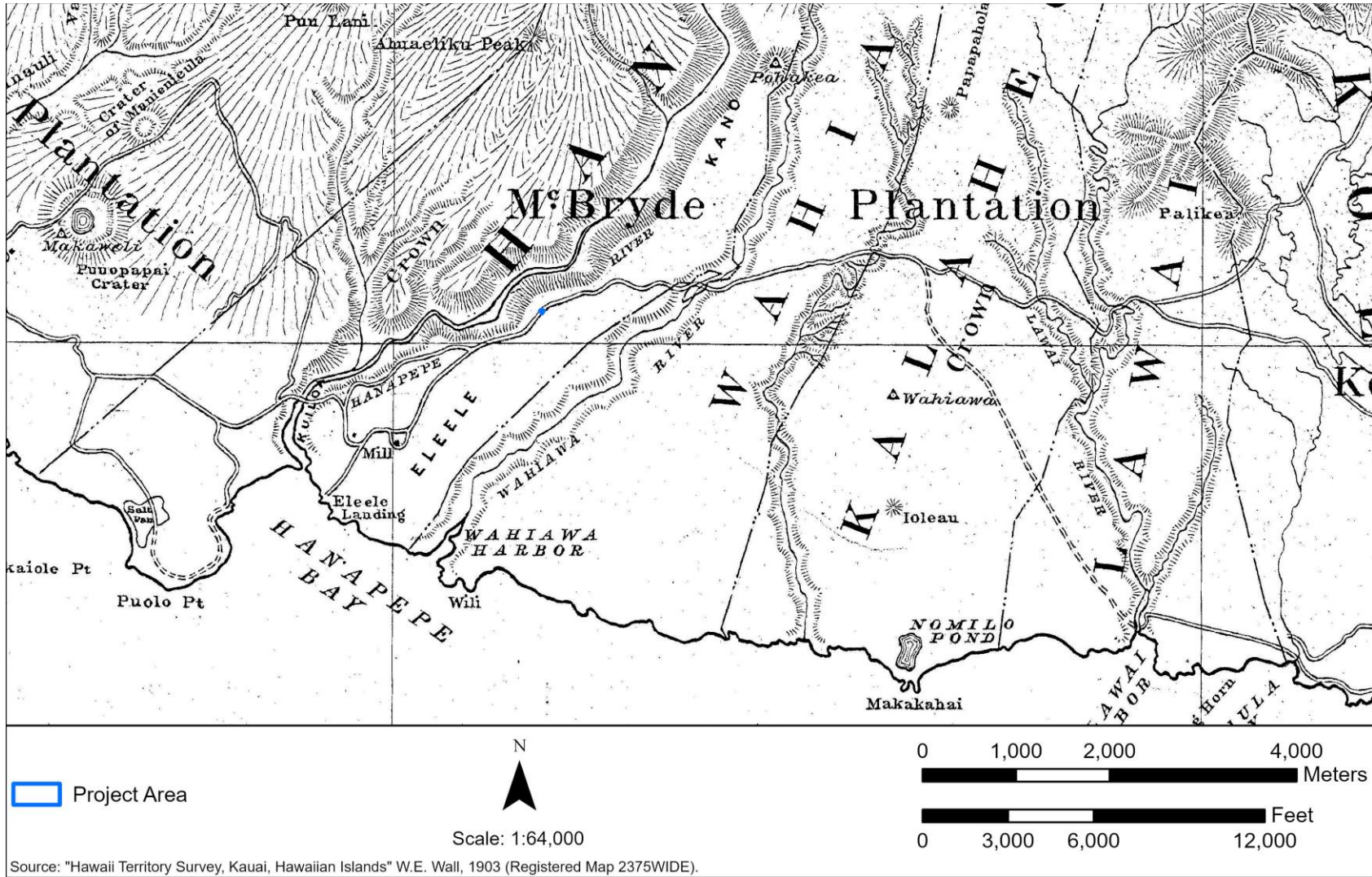


**Figure 8. 1900 map of Kaua'i Island (portion) by F.E. Harvey, showing the proposed Off-Site Water System Improvements Project Area located on the plain of 'Ele'ele near the Hanapēpē Valley escarpment.**

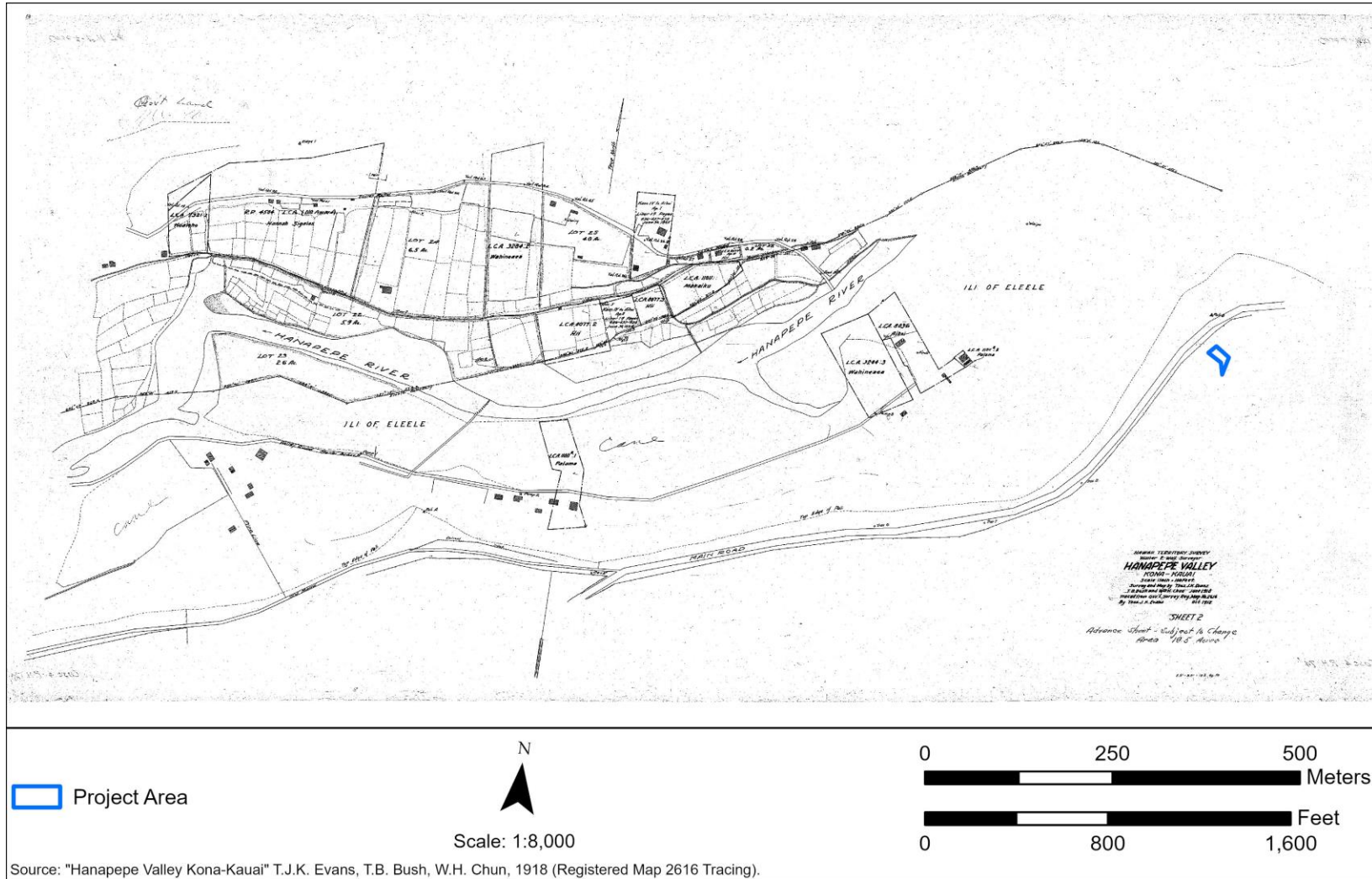


**Figure 9. 1900 map of the McBryde Sugar Company land holdings (portion) by M.D. Monsarrat, showing the proposed Off-Site Water System Improvements Project Area within the plain of 'Ele'ele and a network of irrigation ditches, including the mauka-makai oriented 'Ele'ele Ditch.**





**Figure 10. 1903 map of Kaua‘i Island (portion) by W.E. Wall, showing the proposed Off-Site Water System Improvements Project Area within the western portion of the McBryde Plantation and along a major roadway.**



**Figure 11. 1918 map of Hanapēpē Valley (portion) by T.J.K. Evans et al., showing the boundary of ‘Ele‘ele ‘Ili crossing the Hanapēpē River multiple times before turning east to ascend up the valley escarpment; the proposed Off-Site Water System Improvements Project Area is located atop the cliff on the south side of the “MAIN ROAD.”**

### 3.0 PREVIOUS ARCHAEOLOGY

A number of previous archaeological investigations have been conducted within a 1-mile (1.6 km) radius of the proposed Off-Site Water System Improvements Project Area (Figure 12, Table 1). These studies are summarized below. The locations of documented historic properties are depicted on Figure 13 and the historic property types are presented within Table 2.

The earliest archaeological investigation of Kaua‘i Island was undertaken between 1928 and 1929 by Wendell Bennett (Bennett 1931). Bennett conducted nine months of fieldwork along with a study of Bernice Pauahi Bishop Museum resources, published literature, and various artifact collections. Of the 202 sites identified throughout Kaua‘i (Bennett 1931:98), 12 were located within Hanapēpē Ahupua‘a. Of these, four were located within a 1-mile radius of the current proposed project area (Bennett 1931:113-115). Site 56 (SIHP 50-30-09-00056) consists of remnants of Akowai Heiau. Site 57 (SIHP 50-30-09-00057) consists of three stone-paved house sites in the area of Akowai Heiau. Site 60 (SIHP 50-30-09-00060) comprises the Hanapēpē Complex, a large area within Hanapēpē Valley containing a complex of taro terraces and house sites. Site 61 (SIHP 50-30-09-00061) is a complex of taro terraces, possible agricultural clearance walls, platform house sites, and possible burial caves and petroglyphs within Wahiawa Valley. No sites were noted within the upland plains of ‘Ele‘ele.

In 1960, Richard Pearson of the Bernice Pauahi Bishop Museum conducted a study of the extent of traditional Hawaiian taro agriculture in Hanapēpē Valley (Pearson 1962). The study included background research, a three-day reconnaissance survey, and four days of test excavations; the fieldwork crew included graduate students William Kikuchi and Richard Paglinawan. Excavations within terrace walls did not provide organic material for study. Based primarily on historical research, Pearson concluded that “Our material substantiated Bennett’s terse statement that every available corner of the valley was irrigated and in taro in aboriginal times” (Pearson 1962:12). The precise locations of the test excavations could not be determined from the available documentation.

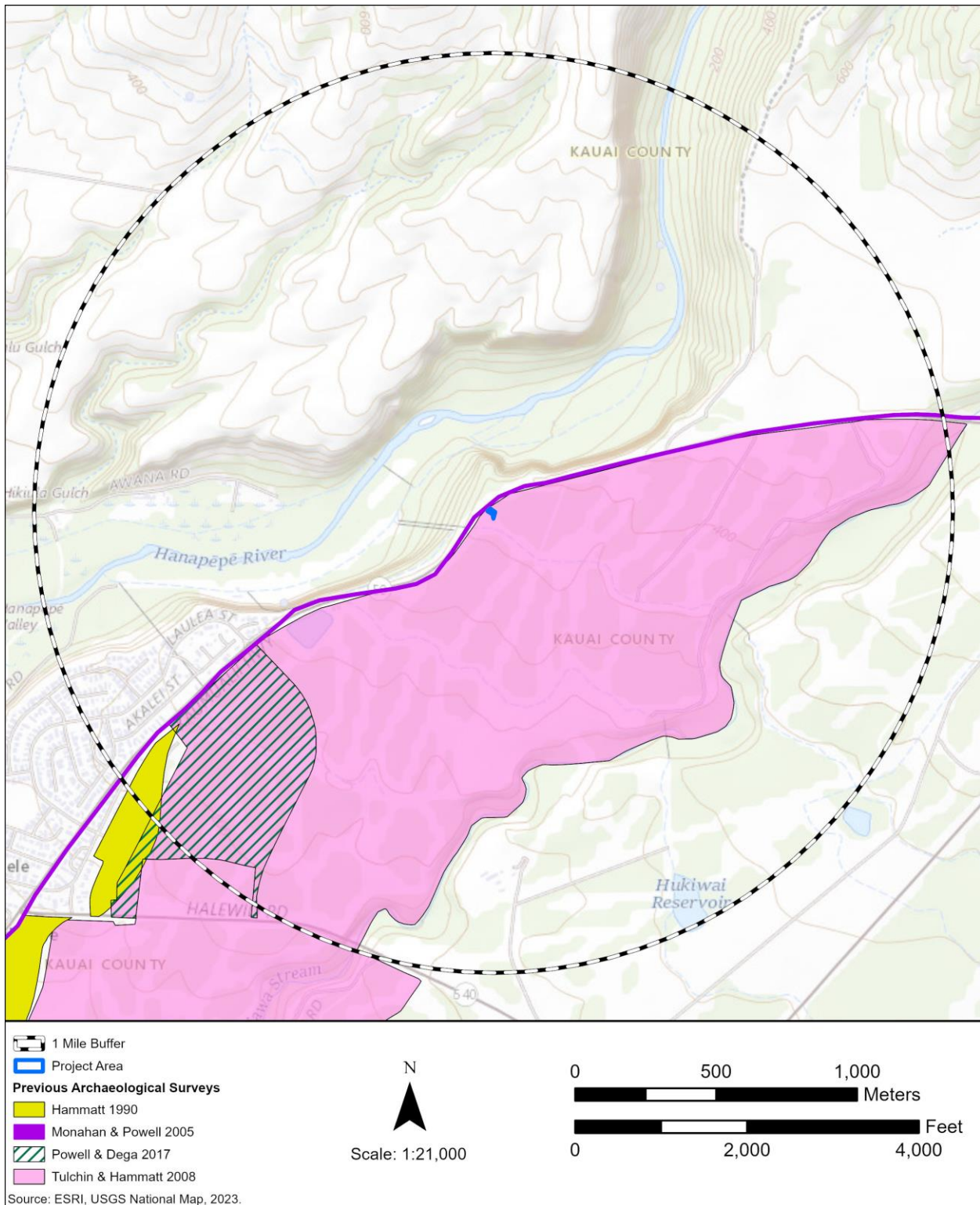
In 1961, William Kikuchi and Richard Paglinawan conducted a three-week survey of the Kona coastline extending from Hanapēpē Bay through Maha‘ulepū Ahupua‘a. This was followed by limited subsurface testing in 1963 (Kikuchi 1963). The survey identified and described a total of 108 sites, and described a small number of additional sites that they were unable to definitively locate. Within Hanapēpē Ahupua‘a, two sites were located within a 1-mile radius of the current proposed project area (Kikuchi 1963:3). Site 1 (SIHP 50-30-09-03037) consists of burial caves with remnant wooden coffins located in the north *pali* of Hanapēpē Valley. Site 2 represents Akowai Heiau (SIHP 50-30-09-00056). Within Wahiawa Ahupua‘a, five sites were located within a 1-mile radius of the current proposed project area (Kikuchi 1963:10-16). Site 8 (SIHP 50-30-09-03040) is a shelter cave containing midden and historic artifacts within the interior. Site 9 (SIHP 50-30-09-03041) consists of names of Hawaiian individuals pecked on the cliff walls on the exterior of Site 8. Site 10 (SIHP 50-30-09-03042) consists of petroglyph figures as well as pecked names, also located around Site 8. Site 11 (SIHP 50-30-09-03043) consists of two large boulders with petroglyph figures. Site 12 (SIHP 50-30-09-03044) is a grindstone located beside a stream bed. Site 13 (SIHP 50-30-09-03045) is a house site.

In 1990, Cultural Surveys Hawai‘i, Inc. (CSH) conducted a one-day archaeological reconnaissance survey of 72 acres in ‘Ele‘ele (Hammatt 1990). The project area extended from Port Allen to 230 feet above sea level. The survey was limited to cane roads and young cane fields with good visibility. No historic properties were identified.

In 2003 and 2004, Scientific Consultant Services, Inc. (SCS) conducted archaeological monitoring for the Phase II Kaua'i Rural Fiber Optic Duct Lines Project (Monahan and Powell 2005). The project corridor extended primarily along the Kaumuali'i Highway right-of-way between Lihu'e and Kekaha. They identified a total of 10 historic properties, including six historic bridges (SIHP 50-30-09-01043 through 50-30-09-01046, 50-30-09-03884, and 50-30-09-03885), two burials (SIHP 50-30-05-03880 and 50-30-05-03881), a subsurface cultural layer (SIHP 50-30-09-03882), and a subsurface road base (SIHP 50-30-11-03883). No historic properties were identified within 'Ele'ele.

In 2008, CSH carried out an archaeological inventory survey (AIS) for the 777-acre 'Ele'ele Urban Expansion Project (Tulchin and Hammatt 2008). They identified a total of 11 sites which could be affected by the proposed development, most of which related to plantation irrigation or transportation features (SIHP 50-30-09-00685 through 50-30-09-00695). Eight historic properties were documented within a 1-mile radius of the current proposed project area. The sites are associated with historic sugar plantation infrastructure and include a water reservoir (SIHP 50-30-09-00690), irrigation ditches (SIHP 50-30-09-00689, 50-30-09-00691, 50-30-09-00692, 50-30-09-00693, and 50-30-09-00694), a soil/rock mound (SIHP 50-30-09-00688), and a historic road (SIHP 50-30-09-00695). The current proposed project area is located just south of the SIHP -00693 irrigation ditch. All eight historic properties were assessed as significant under criterion d and recommended for no further work. However, a letter from SHPD dated August 19, 2008 in response to the AIS submittal indicated that the identified historic properties were also significant under criteria a and c in addition to criterion d (it is not apparent whether the AIS was revised to reflect this recommendation). SHPD recommended SIHP -00688 through -00691, -00693 and -00694 for data recovery. SIHP -00692 and -00695 were recommended for no further work.

In 2014, SCS carried out an AIS for the Lima Ola Workforce Housing Development Project (Powell and Dega 2017). The project area encompassed 78 acres of agricultural land to the south of the current proposed project area. Fieldwork included a 100% pedestrian survey and five backhoe test trenches. One historic-era irrigation ditch was recorded and designated SIHP 50-30-09-02219; this ditch corresponds with SIHP 50-30-09-00692 (Tulchin and Hammatt 2008). The ditch was constructed in 1908 as infrastructure for the McBryde Sugar Company and was known as the Pump 1 Ditch (Powell and Dega 2014:23). The excavations extended to maximum depths of 50-90 cm below surface and exposed a deposit of red silty clay to silty clay loam soil.

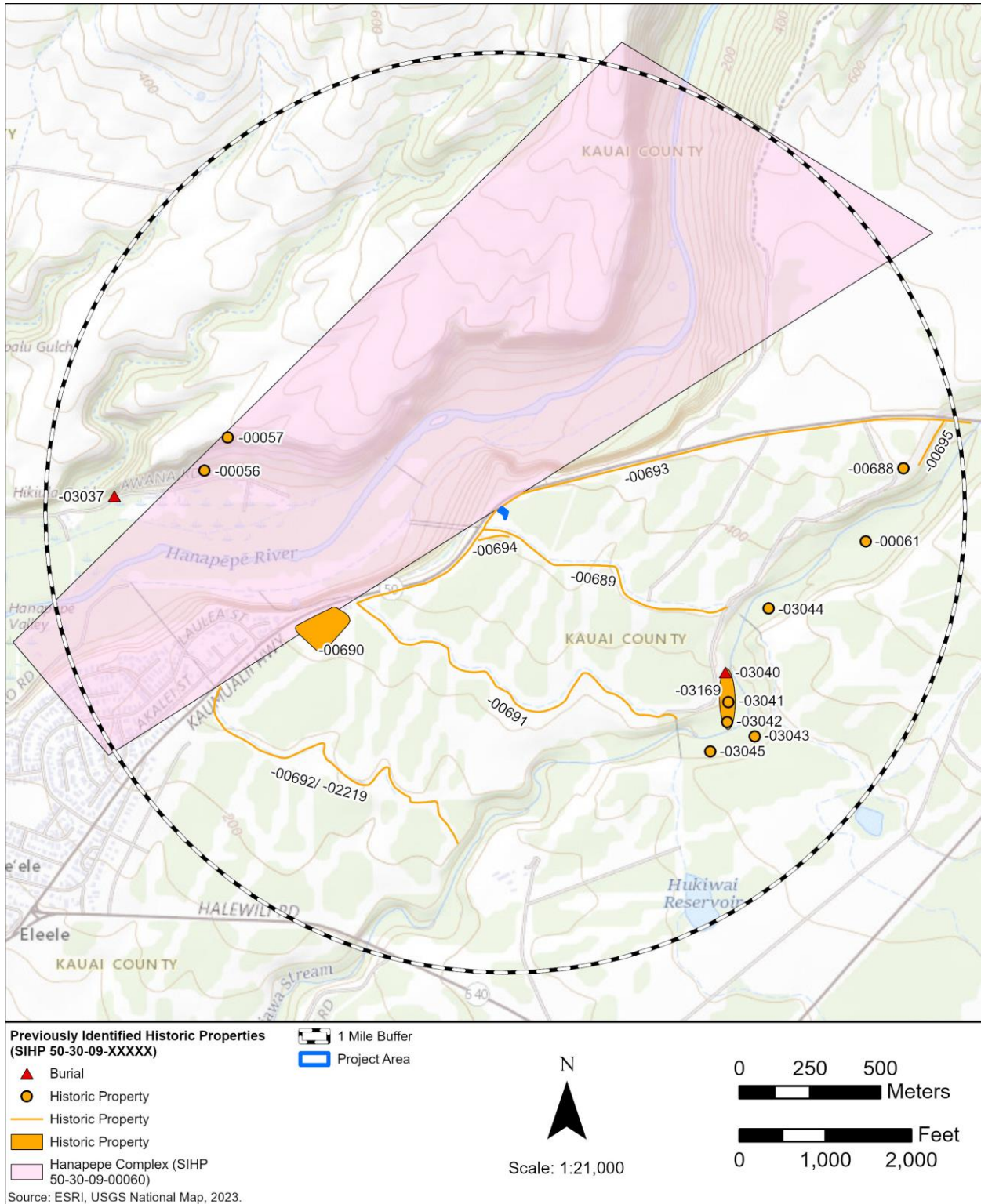


**Figure 12. Previous archaeological investigations within a 1-mile radius of the proposed Off-Site Water System Improvements Project Area (base map: Esri World Imagery 2023).**

**Table 1. Previous Archaeological Studies within a 1-Mile Radius of the Proposed Off-Site Water System Improvements Project Area**

Reference	Type of Study	Location	Findings (SIHP 50-30-09-)
Bennett 1931	Archaeological survey	Kaua'i Island	Island-wide survey identified four historic properties within one mile of the proposed project area: Akowai Heiau (SIHP -00056); house sites at Akowai (SIHP -00057); the Hanapēpē Complex of agricultural terraces and habitation sites (SIHP -00060); and a complex of agricultural terraces, walls, and house sites in Wahiawa (SIHP -00061).
Pearson 1962	Historical research, archaeological reconnaissance survey, and limited testing	Hanapēpē Valley	Background research supported the hypothesis that all available land within Hanapēpē Valley was under cultivation during the late pre-Contact period. Excavations within terrace walls did not provide organic material for study.
Kikuchi 1963	Archaeological survey	Kona District: Hanapēpē Bay to Maha'ulepū	District-wide survey. A total of 108 sites identified and described. Seven newly identified historic properties within one mile of the proposed project area: Site 1, burial caves (SIHP -03037); Site 8, a shelter cave (SIHP -03040); Site 9, petroglyph names (SIHP -03041); Sites 10 and 11, petroglyphs (SIHP -03042 and -03043); Site 12, a grindstone (SIHP -03044); and Site 13, a house site (SIHP -03045). The SHPD database groups Sites -03040 through -03042 into a complex (SIHP -03169). One previously documented historic property recorded: Site 2, Akowai Heiau (SIHP -00056).
Hammatt 1990	Archaeological reconnaissance survey	'Ele'ele	Reconnaissance of 72 acres from sea level to 230 ft elevation; no historic properties identified.
Monahan & Powell 2005	Archaeological monitoring	Kaumuali'i Hwy. rights-of-way and portions of Kuhio Hwy. and Moi Rd.	Identified 10 total historic properties. No historic properties identified within 1 mile of the proposed project area.
Tulchin & Hammatt 2008	Archaeological inventory survey	'Ele'ele and Wahiawa	AIS of 777 acres. Identified 11 historic properties. Eight historic properties identified within one mile of the proposed project area: irrigation infrastructure (SIHP -00688 through -00694) and a historic road (SIHP -00695).

Reference	Type of Study	Location	Findings (SIHP 50-30-09-)
Powell & Dega 2017	Archaeological inventory survey	Lima Ola Housing	Survey included 5 test trenches. One historic property identified: an irrigation ditch associated with the McBryde Sugar Company (SIHP -02219; previously documented as SIHP -00692 by Tulchin & Hammatt in 2008).



**Figure 13. Previously identified historic properties within a 1-mile radius of the proposed Off-Site Water System Improvements Project Area (base map: Esri World Imagery 2023).**



**Table 2. Archaeological Historic Properties within a 1-Mile Radius of the proposed Off-Site Water System Improvements Project Area**

SIHP Number (50-30-09)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
-00056	Akawai Heiau (Site 2 in Kikuchi 1963)	Ceremonial	Pre-Contact	None Provided	None Provided	Bennett 1931; Kikuchi 1963
-00057	House Sites at Akowai	Permanent Habitation	Pre-Contact	None Provided	None Provided	Bennett 1931
-00060	Hanapepe Complex	Agriculture/Habitation	Pre-Contact	None Provided	None Provided	Bennett 1931
-00061	Taro Terraces, Walls, Platforms	Agriculture/Habitation	Pre-Contact	None Provided	None Provided	Bennett 1931
-00688	Irrigation Infrastructure	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00689	Irrigation Ditch	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00690	Kapa Reservoir	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00691	Irrigation Ditch	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00692/-02219	Pump 1 Ditch	Plantation Irrigation	Post-Contact	d	No Further Work	Tulchin & Hammatt 2008; Powell & Dega 2017
-00693	Irrigation Ditch	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00694	Irrigation Ditch	Plantation Irrigation	Post-Contact	d	Data Recovery	Tulchin & Hammatt 2008
-00695	Road	Transportation	Post-Contact	d	No Further Work	Tulchin & Hammatt 2008
-03037	Burial Caves (Site 1 in Kikuchi 1963)	Burial	Pre- to Post-Contact	None Provided	None Provided	Kikuchi 1963
-03040	Shelter Cave (Site 8 in Kikuchi 1963)	Habitation/Possible Burial	Pre- to Post-Contact	None Provided	None Provided	Kikuchi 1963
-03041	Petroglyph	Art/Symbolism	Post-Contact	None	None Provided	Kikuchi 1963

Literature Review and Field Inspection  
 Off-Site Water System Improvements Project  
 ‘Ele‘ele, Hanapēpē Ahupua‘a, Kaua‘i Island  
 March 2024

SIHP Number (50-30-09)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
	Names (Site 9 in Kikuchi 1963)			Provided		
-03042	Petroglyphs (Site 10 in Kikuchi 1963)	Art/Symbolism	Pre- to Post-Contact	None Provided	None Provided	Kikuchi 1963
-03043	Petroglyphs (Site 11 in Kikuchi 1963)	Art/Symbolism	Pre-Contact	None Provided	None Provided	Kikuchi 1963
-03044	Modified Stone (Site 12 in Kikuchi 1963)	Grindstone	Pre-Contact	None Provided	None Provided	Kikuchi 1963
-03045	House Site (Site 13 in Kikuchi 1963)	Habitation	Pre- to Post-Contact	None Provided	None Provided	Kikuchi 1963
-03169	Complex	Habitation/ Art/Symbolism/ Possible Burial	Pre-Contact	None Provided	None Provided	On File, SHPD

#### 4.0 RESULTS OF FIELD INSPECTION

A field inspection of the proposed project area was conducted on February 16, 2024 by Ena Sroat, B.A., and Emmaline Irvine, M.A., under the supervision of Mara Mulrooney, Ph.D. (Principal Investigator). The field inspection consisted of a reconnaissance pedestrian survey conducted in parallel sweeps of the proposed project area. The field inspection did not identify any potential historic properties within the proposed project area. As such, field recordation entailed general photo-documentation of the proposed project area.

The pedestrian survey commenced along the southern boundary of the proposed project area within an open space on the north side of the fenced Lima Ola Subdivision water storage tank area (Figure 14, Figure 15). The survey then tracked between each of the six rows of coffee trees located within the proposed project area (Figure 16, Figure 17). The inspection identified only modern irrigation lines running along the bases or at mid-height of the coffee trees (Figure 18). No artifacts or sugar plantation infrastructure were observed within the proposed project area. An earthen ditch (SIHP 50-30-09-00693) and white PVC irrigation piping was observed outside of and to the northwest of the proposed project area, and a concrete ditch (SIHP 50-30-09-00689) was observed outside of and to the south of the proposed project area (Figure 19).



**Figure 14. Photograph of the southern boundary of the proposed project area, bordering the Lima Ola Subdivision’s existing water storage tank (view to southeast).**



**Figure 15. Photograph of the southern-most row of coffee trees within the proposed project area (view to north).**



**Figure 16. Photograph of cultivated rows of coffee within the central portion of the proposed project area (view to east).**



**Figure 17. Photograph of the northern-most row of coffee trees within the proposed project area (view to west).**



**Figure 18. Photograph of modern coffee plantation infrastructure consisting of black irrigation lines within the proposed project area (view to northeast).**



**Figure 19. Photograph of a concrete water ditch (SIHP 50-30-09-00689) located on the south side of the current water storage tank, outside of the proposed project area (view to west).**

## 5.0 SUMMARY AND RECOMMENDATIONS

A literature review and field inspection were conducted for the proposed Off-Site Water System Improvements Project for the Lima Ola Subdivision in ‘Ele‘ele, Hanapēpē Ahupua‘a, Kona Moku, Kaua‘i Island [TMK: (4) 2-1-001:027 (por.)]. The literature review consisted of a review of historical documents, historical maps and aerial photographs, and reference materials. A one-day archaeological field inspection was conducted on February 16, 2024.

This work was initiated to facilitate historic preservation review by SHPD, as mandated by HRS Chapter 6E, for a proposed 18,700-sq. ft expansion to the water tank storage area for the Lima Ola Subdivision and the installation of a new 0.3 MG 402’ water storage tank.

The literature review found that the dry plateau area of ‘Ele‘ele, in which the proposed project area is located, lay outside of the habitation and agriculture locus of Hanapēpē, which was situated along Hanapēpē River. No cultural sites or resources were noted in this area in nineteenth-century written records or survey maps. Prior to the development of large-scale sugar plantations within ‘Ele‘ele in the late-nineteenth century, which continued until 1996, it was perhaps best known as the location of the last battle between the Kaua‘i *ali‘i*, in support of an independent Kaua‘i kingdom, and the Kamehameha dynasty.

The field inspection did not identify any potential historic properties within the proposed project area. Currently, the proposed project area is entirely under cultivation by the Kauai Coffee Company.

Based on the findings of the literature review and field inspection, no mitigation is recommended for the proposed project, as no subsurface historic properties or artifacts are expected to be encountered during project construction.

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## **APPENDIX A**

### 1873 Survey of 'Ele'ele

NO. 16

CERTIFICATE OF BOUNDARIES

Land of: E L E E L E

District of: W A I M E A

Island of: K A U A I

\*\*\*\*\*

Decision rendered: Nov. 25, 1873

By: Duncan McBryde  
Commissioner of Boundaries  
for the Island of Kauai.

\*\*\*\*\*

Certificate of the Boundaries of the Land  
of Elele District of Waimoa Island  
of Kauai

COMMISSION OF BOUNDARIES

~~Fourth~~ Judicial Circuit, Muncan McBryde, Esq., Commissioner.

In the Matter of the Boundaries  
of the Land of Elele  
District of Waimoa Island  
of Kauai

JUDGMENT.

An application to decide and certify the Boundaries of the Land  
of Elele District of Waimoa Island of  
Kauai having been filed with me on the 14 day of July  
1873 by Geo. O. Klemens Administrator of the  
Estate of His Late Majesty Kamehameha IV  
in accordance with the provisions of an Act to facilitate the settlement of Bound-  
aries, &c., approved on the 22d day of June, A. D. 1868; now, therefore,  
having duly received and heard all the testimony offered in reference to  
the said boundaries and having gone on the said land, at the request of

James W. Kay  
and having endeavored otherwise to obtain all information possible to enable  
me to arrive at a just decision, which will more fully appear by reference to the  
records of this matter by me kept in Book No. 1, page 76, and it  
appearing to my satisfaction that the true, lawful and equitable boundaries,  
are as follows, viz:

Commences at a rocky point  
on the sea shore at the junction of the Kuilow  
Boundary and called Kupuhili, and thence  
mauka along the Hanapepe river and  
Boundary of Kuilow to a place on the river  
banks called Palemo, thence turning East to  
an old Auwai that formerly led to a fish  
pond Kualoau, thence through rice fields to  
a hole in the side of the Pale called Nihouana  
thence up in a straight line to top of ridge  
and mauka along ridge to Kanikoa, thence

continuing along top of ridge and pale to  
opposite and down to a large hole in side of  
cliff called Heana, Thence to an old Heau  
where the Boundary again joins the Mauka  
or NE corner of Kulou at a place called Kalua  
where there is a large Crude of India tree.  
Thence across the Hanapepe river to Haitiili  
Thence up along the old bed of river to loi  
Puehau, Thence to Ruhuna, Thence to  
ridge of stones across river called Waipoa  
Thence to head of auwai of Olule at a place  
called Akahi, Thence up face of high cliff  
to top of ridge and along ridge and pale to  
Rowell's stone wall and following said stone  
wall to junction with the Boundary of Wahiawa  
Thence makaai along the Wahiawa Boundary  
in all its windings and turnings to a rocky  
point on the sea shore called Kenakua and  
then West along sea shore to Kupuheli the  
place of commencement.

It is therefore adjudged and I do  
hereby decide and certify that the Boundaries  
of the said land are and hereafter shall be as  
hereinbefore set forth.

Dated at Wahiawa this 10 day of  
March 1873

Henry A. Bryde  
Commissioner of Boundaries  
Fourth Judicial Circuit

Copy

Notes of Survey of the Land of Elele, on the  
South East Corner of the Ahupuaa of Hanapepe  
by  
James W. Gay

The South East corner of this land commences at the  
N. West corner of Waiwarra at a place called Ikenakina on the  
sea shore where the rocks form an arch through which the  
sea rushes. The boundary runs thence  
427: 48<sup>to</sup> 237<sup>5</sup> links to the centre of a pile of stones under which  
there is a kind of cave or tunnel. At 95 links on this line from  
the top of the cliff there is a flat and a long stone set into the ground  
and from whence the following places bear 44: 43<sup>to</sup> Ahuaelika  
Peak  $\Delta$  on the boundary of Hanapepe and Makaneli.  
432: 25<sup>to</sup> on Puukapele 416: 12<sup>to</sup> on Punalani Peak  $\Delta$   
429: 52<sup>to</sup> on Gohakaa Peak  $\Delta$  on the boundary of Waiwarra  
and Hanapepe. The boundary continued from 237<sup>5</sup> (1219.04)  
415: 39<sup>to</sup> 184<sup>7</sup> links to centre of large pile of stones. At  
399 links on this line close to Makaa side of road there are  
three stones set into the ground thence --- on the line)  
430: 36<sup>to</sup> 1410<sup>7</sup> links to place about 150 links from the top  
of the Falls (3) stones set into the ground thence  $\therefore$   
436: 53<sup>to</sup> 9035<sup>7</sup> links to three stones set into the ground thence  $\therefore$   
outside of old stone wall forming a kind of circle and in  
area about 1/4 acre, there is to the East a clump of Easton  
or Papipi paper thence  
441: 23<sup>to</sup> 5176<sup>7</sup> links to mauka side of Government road  
adjoining Mr. Russell's Land at Stone Fence which forms the  
N. East corner of this land. Thence following along towards

2nd day, Cont'd

? S 74° 32' W 564 Links S 87° 34' W 470 links thence 210.2

? S 73° 40' W 1232 . S 77° 32' W 323 links thence 213.18

S 74° 32' W 564

S 73° 40' W 1232

4 77° 32' W 1118 . to the top of pali or terrace which is the North West corner of this land and South West corner of Mr. Ronelli and from thence the following places bear

Ahuaihu Peak Δ S 26° 56' W Puuhalani Peak Δ

4 52° 27' W Puhakoa Peak Δ S 27° 42' E . The boundary runs thence

S 50° 0' W 628 Links along top of terrace

S 22° 57' W 368 Links thence

S 57° 49' W 1085

S 70° 33' W 1946

4 33° 25' W 620 over to the point top of Keahi point.

The last five courses are along to top of the pali or terrace which is the boundary.

Returning to the place of commencement the boundary runs along the sea shore in a N.W. direction to a point on the East side of the Heavapepe stream, at South corner of a Land called Kiuilua, the property of her Majesty Queen Kapiolani, from thence the boundary runs along the land of Kiuilua

4 65° 41' W 826 Links along Kiuilua. Thence

4 25° 52' W 801 to side of Puheana owned by

Keane and Kalo Kivalaaw - stone set into the ground here

4 48° 21' W 288 Links along to corner of Keane's Puheana

4 81° 20' W 2500 crossing through rice plantation and up the face of pali and passing through cave called Kihouana to the top of the terrace. Thence along top of terrace

4 9° 47' W 700 Links

4 16° 52' W 776





N 0° 3' W	<sup>455.4</sup> 690	links at <sup>51.8</sup> 727 links in the line passes close
<del>N 21° 30' W</del>	<del>791</del>	<del>links to the top of Francobis pali. Thence</del>
N 21° 30' W	<sup>506</sup> 791	links to the top of Francobis pali. Thence
W 82° 12' E	<sup>1115</sup> 1115	
W 58° E	563	
W 42° 30' E	1300	along the top of pali. Thence
W 2° 14' W	1950	passing down the face of pali and through
		cave called Hovana and across flat to the north corner of
		Prailoa. Thence
W 29° 29' W	<sup>305.3</sup> 462	links crossing Hanapepe stream to its natural
		bank and marked side of Gov. Road (then thru stone thm. :.)
W 57° E	<sup>266.6</sup> 407	links crossing an Aurrui, thence
W 70° 24' E	<sup>420</sup> 636	Hanapepe stream to its
		Eastern bank, Thence
W 60° 53' E	<sup>240</sup> 439	
W 87° 46' E	<sup>320.3</sup> 485	
W 62° 8' E	<sup>570</sup> 870	crossing Hanapepe stream to a point
		where a small stream joins the main one. Thence
W 61° 19' E	<sup>243.9</sup> 369	links crossing small stream and on to bank.
W 59° 14' E	<sup>409</sup> 418	along bank and past place called Puhuan
		where a Pamarind and Krango tree are growing. Thence
W 32° 21' E	<sup>409</sup> 62	links along Kuaanna. Thence
W 51° 8' E	<sup>106.7</sup> 161	
W 56° 2' E	<sup>139</sup> 210	
W 77° 33' E	<sup>15.8</sup> 24	
W 41° 38' E	<sup>172.3</sup> 412	
W 16° 23' E	<sup>115.3</sup> 175	to bank of Aurrui and called Kihunuu.
W 60° 34' E	<sup>355.3</sup> 538	along
W 49° 25' E	<sup>294.6</sup> 447	
W 40° 58' E	<sup>177.9</sup> 269	to Hanapepe stream
		and called Waipaa

46  
 N 49° 10' E 206 Links crossing stream to its East bank  
 N 65° 50' E 384<sup>W 3.6</sup> along bank of stream, Thence  
 N 82° 55' E 156<sup>103</sup> along old bank of stream  
 S 85° 12' E 835<sup>51.3</sup> Water comes to foot of Peaahi  
 pali, and containing an area of Seven Hundred and  
 Seventy One acres more or less.

This land is chiefly adapted for grazing  
 purposes, it is very stony. There is in the valley a  
 few acres here and there adapted and suitable for raising  
 rice, but to no great extent.

There is power here in this land a plant owned  
 by a native, but as the boundary has never been defined it  
 is not possible to say to what extent.

I hereby certify that this is a correct survey  
 of the land as shown by the Commission of Boundaries

James W. Gay  
 Surveyor

16 06 8 42 53  
 Cleele  
 Survey J. W. Gay

Notes of Survey of an Pl. of Land  
 called Elele situated in the Ahu-  
 puaa of Hanapepe District of Kona  
 Island of Hawaii made for & in aid  
 of His Excellency M. K. Kiana'oa Governor  
 etc etc.

Commencing upon the sea at  
 the Pali called Kawaakala at the  
 south westerly corner of the Harbor  
 of Mahiwa & upon the top of said  
 Pali running from thence N 30  
 E. 167 Chains following the top  
 of the Pali which bounds the  
 valley of Mahiwa on the West to  
 a rock on the edge of said Pali  
 thence N 49 E 24 Chains along  
 the edge of said Pali to a rock  
 thence S 82 E 5 Chains passing  
 down the side of said Pali to a  
 rock which stands near the west  
 bank of Mahiwa River & upon the  
 south easterly corner of the land  
 held by the Am. Bd of Foreign Missions

+ 110 65  
 chains along  
 foot of said  
 Pali bounded  
 by Kalo land  
 held by said  
 Mission here

in Hanapepe from thence N 11  
 W 3 25/100 Chains to the foot of the  
 Pali bounded by Kalo land held  
 by said Mission thence N 27 E 2 Chains  
 along foot of said Pali bounded



by land held by said Mufson thence  
N 51 E 8<sup>50</sup>/<sub>100</sub> Chains along foot of  
said Pali bounded by land held  
by said Mufson thence N 61 E 10<sup>50</sup>/<sub>100</sub>  
Chain bounded by land held by  
said Mufson to a stone wall  
thence N 89 W 5 Chains passing  
up the side of said pali bounded  
by a stone wall & land held by  
said Mufson thence S 84 W 1<sup>50</sup>/<sub>100</sub>  
Chain bounded by a stone wall  
& land held by said Mufson thence  
S 68 W 2 Chains bounded by a  
stone wall & land held by said  
Mufson thence S 50 W 5 Chains  
bounded by stone wall & land  
held by said Mufson thence S 32  
W 4<sup>50</sup>/<sub>100</sub> Chains bounded by a  
stone wall & land held by said  
Mufson thence S 43 W 15<sup>50</sup>/<sub>100</sub> Chain  
bounded by a stone wall & land  
held by said Mufson thence  
S 69 W 15 Chains bounded by  
a stone wall & land held by  
said Mufson thence N 82 W 11<sup>50</sup>/<sub>100</sub>  
Chains bounded by a stone wall  
& land held by said Mufson  
to the edge of the Pali which  
bounds the valley of Hanapepe  
on the East thence S 40 W 12 Chain  
along the edge of said pali

Hence  $S 47^{\circ} W 42$  Chains along  
the edge of said pali to a high  
rocky cape in said pali Hence  
 $N 77^{\circ} W 205 \frac{1}{100}$  Chains passing  
down the side of said pali &  
crossing the valley & river of Hanu,  
pepe to the foot of the pali bound-  
ing said valley on the West  
called Waipa Hence  $S 35^{\circ} W 21$   
Chains passing down the wester-  
ly side of said River to a Hanu  
Hence  $S 31^{\circ} 80' W 21 \frac{5}{100}$  Chains  
passing down the valley of Hanu,  
pepe to a certain rapid in the  
River of Hanapepe Hence  $S 61^{\circ}$   
 $W 23$  Chains passing down the  
valley of Hanapepe on the eastern  
side of said River to a stake  
Hence  $S 19^{\circ} W 9$  Chains passing  
down the valley of Hanapepe  
to the foot of the pali bounding  
said valley on the East Hence  
 $S 53^{\circ} W 17$  Chains along the  
foot of said pali Hence  $S 84^{\circ}$   
 $W 13$  Chains along foot of said  
pali & passing up to the top  
of the rocky point called Hanu,  
pepe Hence  $S 21^{\circ} E 19 \frac{8}{100}$  Chains  
along the edge of the pali called  
Kapalaui Hence  $S 11^{\circ} W 12 \frac{5}{100}$   
Chains along the edge of said  
pali Hence  $S 54^{\circ} W 19$  Chains

along the edge of said pali to the  
rocky point called Kūpukūhili  
upon the sea & at the easterly  
side of the mouth of Hanapepe  
River from thence following  
the Sea to point of commence-  
ment comprising an area  
of One Kōwāna Three Hundea  
& Thirteen Acres Two Rods &  
sixteen Perches.

Hawaii April 5. 52.

Wm. A. Peale.

Copy of W. A. Peale  
Orig. Drawing -

Certificate of the Boundaries  
of the  
Land of Eleele,  
District of Waimea,  
Kauai.

Commission of Boundaries, Fourth Judicial Circuit, Duncan McBryde, Com'r.

Judgment.

An application to decide and certify the boundaries of the Land of Eleele, District of Waimea, Island of Kauai, having been filed with me on the 14th day of July, 1873, Jno. O. Dominis, Administrator of the Estate of His Late Majesty Kamekameha V in accordance with the provisions of an Act to facilitate the settlement of Boundaries &c, approved on the 22nd day of June, A. D. 1868; now, therefore, having duly received and heard all the testimony offered in reference to the said boundaries and having gone on the said land, at the request of James W. Ray, and having endeavored otherwise to obtain all information possible to enable me to arrive at a just decision, which will more fully appear by reference to the records of this matter by me kept in Book No.1, page 76, and it appearing to my satisfaction that the true, lawful and equitable boundaries, are as follows, viz: Commences at a rocky point on the sea shore at the junction of the Kuilow Boundary and called Kupuhili, and thence mauka along the Hanapoepoe river and boundary of kuiloa to a place on the river bank called Palemo. Thence turning East to an old Auwai that formerly led to a fish pond Kualasu; Thence through rice fields to a hole in the side of the Pale called Nihouana. Thence up in a straight line to top of ridge and mauka along ridge to Kaniohea. Thence continuing along top of ridge and pale to opposite and down to a large hole in side of cliff called Heana. Thence to an old Heau where the boundary again joins the mauka or N.E. corner of Kuiloa at a place called Kaluea where there is a large Pride of India tree. Thence across the Hanapoepoe river to Hailili. Thence up along

the old bed of the river to loi Puuhau. Thence to Kuhuna. Thence to ridge of stones across river called Waipa. Thence to head of auwai of Eleele at a place called Akeahi. Thence up face of high cliff to top of ridge and along ridge and pali to Rowell's stone wall and following said stone wall to junction with the boundary of Wahiawa. Thence makai along the Wahiawa boundary in all its windings and turnings to a rocky point on the sea shore called Kenakua and then West along sea shore to Kupuhele the place of commencement.

It is therefore adjudged and I do hereby decide and certify that the boundaries of the said land are and hereafter shall be as hereinbefore set forth.

Dated at Wahiawa this 25 day of November A. D. 1873.

(Sgd.) Duncan McBryde,  
Commissioner of Boundaries  
Fourth Judicial Circuit.

In this case the expenses are:

Costs .....	\$24.75
Witnesses	<u>2.50</u>
	\$27.25

Which were all awarded to Eleele.

I hereby certify that the above is an accurate and true copy of the certificate of the boundaries of the land of Eleele, District of Waimea, Island of Kauai, issued on the 25th day of November, A. D. 1873.

(Sgd.) Duncan McBryde,  
Commissioner of Boundaries  
Fourth Judicial Circuit.



1039  
CERTIFICATE OF BOUNDARIES

15  
Island of Kauai, District

of Waimea, Land of  
Elele

Decision rendered 25<sup>th</sup> Nov<sup>r</sup>, 1873

By William A. Bryde  
Commissioner of Boundaries  
for the Island of Kauai

In this case the expenses are

Costs	\$ 24.75	
Witnesses	2.50	\$ 27.25
		<u>\$ 27.25</u>

Which were all awarded to Elele

I hereby certify that the above is an accurate and true copy of the certificate of the boundaries of the land of Elele District of Waimea Island of Kauai issued on the 23<sup>rd</sup> day of November A.D. 1873.

Muncan H. Bryde  
 Commissioner of Boundaries  
 Fourth Judicial Circuit

## ***Appendix C: Early Consultation Letters and Responses***

**ENGINEERING DIVISION**  
**DEPARTMENT OF PUBLIC WORKS**  
**TROY TANIGAWA, P.E., COUNTY ENGINEER**  
**BOYD GAYAGAS, DEPUTY COUNTY ENGINEER**



**DEREK S.K. KAWAKAMI, MAYOR**  
**REIKO MATSUYAMA, MANAGING DIRECTOR**

May 10, 2024

Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828  
Attn: Max Solmssen ([Max@kaimanaenv.com](mailto:Max@kaimanaenv.com))

Subject: Chapter 343 Pre-Consultation Request - Kaua'i County Housing Agency  
Lima Ola Affordable Housing Subdivision  
Proposed Off-Site Water System Improvements  
TMK: (4) 2-1-001:027, 'Ele'ele, Kaua'i

Dear Mr. Solmssen:

We offer the following comments:

1. The applicant shall comply with all provisions of the Kaua'i County Sediment and Erosion Control Ordinance No. 808 (Chapter 22, Article 7 of the Kaua'i County Code) to safeguard public health, safety, and welfare, to protect property, and to control soil erosion and sedimentation. This shall include, but not be limited to, a grading and/or grubbing permit in compliance with the Ordinance, which is required if any of the following conditions apply:
  - The work area exceeds one (1) acre.
  - Grading involving excavation or embankment, or combination thereof exceeds 100 cubic yards.
  - Grading exceeds five (5) feet in vertical height or depth at its deepest point.
  - The work area unreasonably alters the general drainage pattern to the detriment of abutting properties.

Per Section 22-7.6 of the Ordinance, the permit requirement can be exempted for work "...in an isolated, self-contained government-controlled area." If the government agency will have active construction management and inspection during the project to ensure compliance with the Ordinance, we recommend that they request a permit exemption.

2. During construction, best management practices (BMPs) shall be incorporated to the maximum extent practicable to prevent damage by sedimentation, erosion, or dust to watercourses, natural areas, and other properties. The permittee and the property owner shall be responsible for ensuring that BMPs are satisfactorily implemented at all times.

Should you have any questions, please contact Bryan Wienand at [bwienand@kauai.gov](mailto:bwienand@kauai.gov) or (808) 241-4896.

Sincerely,

Michael Moule, P.E.  
Chief, Engineering Division

MM/BW  
cc: Regulatory and Construction Compliance Section



**KaimanaEnv.com**

808.341.3546

P.O. Box 11890

Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Michael Moule, P.E.  
Chief, Engineering Division  
County of Kaua'i Department of Public Works  
4444 Rice Street, Suite 275  
Līhu'e, HI 96766

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i**

Thank you for your early consultation letter for the subject project. Your letter was received and will be included in the Draft Environmental Assessment (DEA). Below are responses to your comments:

The selected developer shall comply with all applicable provisions of the Kaua'i County Sediment and Erosion Control Ordinance No. 808 (Chapter 22, Article 7 of the Kaua'i County Code) to safeguard public health, safety, and welfare, to protect property, and to control soil erosion and sedimentation. The work area will not exceed one (1) acre. However, if any of the below conditions apply, the provisions of the Erosion Control Ordinance will be closely followed:

- If grading involving excavation or embankment, or combination thereof exceeds 100 cubic yards.
- Grading exceeds five (5) feet in vertical height or depth at its deepest point.
- The work area unreasonably alters the general drainage pattern to the detriment of abutting properties.

Comment: per Section 22-7.6 of the Kaua'i County Code, the permit requirement can be exempted for work "...in an isolated, self-contained government-controlled area." If the government agency will have active construction management and inspection during the project to ensure compliance with the Ordinance, we recommend that they request a permit exemption.

Response: The above comment will be included in the DEA analysis.

Comment: During construction, best management practices (BMPs) shall be incorporated to the maximum extent practicable to prevent damage by sedimentation, erosion, or dust to watercourses, natural areas, and other properties. The permittee and the property owner shall be responsible for ensuring that BMPs are satisfactorily implemented at all times.





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Response: The above comment will be included in the DEA analysis of impacts and mitigation measures.

Thank you for your participation in consultation process for the proposed project.

Sincerely,

Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC

**Email:** Max@kaimanaenv.com

**Mailing Address:**

Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828





**STATE OF HAWAII  
OFFICE OF PLANNING  
& SUSTAINABLE DEVELOPMENT**

**JOSH GREEN, M.D.**  
GOVERNOR

**SYLVIA LUKE**  
LT. GOVERNOR

**MARY ALICE EVANS**  
DIRECTOR

235 South Beretania Street, 6th Floor, Honolulu, Hawai'i 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawai'i 96804

Telephone: (808) 587-2846  
Fax: (808) 587-2824  
Web: <https://planning.hawaii.gov/>

DTS202404151611NA

Coastal Zone  
Management  
Program

May 16, 2024

Environmental Review  
Program

Land Use Commission

Land Use Division

Special Plans Branch

State Transit-Oriented  
Development

Statewide Geographic  
Information System

Statewide  
Sustainability Branch

Max Solmssen, Environmental Planner  
Kaimana Environmental Solutions LLC  
P.O. Box 11890  
Honolulu, Hawai'i 96828

Dear Mr. Solmssen:

**Subject: Request for Comments for Preparation of an Environmental Assessment (EA) for Proposed Offsite Waster System Improvements, Lima Ola Affordable Housing Subdivision, 'Ele'ele, Kaua'i  
Tax Map Key No. (4) 2-1-001: 027 (portion)**

The Office of Planning and Sustainable Development (OPSD) has reviewed the request for comments for the preparation of a Draft Environmental Assessment (DEA) for the subject project.

The County of Kaua'i Housing Agency proposes to construct a 0.3-million-gallon water tank and associated improvements to serve the County's Lima Ola affordable housing development. OPSD supports the proposed infrastructure improvement as it will support the buildout of the Lima Ola Affordable Housing Project, which is identified as a transit-oriented development (TOD) project in the *State Strategic Plan for Transit-Oriented Development* issued in 2017.

OPSD offers the following comments related to the preparation of the DEA and final project design and implementation.

- Hawai'i Coastal Zone Management (CZM)**  
The CZM area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" under Hawai'i Revised Statutes (HRS) § 205A-1. Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, agencies shall consider ecological, cultural, historic, aesthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the proposed action will require governmental

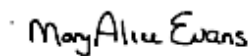
Mr. Max Solmssen  
May 16, 2024  
Page 2

approval, to aid in the agency decision-making process, the DEA should include a discussion of the project's consistency with the policies of the Hawai'i CZM Program, HRS § 205A-2, as amended.

2. Advancement of Sustainability Objectives in the *Hawai'i 2050 Sustainability Plan*  
The 2050 Sustainability Plan was prepared to guide the attainment of sustainability and resilience goals and objectives for the State contained in HRS Chapter 226, Hawai'i State Plan. To this end, the DEA should generally discuss the technologies and best practices and other mitigation measures for the project that would advance implementation of the Recommended Actions in the 2021-2030 Focus Areas on pages 100-107 of the [Hawai'i 2050 Sustainability Plan](#).
3. Need for Proposed Infrastructure Improvements. The DEA should describe the Lima Ola project, the project elements and types of units to be served by the improvements, and the timeframe and phasing of the buildout. It should also describe the water source and water source system capacity, the water requirements and anticipated demand for the Lima Ola buildout, water conservation and reuse measures to be incorporated into the Lima Ola project to mitigate water demand, and whether there will be excess capacity to serve other future developments.

Thank you for the opportunity to provide input on the draft EA. If you have any questions, please contact Ruby Edwards, [ruby.m.edwards@hawaii.gov](mailto:ruby.m.edwards@hawaii.gov), (808) 587-2817. If you wish to respond to this comment letter, please include DTS 202404151611NA in the subject line.

Mahalo,



Mary Alice Evans  
Director





**KaimanaEnv.com**

808.341.3546

PO Box 11890  
Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Mary Alice Evans  
Director  
State of Hawai'i Office of Planning & Sustainable Development  
235 South Beretania Street, 6<sup>th</sup> Floor  
Honolulu, HI 96804

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i DTS 202404151611NA**

Thank you for your early consultation letter for the subject project. Your letter was received and will be included in the Draft Environmental Assessment (DEA). Below are responses to your comments:

Hawai'i Coastal Zone Management (CZM): The Draft Environmental Assessment (DEA) will include a discussion of the project's consistency with the policies of the CZM Program, HRS § 205A-2, as amended.

Advancement of Sustainability Objectives in the Hawai'i 2050 Sustainability Plan: The DEA will discuss the relevant technologies and best practices and other mitigation measures for the project that would advance implementation of the Recommended Actions in the 2021-2030 Focus Areas on pages 100-107 of the Hawai'i 2050 Sustainability Plan.

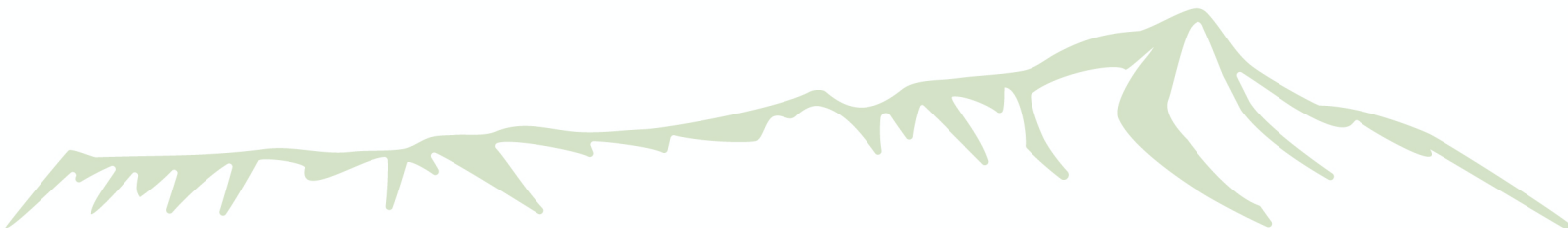
Need for Proposed Infrastructure Improvements: The DEA will discuss the potable water source and system capacity and demand for the proposed action. The details of the proposed Lima Ola affordable housing development, as well as impacts and mitigation measures from the Lima Ola development have been analyzed in the Final Environmental Assessment-Finding of No Significant Impact dated June 24, 2016.

Thank you for your participation in consultation process for the proposed project.

Sincerely,

Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC  
**Email:** Max@kaimanaenv.com

**Mailing Address:**  
Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828



**JOSH GREEN, M.D.**  
GOVERNOR | KE KIA'ĀINA  
**SYLVIA LUKE**  
LEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



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

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

P.O. BOX 621  
HONOLULU, HAWAII 96809

May 15, 2024

LD 0429

Kaimana Environmental Solutions LLC  
Max R. Solmssen, Environmental Planner  
P.O. Box 11890

Via email: [max@kaimanaenv.com](mailto:max@kaimanaenv.com)

**SUBJECT: Early Consultation Request for a Hawai'i Revised Statutes, Chapter 343 (HRS 343) Environmental Assessment (EA) of the Kaua'i County Housing Agency Lima Ola Affordable Housing Subdivision Proposed Off-Site Water System Improvements, Ele'ele, Island of Kauai, Hawaii, TMK (4) 2-1-001: 027 (portion)**

Thank you for the opportunity to review and comment on the subject project. The Land Division of the Department of Land and Natural Resources (DLNR) distributed copies of your request to DLNR's various divisions for their review and comment.

Enclosed are comments received from the Division of Aquatic Resources and Office of Conservation and Coastal Lands. Should you have any questions, please feel free to contact Timothy Chee via email at [timothy.chee@hawaii.gov](mailto:timothy.chee@hawaii.gov). Thank you.

Sincerely,

*Russell Tsuji*

Russell Y. Tsuji  
Land Administrator

Attachments

cc: Central Files



**KaimanaEnv.com**

808.341.3546

PO Box 11890

Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Russell Y. Tsuji  
Land Administrator  
State of Hawai'i Department of Land and Natural Resources, Land Division  
P.O. Box 621  
Honolulu, HI 96809

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i LD 0249**

Thank you for routing our early consultation letter to various State of Hawai'i Department of Land and Natural Resources agencies. We will respond to the agencies that provided comments directly.

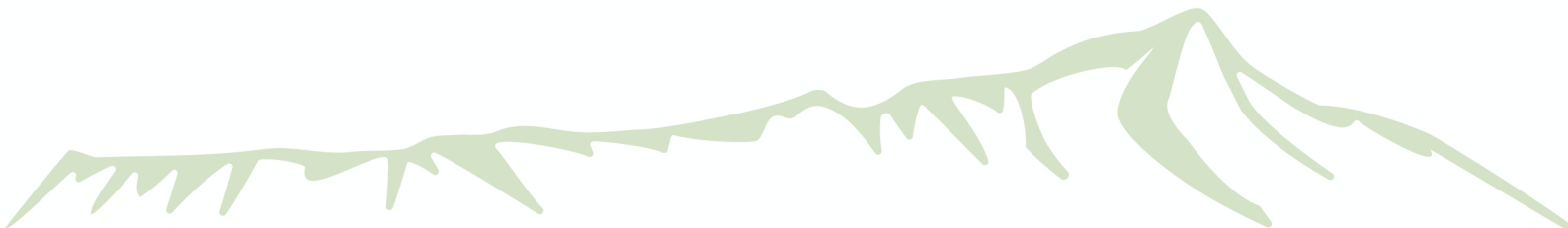
Thank you for your participation in consultation process for the proposed project.

Sincerely,

Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC

**Email:** Max@kaimanaenv.com

**Mailing Address:**  
Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828



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

SYLVIA LUKE  
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
KA 'OIHANA KUMUWAIWAI 'ĀINA

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

RYAN K.P. KANAKA'OLE  
FIRST DEPUTY

DEAN D. UYENO  
ACTING 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

May 21, 2024

Log no. 4522

**MEMORANDUM**

**TO:** RUSSELL Y. TSUJI, Administrator  
Land Division

**FROM:** LINDSEY NEITMANN, Acting Wildlife Program Manager  
Division of Forestry and Wildlife

**SUBJECT: Early Consultation Request for an Environmental Assessment of the  
Kaua'i County Housing Agency Lima Ola Affordable Housing  
Subdivision Proposed Off-Site Water System Improvements, Kaua'i**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your request for early comment on the Environmental Assessment (EA) of the Kaua'i County Housing Agency Lima Ola affordable housing subdivision proposed off-site water system improvements located on the island of Kaua'i; TMK: (4)2-1-001:027 por. The Kaua'i County Housing Agency is proposing to build one 0.3-million-gallon capacity potable water tank located along Kaumuali'i Highway in 'Ele'Ele Kaua'i. The purpose of the water tank is to serve the proposed Lima Ola affordable housing development.

The State listed 'ōpe'ape'a or 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 in any construction as 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 fledging 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/>

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 ae'o or Hawaiian stilt (*Himantopus mexicanus knudseni*), 'alae ke'oke'o or Hawaiian coot (*Fulica alai*), 'alae 'ula or Hawaiian gallinule (*Gallinula chloropus sandvicensis*), koloa maoli or Hawaiian Duck (*Anas wyvilliana*), and nēnē or 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 Kaua'i Branch DOFAW Office at (808) 274-3433 and establish a buffer zone around the nest.

The endemic pueo or Hawaiian Short-Eared Owl (*Asio flammeus sandwichensis*) could potentially nest in the project area. Pueo nest on the ground and active nests have been found year-round. Before any potential vegetative alteration, especially ground-based disturbance, we recommend that line transect surveys are conducted during crepuscular hours through the project area. If a pueo nest is discovered, a minimum buffer distance of 100 meters from the nest should be established until chicks are capable of flight.

DOFAW recommends that a botanical survey be conducted by a qualified botanist in all proposed affected areas prior to commencing work to determine if any rare or endangered plants are present in the project area. We recommend that the survey consists of a complete species list and is conducted during the wettest time of year when plants are more likely to be visible, especially in drier areas. 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/media/plant-avoidance-and-minimization-measures-may-2023>

DOFAW recommends using native plant species for landscaping that are appropriate for the area; i.e., plants for which climate conditions are suitable for them to thrive, plants that historically occurred there, etc. Please do not plant invasive species. DOFAW also recommends referring to [www.plantpono.org](http://www.plantpono.org) for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants proposed for use in the project.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid 'Ōhi'a Death, Coffee Leaf Rust), vertebrate and invertebrate pests (e.g., Coqui Frogs, Little Fire Ants, Coffee Berry Borer, etc.), or invasive plant parts (e.g., Barbados Gooseberry, False Kava, Giant Reed, etc.) that could harm our native species and ecosystems. We recommend consulting the Kaua'i Invasive Species Committee (KISC) at (808) 821-1490 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.

The invasive Coconut Rhinoceros Beetle (CRB) or *Oryctes rhinoceros* is found on the islands of O'ahu, Hawai'i Island, Maui and Kaua'i. On July 1, 2022, the Hawai'i Department of Agriculture (HDOA) approved Plant Quarantine Interim Rule 22-1. This rule restricts the movement of CRB-host material within or to and from the island of O'ahu, which is defined as the Quarantine Area. Regulated material (host material or host plants) is considered a risk for potential CRB infestation. Host material for the beetle specifically includes a) entire dead trees, b) mulch, compost, trimmings, fruit and vegetative scraps, and c) decaying stumps. CRB host plants include the live palm plants in the following genera: *Washingtonia*, *Livistona*, and *Pritchardia* (all commonly known as fan palms), *Cocos* (coconut palms), *Phoenix* (date palms), and *Roystonea* (royal palms). When such material or these specific plants are moved there is a risk of spreading CRB because they may contain CRB in any life stage. For more information regarding CRB, please visit <https://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/coconut-rhinoceros-beetle/>.

DOFAW is concerned about impacts to vulnerable birds from nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles.

Due to the arid climate and risks of wildfire to listed species, we recommend coordinating with the Hawai'i Wildfire Management Organization at (808) 850-0900 or [admin@hawaiiwildfire.org](mailto:admin@hawaiiwildfire.org), on how wildfire prevention can be addressed in the project area. When engaging in activities that have a high risk of starting a wildfire (i.e. welding in grass), it is recommended that you:

- Wet down the area before starting your task,
- Continuously wet down the area as needed,
- Have a fire extinguisher on hand, and

- In the event that your vision is impaired, (i.e. welding goggles) have a spotter to watch for fire starts.

We recommend that Best Management Practices are employed during and after construction to contain any soils and sediment with the purpose of preventing damage to near-shore waters and marine ecosystems.

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 Kate Cullison, Protected Species Habitat Conservation Planning Coordinator via email at [katherine.cullison@hawaii.gov](mailto:katherine.cullison@hawaii.gov).

Sincerely,

*Lindsey Niemann*

LINDSEY NIEMANN  
Acting Wildlife Program Manager



**KaimanaEnv.com**

808.341.3546

PO Box 11890  
Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Lindsey Neitmann  
Acting Wildlife Program Manager  
State of Hawai'i Department of Land and Natural Resources  
Division of Forestry and Wildlife  
1151 Punchbowl Street, Room 325  
Honolulu, HI 96813

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i / DOFAW Log no. 4522**

Thank you for response to early consultation for the subject project. Please see responses to your comments below:

All of the mitigation measures that your agency provided to avoid impacts to special status biological species that may be present within the vicinity of the project area shall be included in the Draft Environmental Assessment (DEA). A biological survey of the project site was completed, and will be included as part of the DEA.

Thank you for your participation in consultation process for the proposed project.

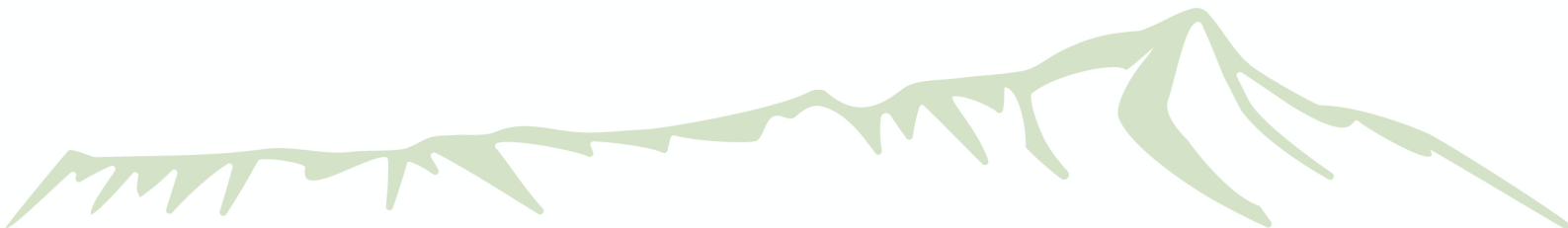
Sincerely,

A handwritten signature in black ink that reads "Max R. Solmssen".

Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC

**Email:** Max@kaimanaenv.com

**Mailing Address:**  
Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828





JOSH GREEN, M.D.  
GOVERNOR | KA HAWAII



DAWN N. S. CHANG  
CHAIRPERSON

KENNETH S. FINK, M.D., MGA, MPH  
NEIL J. HANNAHS  
AURORA KAGAWA-VIVIANI, PH.D.  
WAYNE K. KATAYAMA  
PAUL J. MEYER  
LAWRENCE H. MIKE, M.D., J.D.

DEAN D. UYENO  
ACTING DEPUTY DIRECTOR

STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII'  
DEPARTMENT OF LAND AND NATURAL RESOURCES | KA 'ŌI'HANA KUMUWAIWAI 'ĀINA  
COMMISSION ON WATER RESOURCE MANAGEMENT | KE KAHUWAI PONO  
P.O. BOX 621  
HONOLULU, HAWAII 96809

Apr 23, 2024

REF: RFD.6269.2

TO: Russell Tsuji, Land Administrator  
Land Division

FROM: Dean D. Uyeno, Acting Deputy Director   
Commission on Water Resource Management

SUBJECT: Kaua'i County Housing Agency Lima Ola Affordable Housing Subdivision Proposed Off-Site Water System

FILE NO.: RFD.6269.2  
TMK NO.: (4) 2-1-001:027

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at <http://dlnr.hawaii.gov/cwm>.

Our comments related to water resources are checked off below.

1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at <http://www.usgbc.org/leed>. A listing of fixtures certified by the EAP as having high water efficiency can be found at <http://www.epa.gov/watersense>.
5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>
6. We recommend the use of alternative water sources, wherever practicable.
7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at <http://energy.hawaii.gov/green-business-program>.
8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at [http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH\\_Irrigation\\_Conservation\\_BMPs.pdf](http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf).

- 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
- 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.
- 11. The Hawaii Water Plan is directed toward the achievement of the utilization of reclaimed water for uses other than drinking and for potable water needs in one hundred per cent of State and County facilities by December 31, 2045 (§174C-31(g)(8), Hawaii Revised Statutes). We strongly recommend that this project consider using reclaimed water for its non-potable water needs, such as irrigation. Reclaimed water may include, but is not limited to, recycled wastewater, gray water, and captured rainwater/stormwater. Please contact the Hawai'i Department of Health, Wastewater Branch, for more information on their reuse guidelines and the availability of reclaimed water in the project area.
- 12. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.
- 13. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
- 14. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.
- 15. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
- 16. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.
- 17. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
- 18. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
- 19. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

OTHER: Planning -

The proposed water source(s) and projected water demands for the project, both potable and non-potable, should be identified and the calculations used to estimate demands should be provided. A discussion of the potential impacts on water resources and other public trust uses of water should be included, and any proposed mitigation measures described. Water conservation and efficiency measures to be implemented should also be discussed.

If you have any questions, please contact Ryan Imata of the Regulation Branch at (808) 587-0225 or Katie Roth of the Planning Branch (808) 587-0216.



**KaimanaEnv.com**

808.341.3546

P.O. Box 11890

Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Dean D. Uyeno  
Acting Director  
State of Hawai'i Department of Land and Natural Resources  
Commission on Water Resource Management  
P.O. Box 621  
Honolulu, HI 96809

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i**

Thank you for response to early consultation for the subject project. Please see responses to your comments below:

Comment: We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>

Response: The above comment will be included in the Draft Environmental Assessment (DEA) analysis.

Comment: There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

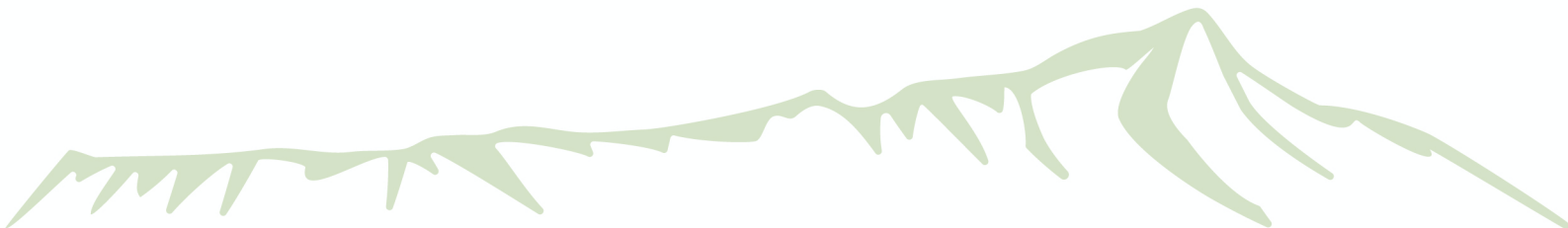
Response: The above comment will be included in the DEA mitigation measures.

Comment: A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

Response: The above comment will be included in the DEA mitigation measures.

Comment: A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

Response: The above comment will be included in the DEA mitigation measures.





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Comment: The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

Response: The County of Kaua'i Housing Agency, and their contracted engineers have been in consultation with the Kaua'i County Department of Water in order to identify the planned water source for the proposed action. The DEA will identify the source aquifer. The selected contractor will apply to the Kaua'i County Department of Water and your agency, if required, for any required permits to assure there no significant impacts to water resources from the proposed project.

Comment: The proposed water source(s) and projected water demands for the project, both potable and non-potable, should be identified and the calculations used to estimate demands should be provided. A discussion of the potential impacts on water resources and other public trust uses of water should be included, and any proposed mitigation measures described. Water conservation and efficiency measures to be implemented should also be discussed.

Response: The DEA will identify the source aquifer from which the proposed water system is planned to pump, and will discuss any impacts to water quality and capacity from the proposed project, as well as applicable mitigation measures. The DEA will recommend close coordination with your agency during the planning and development process.

Thank you for your participation in consultation process for the proposed project.

Sincerely,

A handwritten signature in black ink that reads "Max R. Solmssen".

Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC

**Email:** Max@kaimanaenv.com

**Mailing Address:**

Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828





May 15, 2024

Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828

**SUBJECT: Early Consultation Request for a Hawaii Revised Statutes, Chapter 343 (HRS 343) Environmental Assessment (EA) of the Kauai County Housing Agency Lima Ola Affordable Housing Subdivision Proposed Off-Site Water System Improvements, Tax Map Key (TMK) Parcel (4) 2-1-001:027 (portion) Ele'ele, Kauai**

To whom it may concern:

Thank you for your letter dated April 15, 2024 requesting comments on the above subject. Kauai Island Utility Cooperative (KIUC) request that if and when electrical service is requested for this project, we recommend that the service be installed underground from existing KIUC facilities or extended underground if new electrical facilities are to be installed within the property. Underground electrical facilities will reduce the chances of threatened Newell Shearwater seabird collision on new overhead lines. In addition, should there be a requirement for KIUC to install overhead electric poles, the height of the poles above ground shall not be higher than 45 feet.

Please let me know if you have any questions. I can be reached at (808) 246-4370 or via email at [fpascual@kiuc.coop](mailto:fpascual@kiuc.coop).

Very truly yours,

A handwritten signature in black ink, appearing to read "Fred Pascual", written in a cursive style.

FERDINAND "FRED" PASCUAL  
Distribution Planning Coordinator



**KaimanaEnv.com**

808.341.3546

PO Box 11890  
Honolulu, HI 96828

max@kaimanaenv.com

June 10, 2024

To: Ferdinand "Fred" Pascual  
Distribution Planning Coordinator  
Kaua'i Island Utility Cooperative  
4463 Pahe'e Street, Suite 1  
Līhu'e, HI 96766

**Subject: Receipt of Environmental Assessment Early Consultation Letter for the Kaua'i County Housing Agency Lima Ola Subdivision Proposed Off-Site Water System Improvements, 'Ele'ele, Kaua'i, Hawai'i**

Thank you for response to early consultation for the subject project. Please see responses to your comments below:

All of your recommendations regarding electrical infrastructure development for the proposed project will be included in the Draft Environmental Assessment (DEA).

Thank you for your participation in consultation process for the proposed project.

Sincerely,


Max R. Solmssen  
Environmental Planner  
Kaimana Environmental Solutions LLC

**Email:** Max@kaimanaenv.com

**Mailing Address:**

Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828



**From:** Clark, Michelle michelle\_clark@fws.gov   
**Subject:** Fw: [EXTERNAL] Early Consultation for the Proposed Lima Ola Affordable Housing Development Off-Site Water Improvements  
**Date:** May 1, 2024 at 8:58 AM  
**To:** Max Solmssen max@kaimanaenv.com  
**Cc:** Kim, Jiny jiny\_kim@fws.gov, Nagatani, Leila T leila\_nagatani@fws.gov

---

Aloha Mr. Solmssen,

The Pacific Islands Fish and Wildlife Office is transitioning to the use of 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 and designated critical habitat in your project area. Using IPaC expedites the process for species list distribution and takes minimal time.

Attached are the instructions for creating a species list using IPAC. Let me know if you have any problems along the way.

thanks,

Michelle Clark (she/her)  
Island Biologist  
U.S. Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
7370-K Kuamo'o Rd.  
Kapa'a, Hawai'i 96746

Cell: 808.457.7276  
<https://www.fws.gov/pacificislands/>

---

**From:** Max Solmssen <max@kaimanaenv.com>  
**Sent:** Monday, April 15, 2024 4:04 PM  
**To:** PIFWO\_Admin, FW1 <pifwo\_admin@fws.gov>  
**Subject:** [EXTERNAL] Early Consultation for the Proposed Lima Ola Affordable Housing Development Off-Site Water Improvements

**This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.**

Aloha,

Attached please find an Early Consultation letter as part of the environmental review process in accordance with Hawaii Revised Statutes (HRS), Chapter 343 and the National Environmental Policy Act (NEPA).

Mahalo,

Max R. Solmssen  
Principal  
Kaimana Environmental Solutions LLC



IPaC Info  
Letter\_...nal.pdf



**Subject:** Re: [EXTERNAL] Early Consultation for the Proposed Lima Ola Affordable Housing Development Off-Site Water Improvements  
**Date:** Wednesday, May 1, 2024 at 10:25:12 AM Hawaii-Aleutian Standard Time  
**From:** Max Solmssen  
**To:** Clark, Michelle  
**CC:** Kim, Jiny, Nagatani, Leila T

Hi Michelle,

Thanks for the email. We will complete a species list request via the IPaC system.

Thanks,

Max R. Solmssen  
Principal  
Kaimana Environmental Solutions LLC

808.341.3546  
max@kaimanaenv.com

[www.kaimanaenv.com](http://www.kaimanaenv.com)

PO Box 11890  
Honolulu, HI 96828

On May 1, 2024, at 8:58 AM, Clark, Michelle <michelle\_clark@fws.gov> wrote:

IPaC



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Pacific Islands Fish And Wildlife Office  
300 Ala Moana Boulevard, Box 50088  
Honolulu, HI 96850-5000  
Phone: (808) 792-9400 Fax: (808) 792-9580

In Reply Refer To:

06/18/2024 19:36:12 UTC

Project Code: 2024-0105798

Project Name: Lima Ola Subdivision Off-Site Water System Improvements

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened and endangered species, as well as designated critical habitat that may occur within the boundary of your proposed project and that may be affected by project related actions. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Please contact the Service's Pacific Islands Fish and Wildlife Office (PIFWO) at 808-792-9400 if you have any questions regarding your IPaC species list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may adversely affect threatened and endangered species and/or designated critical habitat.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this 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 this list. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a Biological

Evaluation, similar to a Biological Assessment, be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment or Biological Evaluation are described at 50 CFR 402.12.

Due to the significant number of listed species found on each island within PIFWO's regulatory jurisdiction, and the difficulty in accurately mapping ranges for species that we have limited information about, your species list may include more species than if you obtained the list directly from a Service biologist. We recommend you use the species links in IPaC to view the life history, habitat descriptions, and recommended avoidance and minimization measures to assist with your initial determination of whether the species or its habitat may occur within your project area. If appropriate habitat is present for a listed species, we recommend surveys be conducted to determine whether the species is also present. If no surveys are conducted, we err on the side of the species, by regulation, and assume the habitat is occupied. Updated avoidance and minimization measures for plants and animals, best management practices for work in or near aquatic environments, and invasive species biosecurity protocols can be found on the PIFWO website at: <https://www.fws.gov/office/pacific-islands-fish-and-wildlife/library>.

If a Federal agency determines, based on the Biological Assessment or Biological Evaluation, that a listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/index>.

Non-federal entities can also use the IPaC generated species list to develop Habitat Conservation Plans (HCP) in accordance with section 10(a)(1)(B) of the Act. We recommend HCP applicants coordinate with the Service early during the HCP development process. For additional information on HCPs, the Habitat Conservation Planning handbook can be found at <https://www.fws.gov/sites/default/files/documents/habitat-conservation-planning-handbook-entire.pdf>.

Please be aware that wind energy projects should follow the Service's wind energy guidelines (<http://www.fws.gov/windenergy>) for minimizing impacts to migratory birds. Listed birds and the Hawaiian hoary bat may also be affected by wind energy development and we recommend development of a Habitat Conservation Plan for those species, as described above. Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at:

- <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers>
- <http://www.towerkill.com>
- <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation actions that benefit threatened and endangered species into their project planning to further the purposes of the Act in accordance with section 7(a)(1). Please include the Consultation Tracking Number associated with your IPaC species list in any

request for consultation or correspondence about your project that you submit to our office. Please feel free to contact us at PIFWO\_admin@fws.gov or 808-792-9400 if you need more current information or assistance regarding the potential impacts to federally listed species and federally designated critical habitat.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

## OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

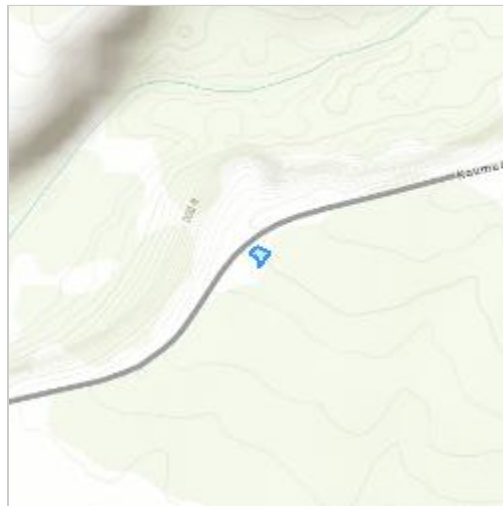
**Pacific Islands Fish And Wildlife Office**  
300 Ala Moana Boulevard, Box 50088  
Honolulu, HI 96850-5000  
(808) 792-9400

## PROJECT SUMMARY

Project Code: 2024-0105798  
Project Name: Lima Ola Subdivision Off-Site Water System Improvements  
Project Type: Government / Municipal (Non-Military) Construction  
Project Description: Land disturbance planned as part of the proposed project includes the design and construction of one (1) 0.3 million gallon County municipal potable water storage tank that would be located adjacent to an existing 0.2 million gallon County municipal water storage tank.

### Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@21.9187008,-159.56533624599132,14z>



Counties: Kauai County, Hawaii

## ENDANGERED SPECIES ACT SPECIES

There is a total of 24 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

**MAMMALS**

NAME	STATUS
Hawaiian Hoary Bat <i>Lasiurus cinereus semotus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/770">https://ecos.fws.gov/ecp/species/770</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6477.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6477.pdf</a>	Endangered

**BIRDS**

NAME	STATUS
Band-rumped Storm-petrel <i>Hydrobates castro</i> Population: USA (HI) No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1226">https://ecos.fws.gov/ecp/species/1226</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf</a>	Endangered
Hawaiian Common Gallinule <i>Gallinula galeata sandvicensis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/6612">https://ecos.fws.gov/ecp/species/6612</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf</a>	Endangered
Hawaiian Coot (alae Ke`oke`o) <i>Fulica alai</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/7233">https://ecos.fws.gov/ecp/species/7233</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf</a>	Endangered
Hawaiian Duck <i>Anas wyvilliana</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/7712">https://ecos.fws.gov/ecp/species/7712</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf</a>	Endangered
Hawaiian Goose <i>Branta (=Nesochen) sandvicensis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1627">https://ecos.fws.gov/ecp/species/1627</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6925.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6925.pdf</a>	Threatened
Hawaiian Petrel <i>Pterodroma sandwichensis</i> No critical habitat has been designated for this species.	Endangered

NAME	STATUS
Species profile: <a href="https://ecos.fws.gov/ecp/species/6746">https://ecos.fws.gov/ecp/species/6746</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf</a>	
Hawaiian Stilt <i>Himantopus mexicanus knudseni</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2082">https://ecos.fws.gov/ecp/species/2082</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6934.pdf</a>	Endangered
Newell's Shearwater <i>Puffinus newelli</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2048">https://ecos.fws.gov/ecp/species/2048</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/6939.pdf</a>	Threatened

## REPTILES

NAME	STATUS
Hawksbill Sea Turtle <i>Eretmochelys imbricata</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/3656">https://ecos.fws.gov/ecp/species/3656</a>	Endangered

## FLOWERING PLANTS

NAME	STATUS
`aiea <i>Nothocestrum latifolium</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1061">https://ecos.fws.gov/ecp/species/1061</a>	Endangered
`awikiwiki <i>Canavalia napaliensis</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/1325">https://ecos.fws.gov/ecp/species/1325</a>	Endangered
`awikiwiki <i>Canavalia pubescens</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/7908">https://ecos.fws.gov/ecp/species/7908</a>	Endangered
Carter's Panicgrass <i>Panicum fauriei</i> var. <i>carteri</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/5578">https://ecos.fws.gov/ecp/species/5578</a>	Endangered
Dwarf Iliau <i>Wilkesia hобыdi</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/5565">https://ecos.fws.gov/ecp/species/5565</a>	Endangered
Honohono <i>Haplostachys haplostachya</i> No critical habitat has been designated for this species.	Endangered



NAME	STATUS
Species profile: <a href="https://ecos.fws.gov/ecp/species/5815">https://ecos.fws.gov/ecp/species/5815</a>	
<b>Ihi <i>Portulaca villosa</i></b> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/4886">https://ecos.fws.gov/ecp/species/4886</a>	Endangered
<b>Makou <i>Peucedanum sandwicense</i></b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/5579">https://ecos.fws.gov/ecp/species/5579</a>	Threatened
<b>Ohai <i>Sesbania tomentosa</i></b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/8453">https://ecos.fws.gov/ecp/species/8453</a> General project design guidelines: <a href="https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/7050.pdf">https://ipac.ecosphere.fws.gov/project/IBRSCMJFHBF3DHESNOJM6TXYZU/documents/generated/7050.pdf</a>	Endangered
<b>Schiedea spergulina var. leiopoda</b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/1597">https://ecos.fws.gov/ecp/species/1597</a>	Endangered
<b>Schiedea spergulina var. spergulina</b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/282">https://ecos.fws.gov/ecp/species/282</a>	Threatened
<b>Spermolepis hawaiiensis</b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/1670">https://ecos.fws.gov/ecp/species/1670</a>	Endangered
<b>Uhiuhi <i>Mezoneuron kavaïense</i></b> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/7129">https://ecos.fws.gov/ecp/species/7129</a>	Endangered

## FERNS AND ALLIES

NAME	STATUS
<b>Microlepis strigosa var. mauiensis</b> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/4737">https://ecos.fws.gov/ecp/species/4737</a>	Endangered

## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

# USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

## BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act<sup>1</sup> and the Migratory Bird Treaty Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats<sup>3</sup>, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "[Supplemental Information on Migratory Birds and Eagles](#)".

- 
1. The [Bald and Golden Eagle Protection Act](#) of 1940.
  2. The [Migratory Birds Treaty Act](#) of 1918.
  3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

THERE ARE NO BALD AND GOLDEN EAGLES WITHIN THE VICINITY OF YOUR PROJECT AREA.

## MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats<sup>3</sup> should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "[Supplemental Information on Migratory Birds and Eagles](#)".

- 
1. The [Migratory Birds Treaty Act](#) of 1918.
  2. The [Bald and Golden Eagle Protection Act](#) of 1940.
  3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE

SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
'apapane <i>Himatione sanguinea</i> This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands. <a href="https://ecos.fws.gov/ecp/species/9659">https://ecos.fws.gov/ecp/species/9659</a>	Breeds Dec 1 to Jul 31
Bulwer's Petrel <i>Bulweria bulwerii</i> This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands. <a href="https://ecos.fws.gov/ecp/species/10579">https://ecos.fws.gov/ecp/species/10579</a>	Breeds May 1 to Sep 30
Wandering Tattler <i>Tringa incana</i> This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands. <a href="https://ecos.fws.gov/ecp/species/11941">https://ecos.fws.gov/ecp/species/11941</a>	Breeds elsewhere

## PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

### Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

### Survey Effort (|)

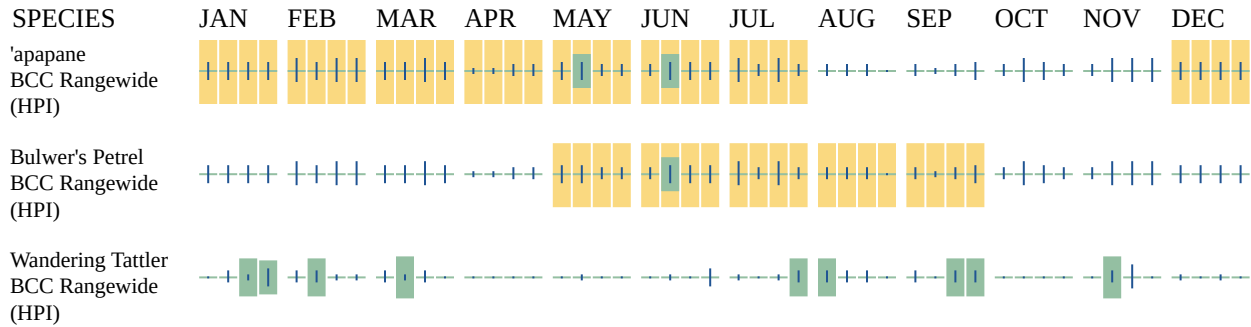
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

### No Data (—)

A week is marked as having no data if there were no survey events for that week.

---

■ probability of presence   ■ breeding season   | survey effort   — no data



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

## WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

## **IPAC USER CONTACT INFORMATION**

Agency: County of Kauai  
Name: Max Solmssen  
Address: PO Box 11890  
City: Honolulu  
State: HI  
Zip: 96828  
Email: max@kaimanaenv.com  
Phone: 8083413546

## **LEAD AGENCY CONTACT INFORMATION**

Lead Agency: County of Kauai

## ***Appendix D: Lima Ola Water Master Plan***





*Water Master Plan*

for

**Lima Ola  
Workforce Housing Development**  
Eleele, Kauai, Hawaii

*Prepared By:*

Community Planning  
And Engineering, Inc.

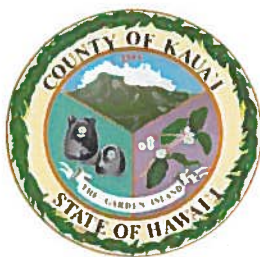
May 2019

# *Water Master Plan*

for

## **Lima Ola Workforce Housing Development Eleele, Kauai, Hawaii**

*Prepared For:*



*Kauai County  
Housing Agency*



*Prepared By:*



**Community Planning  
and Engineering, Inc.**



THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION.  
CONSTRUCTION OF THIS PROJECT  
WILL BE UNDER MY OBSERVATION.  
LICENSE EXPIRATION DATE: 4/30/20

1286 Queen Emma Street  
Honolulu, Hawaii 96813



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- Exhibit 2 – Lima Ola Workforce Housing Proposed Development
- Exhibit 3 – 340-Foot Service Zone Pipe and Junction Map
- Exhibit 4 – 402-Foot Service Zone Pipe and Junction Map
- Exhibit 5 – Schematic Diagram

### Appendix B: Existing Hanapepe-Eleele Water System Water Model Results for the Existing System

### Appendix C: Proposed Lima Ola Development Water Model Results for the Lima Ola Development

### Appendix D (Large files on CD):

- Lima Ola Development Water Model (Bentley WaterCAD, Version 2013)
- County of Kauai, Department of Water Approval Letter of WMP (dated October 5, 2015)
- County of Kauai, Department of Water Conditional Approval Letter (dated May 14, 2012)
- Water Meter Readings Data Provided by County of Kauai, Department of Water
- Fire Hydrant Data Provided by County of Kauai, Department of Water

## Executive Summary

This project involves the development of an affordable housing community called Lima Ola in Eleele on the island of Kauai, Hawaii. The development will be constructed in four (4) distinct phases; however, with development schedules and funding for Phases 2 through 4 being unknown at this time, this water master plan is seeking at a minimum the acceptance of Phase 1 to proceed. Although the emphasis is focused toward Phase 1, subsequent phases (2 through 4) will need to be taken into consideration when performing the water analysis in order to properly size improvements to the water system that may be necessary to accommodate the Lima Ola Development. Based on this a water master plan will be prepared for the Lima Ola Development.

This water master plan supersedes the previously approved “Water Master Plan for Lima Ola Workforce Housing Development,” dated September 2015. Revisions were made to the water master plan to conform with the construction plans prepared for “Lima Ola Subdivision Phase 1.” The revisions made to this water master plan does not significantly impact the results of the interconnection of the proposed Lima Ola Development water system and the existing Hanapepe-Eleele Water System.

The water master plan includes information on the existing Hanapepe-Eleele Water System consisting of existing storage tanks, groundwater wells and its associated pumps, booster pumps, and distribution piping. Existing water demands were determined using 2013 water usage data from water meters within the Hanapepe-Eleele Water System. A 15% water loss factor, with the addition of a 5% factor of safety, was added to the demand that would take into consideration potential leaks or possibility of water loss from the system. Existing water demands for the Hanapepe-Eleele Water System are 830,960 GPD (average daily); 1,246,440 GPD (maximum daily); and 2,492,878 GPD (peak hour). Distribution piping, well pumping, and booster pumping information was taken from water system maps and other data (i.e. previous water model information), and verified with available as-built drawings and/or in the field. Water system information was then used to construct a water system model for the Hanapepe-Eleele Water System. Existing water demands and other information was included in the water system model to establish a baseline of the operation of the water system. Model runs were compared to fire hydrant tests as a means of calibration.

The proposed Lima Ola Development will increase the water demand of the Hanapepe-Eleele Water System by 304,380 gallons per day (GPD) on an average day, or 456,570 GPD during maximum daily demand flows, and 913,140 GPD during peak hour demand flows for the overall development (Phases 1 through 4). In terms of phases, the overall proposed water demand for the development is shown in the following table.

**Table ES-1: Proposed Water Demand by Development Phase**

	<b>Average Demand (GPD)</b>	<b>Maximum Daily Demand (GPD)</b>	<b>Peak Hour Demand (GPD)</b>
Phase 1	92,220	138,330	276,660
Phase 2	101,820	152,730	305,460
Phase 3	65,640	98,460	196,920
Phase 4	44,700	67,050	134,100
Total	304,380	456,570	913,140

Pumping capacity analysis was performed to evaluate the pumping ability of the water system to provide the necessary water required for the Hanapepe-Eleele Water System and the overall Lima Ola Development. The pumping capacity and source availability proved to be adequate to accommodate the demand for Phase 1. As for subsequent Phases 2, 3 and 4, the pumping capacity and source availability will be re-evaluated at the time when planning for the phase is implemented. If at the time of re-evaluation additional source is needed, then considerations will be discussed with County of Kauai, Department of Water to analyze viable options to address need.

To fulfill the water demands for the proposed Lima Ola Development, water will be drawn from water storage tanks on the Eleele-side of the water system consisting of two (2) 400,000 gallon water storage tanks at the 340-foot elevation and a 200,000 gallon water storage tank at the 402-foot elevation. Phase 1 of the proposed development will utilize water from the two (2) 400,000 gallon water storage tanks. Subsequent phase (2, 3, and 4) will utilize water from the one (1) 200,000 gallon water storage tank. An analysis of the adequacy of the existing tanks were performed which took into consideration existing and proposed water demands of these tanks. The results indicated that two (2) 400,000 gallon tanks at the 340-foot elevation are adequate to accommodate the demands of both the existing and proposed Phase 1 water demands. In comparison, the 200,000 gallon water storage tank at the 402-foot elevation showed that it was inadequate to accommodate the added proposed water demands for Phase 2; therefore, an additional tank at the 402-foot elevation needs to be considered. Under the current proposed development plan as shown in this Water Master Plan, the additional tank required would be 300,000 gallon; however, this requirement will be evaluated when planning and design considerations commences for Phase 2. Subsequent phases (3 and 4) will also be evaluated when planning and design considerations commences.

A proposed 16-inch water transmission line that interconnects the Hanapepe water system with the Eleele water system along Kaumualii Highway is being considered. The project is a Capital Improvement Project (CIP) part of the Hanapepe-Eleele Water System improvement program assessed in the DOW's Water Plan 2020. Presently, design and construction of the proposed water line is depended upon availability of Department of Water funds. Should source capacity for the Lima Ola Phases 2, 3 and 4 be either provided by developing a new well in the Hanapepe 212 service zone or if source capacity is obtained from the Hanapepe 212 service zone, a 16-inch water transmission line that will interconnect the Hanapepe water system with the Eleele water system along Kaumualii Highway will be required prior to further development beyond Phase 1 of the Lima Ola Development project.

This proposed water line would increase reliability of the water system by allowing water to flow from the Hanapepe 212-foot water system to the Eleele-side of the system that would support future development phases of the Lima Ola Development project and areas such as Eleele Shopping Center and Port Allen.

Upon completion of the analyses and modeling scenarios, the following improvements are required per phase:

**Table ES-2: Required Improvements Per Phase**

	<b>Required Improvements</b>
Phase 1	Approximately 3,520 linear feet of 8-inch water line; 1,015 linear feet of 12-inch water line; 12 fire hydrants; 42 water laterals; and necessary chlorination and testing.
Phase 2*	300,000 gallon water storage tank at 402-foot elevation; 350 GPM booster pump at the 340-foot elevation; approximately 2,300 linear feet of 8-inch water line; 3 fire hydrants; 75 water laterals; and chlorination and testing. 16-inch transmission waterline along Kaumualii Highway interconnecting Hanapepe and Eleele service zones (DOW CIP).
Phase 3*	Approximately 2,400 linear feet of 8-inch water line; 350 linear feet of 12-inch water line; 3 fire hydrants; 34 water laterals; and chlorination and testing.
Phase 4*	Approximately 1,500 linear feet of 8-inch water line; 3 fire hydrants; 18 water laterals; and chlorination and testing.

\*Required improvements address storage and transmission facilities for Phases 2 through 4 are based on the current layout of the Lima Ola Development and its associated water demands, which are subject to change. It is noted that due to the uncertainty of the development schedule for Phases 2 through 4 of this project and other potential developments in the vicinity, Phase 2 through 4 will be re-evaluated at the appropriate time when the planning and design of the particular phase commences.

## **Introduction**

### ***Background***

The scope of this project includes the development of an affordable housing community, Lima Ola, on the island of Kauai, Hawaii. The project site is located mauka of Halewili Road and east of Kaumualii Highway, and consists of approximately 75 acres of land within Tax Map Key (TMK) (4) 2-1-001:027, owned by the County of Kauai. The parcel of land was purchased by the County of Kauai from McBryde Sugar Company with the stipulation that the parcel be developed for affordable housing. The land was previously used for sugarcane cultivation and is currently being used by Kauai Coffee Company under a licensed agreement with the County of Kauai. The agreement states that Kauai Coffee Company will vacate the land when the County of Kauai proceeds with the housing development project.

The Kauai County Housing Agency is in the process of completing the Hawaii Revised Statutes (HRS) 201H exemption process for the proposed Lima Ola subdivision. HRS Section 201H-38 was enacted into law to provide a process whereby an affordable housing project may be granted exemptions from any statutes, ordinances, charter provisions, and rules of any governmental agency relating to planning, zoning and construction standards that do not negatively affect the health and safety of the general public. As part of the 201H exemption process, the Kauai County Housing Agency is seeking an exemption from the Kauai County Code Zoning Ordinance, as well as a State Land Use District Boundary Amendment in order to allow for residential use in a district currently zoned for Agricultural use.

Community Planning and Engineering, Inc., (CPE) in association with PBR Hawaii (PBR) prepared an overall development master plan for the proposed project. Based on the overall development master plan, the Lima Ola project is planned for 550 residential units (single family, multi-family and senior resident units) designed with green sustainable energy efficiency features, a community center, drainage swales and detention basins, landscaped areas, and bike and pedestrian paths. The project will be implemented in four development phases.

### ***Purpose of Study***

The purpose of this water master plan is to analyze the adequacy of the existing Hanapepe-Eleele Water System, within Tax Map Key Zone 1 and 2 in the Fourth Tax District, and how the existing water system is affected by the proposed Lima Ola Development. Additionally, the water master plan incorporates the water demands for the proposed developments which determine pipe and tank sizes that conform to the 2002 Water System Standards for the Department of Water. Water demands for proposed developments, along with an estimated system loss value, are further analyzed into an integrated water model with connection to the existing water system. The proposed water system for Phase 1 of the Lima Ola Development will be interconnected with the existing Hanapepe-Eleele Water System, drawing water from the existing source facilities: Hanapepe Well A, Hanapepe Well B, and Hanapepe Well No. 4. Source adequacy for subsequent phases 2, 3 and 4 will be re-evaluated at the time planning is implemented.

## Water System Design Criteria

The proposed water master plan utilizes the State of Hawaii, Water System Standards (2002). The criterion used in the development of this water master plan is included in this section.

### Consumption Guidelines

The average daily demands were obtained from the consumption guidelines. Table 1 summarizes these guidelines for the County of Kauai.

**Table 1: Kauai County Consumption Guidelines**

Zoning Designation	Average Daily Demand
Single Family or Duplex	500 gallons / unit
Multi-Family Low Rise	350 gallons / unit
Commercial Only	3000 gallons / acre
Schools, Parks	4000 gallons / acre or 60 gallons / student

### Demand Factors

The demand factors which calculate the maximum daily demand and peak hour demand are summarized in Table 2.

**Table 2: Demand Factors**

Maximum Daily Demand	Peak Hour
1.5 x Average Day	3.0 x Average Day

### Fire Flow Requirements

The fire flow requirements for the Kauai County are summarized in Table 3.

**Table 3: Fire Flow Requirements**

Land Use	Flow Gallons per Minute (GPM)	Duration (Hours)	Fire Hydrant Spacing (Feet)
Single Family (R-10)	1,250	2	350
Community Center/Small Shopping Center	2,000	2	350

### Pipeline Sizing

Pipelines need to be designed to meet the following requirements:

- Maximum daily flow plus fire flow with a residual pressure of 20 pounds per square inch (psi) at the critical fire hydrant.
- Peak hour flow with a minimum residual pressure of 40 psi.



- “C” factors as shown in Table 4.

**Table 4: “C” Factors**

<b>Pipe Diameter</b>	<b>“C”</b>
8”, 12”	110

- Maximum velocity in the distribution main (without fire flow) is 6 feet per second (fps).
- Maximum static or pumping pressure, whichever is greater, shall not exceed 125 psi.

### ***Reservoir (Tank) Capacity***

Reservoirs (tanks) need to be designed to meet the following requirements:

- Meet maximum day consumption. Reservoir (tank) full at the beginning of the 24-hour period with no source input to the reservoir (tank).
- Meet maximum day rate plus fire flow for duration of fire. Reservoir (tank)  $\frac{3}{4}$  full at start of fire, with credit for incoming flow from pumps, one maximum size pump out of service.
- Minimum size reservoir (tank) shall be 0.1 million gallon (MG). The standard sizes for reservoirs (tanks) are 0.1 MG, 0.2 MG, 0.25 MG, 0.3 MG, 0.5 MG, 1.0 MG, and 0.5 MG increments thereafter.

Where there are two or more reservoirs (tanks) serving the same system, the design shall be made on the basis of combined protection provided by all facilities available.

### ***Total Pump Capacity***

The system is deemed to have adequate pumping capacity if it meets the maximum day demand with an operating time of 24 hours. This justification is in consideration of the storage facility with the largest pumping capacity to be out of service.

## Hanapepe-Eleele Water System

### *Existing Water System*

The Department of Water (DOW) has four (4) well sources in the Hanapepe-Eleele Water System. Two (Hanapepe A and Hanapepe B) of the four wells are situated in Hanapepe Valley. Hanapepe A was drilled in 1974 and has a pumping capacity of 500 gallons per minute (GPM). The existing ground elevation at Hanapepe A is 98 feet above mean sea level (MSL). Hanapepe B was drilled in 1980 and has a pumping capacity of 900 GPM. The existing ground elevation at Hanapepe B is 99 feet above MSL. The two other wells (Hanapepe 25-1 and Hanapepe 4) are located on the west side of Hanapepe Valley. Hanapepe 25-1 was drilled in 1966 and has a pumping capacity of 150 GPM. Hanapepe 25-1 has been abandoned in place and is no longer being used by the DOW due to a pump/motor problem. The existing ground elevation at Hanapepe 25-1 is 78 feet above MSL. Hanapepe 4 was drilled in 1993 and has a pumping capacity of 700 GPM. The existing ground elevation at Hanapepe 4 is 463 feet above MSL. The Hanapepe and Eleele water systems are interconnected, with both areas retrieving water from the three active well sources in Hanapepe. Water is drawn into Eleele through a booster pump connection in Hanapepe Valley. The four well sources for the Hanapepe-Eleele Water System are summarized in Table 5 below.

**Table 5: Hanapepe-Eleele Water System Source Facilities**

<b>Well Source</b>	<b>Pumping Capacity (GPM)</b>	<b>Ground Elevation Above Mean Sea Level (ft)</b>	<b>Status</b>
Hanapepe A	500	98	Active
Hanapepe B	900	99	Active
Hanapepe 25-1	150	78	Inactive
Hanapepe 4	700	463	Active

The DOW has five (5) water storage tanks within the Hanapepe-Eleele Water System. On the Eleele-side there are two (2) 0.4-million gallon (MG) steel tanks with 340-foot spillway elevation; and one (1) 0.2-MG concrete tank with a 402-foot spillway elevation. On the Hanapepe-side there are one (1) 0.5-MG concrete tank at the 402-foot spillway elevation; and, one (1) 0.5-MG concrete tank at the 212-foot spillway elevation. Delivery of water to the Eleele-side of the water system primarily comes from the Hanapepe A and B Wells and is pumped through two (2) 750 GPM Eleele booster pumps in Hanapepe Valley and a 27-inch water line up the valley wall to the Eleele steel tanks at the 340-foot elevation. Located next to the two (2) 340-foot Eleele tanks are two (2) 120 GPM Eleele Nani booster pumps, which delivers water from the 340-foot Eleele tanks to the 402-foot Upper Eleele tank. In Hanapepe, water is primarily delivered from the Hanapepe 4 Well to the 0.5-MG concrete tank with a 402-foot spillway. The 212-foot Hanapepe Heights water storage tank is primarily fed from the 402-foot water storage tank. It is noted that although each water storage tank in the Hanapepe-Eleele Water System has its associated primary water source, the three (3) active wells have the ability to deliver water to all five (5) water storage tanks. The five existing water storage tanks are summarized in Table 6.

**Table 6: Existing Water Storage Tanks**

<b>Pump</b>	<b>Delivery Pathway</b>	<b>Storage Tank</b>
Two (2) 750-GPM Eleele Booster Pumps	From well sources to 340-foot storage tanks	Two (2) 0.4-MG Steel Eleele Tanks at 340-foot elevation
Two (2) 120-GPM Eleele Nani Booster Pumps	From 340-foot storage tanks to 402-foot storage tank	0.2-MG Concrete Upper Eleele Tank at 402-foot elevation
500-GPM Pump at Hanapepe A Well and 900-GPM Pump at Hanapepe B Well	From well source and 402-foot storage tank to 212-foot storage tank	0.5-MG Concrete Hanapepe Heights Tank at 212-foot elevation
700-GPM Pump at Hanapepe 4 Well	From well source to 402-foot storage tank	0.5-MG Concrete Upper Hanapepe Heights Tank at 402-foot elevation

The existing Hanapepe-Eleele Water System is shown in Exhibit 1 - Overall System Map in Appendix A.

## Proposed Development

The proposed Lima Ola Development located in Eleele, Kauai is on approximately 75 acres situated north of Halewili Road and east of Kaumualii Highway and the Habitat for Humanity housing project. Total development will consist of approximately 550 residential units consisting of single family, multi-family, and senior housing units, a park, and a community center. The project will be developed into four (4) distinct phases, as shown in Exhibit 2 – Lima Ola Workforce Housing Proposed Development in Appendix A.

Based on the topography of the project, Phase 1 of the development falls within the 340-foot water service zone and the remaining three (3) phases (Phases 2, 3 and 4) fall within the 402-foot water service zone. For Phase 1, there will be two connection points for the proposed waterline, one connection will be made to the existing 12-inch waterline on Kaumualii Highway, which distributes water from the water storage tanks at the 340-foot elevation. This connection point will be north of the Habitat for Humanity housing project and will require a waterline easement from the highway to the roadway in Phase 1. The second connection will be made to the existing 8-inch waterline on Mahea Road, where the Lima Ola development will connect and extend the existing roadway. For Phases 2, 3 and 4, there will be two connection points for the proposed waterline, both connections will be made to the existing 12-inch waterline on Kaumualii Highway, which distributes water from the water storage tank at the 402-foot elevation. Refer to Exhibit 3 – 340-Foot Service Zone Pipe and Junction Map and Exhibit 4 – 402-Foot Service Zone Pipe and Junction Map in Appendix A for the proposed alignment of the waterline for the Lima Ola development.

Water demands for each phase of the proposed development were calculated based on the State of Hawaii, Water System Standards (2002). In addition, to the demand factors from the Water System Standards, a 15% water system loss factor, with an added 5% factor of safety, was also considered for the water demands of both existing and proposed to account for possible water leakage and/or water loss through the system. The analysis to be performed will determine whether the existing pumping capacity, existing reservoir capacities and existing water distribution system is adequate to serve the proposed development.

Tables 7 through 10 show the proposed development and water demands for each phase.

**Table 7: Phase 1 Development**

Development Type	No. of Units	Average Daily Demand (GPD)	Maximum Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family	38	19,000	28,500	57,000
Multi-Family	111	38,850	58,275	116,550
Community Center (3,000 GPD/acre)	3	9,000	13,500	27,000
Irrigation (4,000 GPD/acre)	2.5	10,000	15,000	30,000
Total		76,850	115,275	230,550
Total (Including 20% loss)		92,220	138,330	276,660

**Table 8: Phase 2 Development\***

Development Type	No. of Units	Average Daily Demand (GPD)	Maximum Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family	75	37,500	56,250	112,500
Multi-Family	97	33,950	50,925	101,850
Irrigation (4,000 GPD/acre)	3.35	13,400	20,100	42,200
Total		84,850	127,275	254,550
Total (Including 20% loss)		101,820	152,730	305,460

**Table 9: Phase 3 Development\***

Development Type	No. of Units	Average Daily Demand (GPD)	Maximum Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family	34	17,000	25,500	51,000
Multi-Family	102	35,700	53,550	107,100
Irrigation (4,000 GPD/acre)	0.5	2,000	3,000	6,000
Total		54,700	82,050	164,100
Total (Including 20% loss)		65,640	98,460	196,920

**Table 10: Phase 4 Development\***

Development Type	No. of Units	Average Daily Demand (GPD)	Maximum Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family	18	9,000	13,500	27,000
Multi-Family	75	26,250	39,375	78,750
Irrigation (4,000 GPD/acre)	0.5	2,000	3,000	6,000
Total		37,250	55,875	111,750
Total (Including 20% loss)		44,700	67,050	134,100

\*Water demands shown were calculated based on the current overall Land Use Master Plan. Due to uncertainty in the development schedules for Phases 2 through 4 and the potential for changes to the development density and configuration could occur in which water demands could also change. Water demands for future phases would have to be re-evaluated upon commencement of the planning and design of those phases.

## ***Pumping Capacity Analysis***

### **Overall Hanapepe-Eleele System**

The pumping capacity of the existing system was analyzed to determine if it is adequate to accommodate the proposed Lima Ola Development. The analysis was done with the consideration of two wells (Hanapepe A and Hanapepe 4) as water sources. In accordance with the County of Kauai's Water System Standards, the largest pumping unit in the system

is considered to be out of service (on standby). With Hanapepe B being the well with the largest pump (900 GPM) in the Hanapepe-Eleele Water System, this pump was considered out of service. With the developmental planning proceeding for Phase 1 of Lima Ola, pumping capacity will need to be re-evaluated for subsequent phases 2, 3 and 4, at the time when phase(s) are implemented.

Total Pumping Capacity of Well 'Hanapepe A' = 500 GPM

Total Pumping Capacity of Well 'Hanapepe 4' = 700 GPM

Total Pumping Capacity of the Hanapepe-Eleele System = 1,200 GPM

**= 1,728,000 Gallons per Day (GPD)**

The pumping capacity of the proposed water system was analyzed for two (2) different scenarios.

**Scenario 1:** The first scenario uses the maximum water demand of the Hanapepe-Eleele Water System based on water consumption data provided by the DOW for the 2013 calendar year and the projected demand for the Lima Ola Development based on the Water System Standards, 2002. Water consumption data provided by the DOW is shown in Appendix D (see attached CD).

Average Daily Demand for the Hanapepe-Eleele Water System (2013 DOW Data)

= 692,466 GPD

Maximum (Max) Factor = 1.5

Maximum Daily Demand = 1.5 x 692,466 GPD

= 1,038,700 GPD

In consideration of non-metered water use and future pending developments, a 15 percent allowance, with the addition of a 5 percent factor of safety, was included in the calculations to represent a water system loss; adding onto the existing water consumption. Non-metered water use includes pipe leakage, unaccounted water meters and hydrants, unauthorized water use, inaccurate metering and line flushing. This value is based on the projection of the water conservation programs described in the DOW's Water Plan 2020.

Allowance for Non-Metered Water Use and Future Pending Developments

= 20% (estimated system loss)

Maximum Daily Demand (including 20% loss) = 1.20 x 1,038,700 GPD

= 1,246,440 GPD

Water demands for each phase of the proposed Lima Ola Development are shown in the following Tables 11 through 14.

**Table 11: Phase 1 Water Consumption**

<b>Development Type</b>	<b>Water Demand Per Land Use (GPD/Unit)</b>	<b>No. of Units</b>	<b>Area (Acres)</b>	<b>Average Demand (GPD)</b>	<b>Max Daily Demand (GPD)</b>	<b>Peak Hour Demand (GPD)</b>
Single Family or Duplex	500	38	-	19,000	28,500	57,000
Multi Family	350	111	-	38,850	58,275	116,550
Community Center	3,000	-	3	9,000	13,500	27,000
Irrigation	4,000	-	2.5	10,000	15,000	30,000
<b>Total</b>				<b>76,850</b>	<b>115,275</b>	<b>230,550</b>

\*Phase 1 is located within the 340-Foot Service Zone. Primarily to be serviced by two (2) 0.4 MG water storage tanks.

Calculated Maximum Daily Demand for Lima Ola (Phase 1) = 115,275 GPD

**Table 12: Phase 2 Water Consumption**

<b>Development Type</b>	<b>Water Demand Per Land Use (GPD/Unit)</b>	<b>No. of Units</b>	<b>Area (Acres)</b>	<b>Average Demand (GPD)</b>	<b>Max Daily Demand (GPD)</b>	<b>Peak Hour Demand (GPD)</b>
Single Family or Duplex	500	75	-	37,500	56,250	112,500
Multi Family	350	97	-	33,950	50,925	101,850
Irrigation	4,000	-	3.35	13,400	20,100	40,200
<b>Total</b>				<b>84,850</b>	<b>127,275</b>	<b>254,550</b>

\*Phase 2 is located within the 402-Foot Service Zone. Primarily to be serviced by one (1) 0.2 MG water storage tank.

Calculated Maximum Daily Demand for Lima Ola (Phase 2) = 127,275 GPD

**Table 13: Phase 3 Water Consumption**

Development Type	Water Demand Per Land Use (GPD/Unit)	No. of Units	Area (Acres)	Average Demand (GPD)	Max Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family or Duplex	500	34	-	17,000	25,500	51,000
Multi Family	350	102	-	35,700	53,550	107,100
Irrigation	4,000	-	0.5	2,000	3,000	6,000
Total				54,700	82,050	164,100

\*Phase 3 is located within the 402-Foot Service Zone. Primarily to be serviced by one (1) 0.2 MG water storage tank.

Calculated Maximum Daily Demand for Lima Ola (Phase 3) = 82,050 GPD

**Table 14: Phase 4 Water Consumption**

Development Type	Water Demand Per Land Use (GPD/Unit)	No. of Units	Area (Acres)	Average Demand (GPD)	Max Daily Demand (GPD)	Peak Hour Demand (GPD)
Single Family or Duplex	500	18	-	9,000	13,500	27,000
Multi Family	350	75	-	26,250	39,375	78,750
Irrigation	4,000	-	0.5	2,000	3,000	6,000
Total				37,250	55,875	111,750

\*Phase 4 is located within the 402-Foot Service Zone. Primarily to be serviced by one (1) 0.2 MG water storage tank.

Calculated Maximum Daily Demand for Lima Ola (Phase 4) = 55,875 GPD

Total Maximum Daily Demand for Lima Ola = 380,475 GPD

Total Maximum Daily Demand for Lima Ola (including 20% loss) = 1.20 x 380,475 GPD

= 456,570 GPD

Total Demand (including Lima Ola) of the Hanapepe-Eleele Water System = **1,703,010 GPD**

**Total Maximum Daily Demand is less than Total Pumping Capacity. Therefore, pumping capacity is adequate. (1,703,000 GPD < 1,728,000 GPD)**

**Scenario 2:** The second scenario is based on the projected demand in the DOW's Water Plan 2020 for the Hanapepe-Eleele water system. The projected demand value is stated in Table 4.5 of the Water Plan 2020, which displays the historical and forecasted water use for the water systems in Kauai. The value stated in the Water Plan 2020 incorporates non-metered



water use. Proposed water demands for Lima Ola Development also include non-metered water use.

Hanapepe-Eleele Forecasted Demand (Year 2020) = **1,361,000 GPD**

Hanapepe-Eleele Forecasted Demand (Year 2020) + Phase 1 of Lima Ola Development  
 $1,361,000 + 138,330 = 1,499,330$  GPD

Hanapepe-Eleele Forecasted Demand (Year 2020) + Overall Lima Ola Development  
 $1,361,000 + 456,570 = 1,817,570$  GPD

**Total Maximum Daily Demand for the Hanapepe-Eleele Forecasted Demand (Year 2020) with the addition of Phase 1 of Lima Ola is less than Total Pumping Capacity. Therefore, pumping capacity is adequate. ( $1,499,330$  GPD <  $1,728,000$  GPD)**

### **Eleele Water System**

The pumping capacity of the existing Eleele portion of the Hanapepe-Eleele Water System was analyzed to determine if it is adequate to accommodate the proposed Lima Ola Development. In the existing Hanapepe-Eleele Water System, water is drawn into Eleele through a 750-GPM booster pump in Hanapepe Valley. Therefore the pumping capacity analysis was based on the Eleele booster pump as the water source for Eleele.

Total Pumping Capacity of Eleele Booster Pump = 750 GPM\*

**= 1,080,000 Gallons per Day (GPD)**

\*750 GPM is identified here, for capacity of Eleele, is not the set figure that the DOW has approved from the available total source of the Hanapepe-Eleele service zone. The exact capacity of water being delivered from Hanapepe to Eleele will be determined by the DOW.

The pumping capacity was done using the maximum daily water demand for Eleele based on the Hanapepe-Eleele water consumption data provided by the DOW for the 2013 calendar year and the proposed maximum daily demand for the Lima Ola Development was based on the Water System Standards, 2002. Water consumption data provided by the DOW is shown in Appendix D (see attached CD).

Average Daily Demand

Existing Eleele Water System (Based on 2013 DOW Data) = 252,924 GPD

Proposed Lima Ola Development = 253,650 GPD

Total =  $252,924 + 253,650 = 506,574$  GPD

Maximum Daily Demand =  $1.5 \times 506,574$  GPD

**= 759,861 GPD**

In consideration of non-metered water use and future pending developments, a 15 percent allowance, with the addition of a 5 percent factor of safety, was included in the calculations to represent a water system loss; adding onto the existing and proposed water consumption. Non-metered water use includes pipe leakage, unaccounted water meters and hydrants, unauthorized water use, inaccurate metering and line flushing. This value is based on the projection of the water conservation programs described in the DOW's Water Plan 2020.

Allowance for Non-Metered Water Use and Future Pending Developments

= 20% (estimated system loss)

Maximum Daily Demand (including 20% loss) =  $1.20 \times 759,861$  GPD

= 911,834 GPD

Total Maximum Daily Demand (Existing Eleele and proposed Lima Ola) of the Hanapepe-Eleele Water System = **911,834 GPD**

**Total Maximum Daily Demand is less than Total Pumping Capacity. Therefore, pumping capacity is adequate. (911,834 GPD < 1,080,000 GPD)**

In accordance to the analysis performed, the pumping capacity and source availability is adequate for Phase 1 of the proposed Lima Ola Development. This is in accordance with consideration of the Eleele 750 GPM booster pump being the limiting source for the existing Eleele and proposed Lima Ola Development in the Hanapepe-Eleele Water System. Due to the uncertainty of Lima Ola's development schedule and the schedule of other developments, the pumping capacity and source availability for subsequent Phases 2, 3 and 4 will be re-evaluated at the time when that phase(s) are implemented. Designation of the maximum allowable capacity for the Eleele service zone from the total source capacity of the three (3) active well sources in the Hanapepe service zone will be determined by the DOW.

### ***Reservoir (Tank) Sizing Analysis***

For the proposed development, the maximum daily demand with a 15 percent estimated water system loss, with an addition of a 5 percent factor of safety, was calculated to evaluate the required water storage capacity to support the Lima Ola development. The water demand analysis was performed for each phase of the development.

### **Lima Ola Development – Phase 1 (340-Foot Service Zone)**

Phase 1 of the proposed Lima Ola development was analyzed for the case of using the existing water storage at the 340-foot elevation service zone.

Existing 340-Foot Service Zone with Lima Ola Development (Phase 1)

Phase 1 was evaluated along with the existing water demands for the 340-foot service zone area to determine if the two (2) existing 0.4 MG Eleele water storage tanks are adequate to service the existing water demand and proposed water demand for Phase 1. Water demands also include the 20% water loss factor.

**Case 1**

Criteria: Meet maximum day consumption. Tank is full at the beginning of the 24-hour period with no source input to the tank.

Average Daily Demand

Existing 340' service zone (Based on 2013 DOW Data) = 211,104 GPD

Lima Ola, Phase 1 = 76,850 GPD

Total = 211,104 + 76,850 = 287,954 GPD

Maximum Daily Demand = 1.5 x 287,954 GPD

= 431,931 GPD

Maximum Daily Demand (including 20% loss) = 1.20 x 431,931 GPD

= 518,318 GPD

Therefore, the tank must have a 518,318-gallon capacity.

**Case 2**

Criteria: Meet the maximum day rate plus fire flow for duration of fire. Tank is  $\frac{3}{4}$  full at the start of fire, with credit for incoming flow from pumps, one maximum size pump out of service.

Assume Inflow from Pumps (worst case scenario) = 0 GPM

$$\frac{\left[ \frac{431,931 \text{ GPD}}{24 \frac{\text{hr}}{\text{day}} \times 60 \frac{\text{min}}{\text{hr}}} + 2,000 \text{ GPM} \right] \times 120 \text{ min}}{0.75} = 367,993 \text{ gallons}$$

Maximum Daily Demand (including 20% loss) = 1.20 x 367,993 GPD

= 441,591 GPD

Therefore, the tank must have a 441,591-gallon capacity.

Case 1 governs. The two (2) existing 0.4 MG water storage tanks have adequate water storage capacity to accommodate the existing water demands for the existing 340-foot elevation service zone and Phase 1 of the Lima Ola Development.

### **Lima Ola Development - Phase 2 (402-Foot Service Zone)**

#### Existing 402-Foot Service Zone with Lima Ola Development (Phase 2)

Phase 2 was evaluated along with the existing water demands for the 402-foot service zone area to determine if the existing 0.2 MG Eleele water storage tank is adequate to service the existing water demand and proposed water demand for Phase 2. Water demands also include the 20% water loss factor. It is also noted that the existing 0.2 MG water storage tank is filled from the 340-foot water storage tanks through two (2) 120 GPM Eleele Nani booster pumps, where one (1) pump operates at a time with the other one serving as a back-up pump.

#### **Case 1**

Criteria: Meet maximum day consumption. Tank is full at the beginning of the 24-hour period with no source input to the tank.

#### Average Daily Demand

Existing 402' service zone (Based on 2013 DOW Data) = 41,820 GPD

Lima Ola, Phase 2 = 84,850 GPD

Total = 41,820 + 84,850 = 126,670 GPD

Maximum Daily Demand = 1.5 x 126,670 GPD  
= 190,005 GPD

Maximum Daily Demand (including 20% loss) = 1.20 x 190,005 GPD  
= 228,006 GPD

Therefore, the tank must have a 228,006-gallon capacity.

#### **Case 2**

Criteria: Meet the maximum day rate plus fire flow for duration of fire. Tank is  $\frac{3}{4}$  full at the start of fire, with credit for incoming flow from pumps, one maximum size pump out of service.

Assume Inflow from Pumps (worst case scenario) = 0 GPM

$$\frac{\left[ \frac{190,005 \text{ GPD}}{24 \frac{\text{hr}}{\text{day}} \times 60 \frac{\text{min}}{\text{hr}}} + 1,250 \text{ GPM} \right] \times 120 \text{ min}}{0.75} = 221,112 \text{ gallons}$$

$$\begin{aligned} \text{Maximum Daily Demand (including 20\% loss)} &= 1.20 \times 221,112 \text{ GPD} \\ &= 265,334 \text{ GPD} \end{aligned}$$

Therefore, the tank must have a 265,334-gallon capacity.

Case 2 governs. The existing 0.2 MG water storage tank is inadequate to accommodate the existing water demand for the 402-foot elevation water service zone and the proposed water demand for Phase 2 of the Lima Ola Development. Since subsequent phases of the proposed Lima Ola Development is also serviced by the existing 0.2 MG water storage tank, this analysis will continue to look at water demands for Phases 3 and 4 to determine sizing requirements for water storage.

As previously noted, the 120 GPM Eleele Nani booster pumps are used to supply water from the two (2) 0.4 MG water storage tanks at the 340-foot elevation to the 402-foot 0.2 MG water storage tank. The booster pump must meet the pumping capacity criteria at the maximum daily demand with an operating time of 24 hours.

Eleele Nani Booster Pump: 120 GPM = 172,800 GPD.

Maximum Daily Demand (Existing + Phase 2): 228,006 GPD (inclusive of 20% water loss)

Therefore, pumping ability to fill the 0.2 MG 402-foot water storage tank is inadequate to accommodate the water demands for existing and proposed Phase 2 Lima Ola. To meet the 228,006 GPD demand, a minimum sized pump required is a 160 GPM booster pump; however, since Phase 3 and 4 also needs to be pumped to the 0.2 MG 402-foot water storage tank, the analysis will continue to look at water demands for these phases and determine the minimum required pumping capacity to satisfy these phases.

### **Lima Ola Development - Phases 2 and 3 (402-Foot Service Zone)**

#### **Existing 402-Foot Service Zone with Lima Ola Development (Phases 2 and 3)**

In the previous analysis, it was determined that the existing 0.2 MG water storage tank at the 402-foot elevation is inadequate to accommodate existing and Phase 2 Lima Ola water demands. It was also determined that the existing 120 GPM booster pump was also inadequate to meet the maximum daily demands required with an operating time of 24 hours. However, for purposes of this Water Master Plan and consistency of the calculations, the following calculations will continue to look at the how subsequent phases affects the water system.

#### **Case 1**

Criteria: Meet maximum day consumption. Tank is full at the beginning of the 24-hour period with no source input to the tank.

Average Daily Demand

Existing 402' service zone (Based on 2013 DOW Data) = 50,184 GPD

$$\begin{aligned} \text{Lima Ola, Phase 2 + 3} &= 84,850 + 54,700 = 139,550 \text{ GPD} \\ \text{Total} &= 50,184 + 139,550 = 189,734 \text{ GPD} \end{aligned}$$

$$\begin{aligned} \text{Maximum Daily Demand} &= 1.5 \times 189,734 \text{ GPD} \\ &= 284,601 \text{ GPD} \end{aligned}$$

$$\begin{aligned} \text{Maximum Daily Demand (including 20\% loss)} &= 1.20 \times 284,601 \text{ GPD} \\ &= 341,521 \text{ GPD} \end{aligned}$$

Therefore, the tank must have a 341,521-gallon capacity.

### Case 2

Criteria: Meet the maximum day rate plus fire flow for duration of fire. Tank is  $\frac{3}{4}$  full at the start of fire, with credit for incoming flow from pumps, one maximum size pump out of service.

Assume Inflow from Pumps (worst case scenario) = 0 GPM

$$\frac{\left[ \frac{284,601 \text{ GPD}}{24 \frac{\text{hr}}{\text{day}} \times 60 \frac{\text{min}}{\text{hr}}} + 1,250 \text{ GPM} \right] \times 120 \text{ min}}{0.75} = 231,622 \text{ gallons}$$

$$\begin{aligned} \text{Maximum Daily Demand (including 20\% loss)} &= 1.20 \times 231,622 \text{ GPD} \\ &= 277,946 \text{ GPD} \end{aligned}$$

Therefore, the tank must have a 277,946-gallon capacity.

Case 1 governs. The existing 0.2 MG water storage tank is inadequate to accommodate the existing water demand for the 402-foot elevation water service zone and the proposed water demand for Phases 2 and 3 of the Lima Ola Development. In addition, it is also known that the existing 120 GPM Eleele Nani booster pumps at the 340-foot elevation water storage tank are inadequate to convey water from the 340-foot elevation water storage tank to the 402-foot elevation water storage tank.

## **Lima Ola Development - Phases 2, 3 and 4 (402-Foot Service Zone)**

### Existing 402-Foot Service Zone with Lima Ola Development (Phases 2, 3 and 4)

In the previous analysis, it was determined that the existing 0.2 MG water storage tank at the 402-foot elevation is inadequate to accommodate existing and Phases 2 and 3 Lima Ola water demands. It was also determined that the existing 120 GPM booster pump was also inadequate to meet the maximum daily demands required with an operating time of 24 hours. For purposes of this Water Master Plan and consistency of the calculations, the

following calculations will continue to look at the how subsequent phases affects the water system.

**Case 1**

Criteria: Meet maximum day consumption. Tank is full at the beginning of the 24-hour period with no source input to the tank.

Average Daily Demand

$$\begin{aligned} \text{Existing 402' service zone (Based 2013 on DOW Data)} &= 50,184 \text{ GPD} \\ \text{Lima Ola, Phase 2 + 3 + 4} &= 84,850 + 54,700 + 37,250 = 176,800 \text{ GPD} \\ \text{Total} &= 50,184 + 176,800 = 226,984 \text{ GPD} \end{aligned}$$

$$\begin{aligned} \text{Maximum Daily Demand} &= 1.5 \times 226,984 \text{ GPD} \\ &= 340,476 \text{ GPD} \end{aligned}$$

$$\begin{aligned} \text{Maximum Daily Demand (including 20\% loss)} &= 1.20 \times 340,476 \text{ GPD} \\ &= 408,571 \text{ GPD} \end{aligned}$$

Therefore, the tank must have a 408,571-gallon capacity.

**Case 2**

Criteria: Meet the maximum day rate plus fire flow for duration of fire. Tank is  $\frac{3}{4}$  full at the start of fire, with credit for incoming flow from pumps, one maximum size pump out of service.

Assume Inflow from Pumps (worst case scenario) = 0 GPM

$$\frac{\left[ \frac{340,476 \text{ GPD}}{24 \frac{\text{hr}}{\text{day}} \times 60 \frac{\text{min}}{\text{hr}}} + 1,250 \text{ GPM} \right] \times 120 \text{ min}}{0.75} = 237,831 \text{ gallons}$$

$$\begin{aligned} \text{Maximum Daily Demand (including 20\% loss)} &= 1.20 \times 237,831 \text{ GPD} \\ &= 285,397 \text{ GPD} \end{aligned}$$

Therefore, the tank must have a 285,397-gallon capacity.

Case 1 governs. The existing 0.2 MG water storage tank is inadequate to accommodate the existing water demand for the 402-foot elevation water service zone and the proposed water demand for Phases 2, 3 and 4 of the Lima Ola Development. In addition, it is also known that the existing 120 GPM Eleele Nani booster pumps at the 340-foot elevation water storage tank are inadequate to convey water from the 340-foot elevation water storage tank to the 402-foot elevation water storage tank.

In accordance with the analysis performed in this section, it is determined that the two (2) existing 0.4 MG 340-foot water storage tanks are adequate to accommodate Phase 1 of the Lima Ola Development. However, the existing 0.2 MG 402-foot water storage tank and the 120 GPM booster pumps are inadequate to accommodate the remaining phases (Phases 2 through 4) of the Lima Ola Development. Since the deficiency occurs during Phase 2, improvements to the water system should take place during construction of the Phase 2 Development, but the size of the improvements should consider the ultimate development (Phase 4). Based on this, it is recommended that an additional 0.3 MG water storage tank be constructed at the 402-foot elevation. It is also recommended that the pumping ability at the 340-foot elevation tanks be increased from 120 GPM to 350 GPM to fill the existing 0.2 MG and proposed 0.3 MG storage tanks at the 402-foot elevation in 24 hours.



## Hydraulic Model Analysis

The purpose of constructing a water system model was to simulate the operation of the existing Hanapepe-Eleele Water System and evaluate the effect the Lima Ola Development has on the water system. In addition, the water model will allow the sizing of distribution mains and provide results that meet the Water System Standards (2002). This water model was developed using the Bentley WaterCAD, Version 2013. The water model was constructed as follows:

### *Existing Hanapepe-Eleele Water System*

The existing Hanapepe-Eleele Water System model was constructed with information from as-built drawings and a previous water model that was developed for the Hanapepe-Eleele Water System. The simulation results for all pipes and nodes for the existing Hanapepe-Eleele Water System are shown in Appendix B. The water demands were based on the 2013 water consumption data provided by the DOW; see Appendix D in attached CD. The demand for each node was calculated based on the ratio between the DOW WaterGEMS model and the DOW 2013 consumption data for the Hanapepe-Eleele area. The calculated demands were then assigned to select nodes throughout the water system model. The velocities in the pipe segments of the existing water system range between 0 fps to 2.00 fps. The pressures at various nodes of the existing water system range between 31 psi to 125 psi.

### *Calibrating the Water Model*

The model was calibrated by comparing selected fire hydrant test pressures measured during field testing against residual fire hydrant pressures obtained from the model. The deviation of error between the data from the field and the hydraulic model was  $\pm 10$  psi in consideration of systematic errors, as well as measurement analysis errors. The field testing data for the fire hydrants was provided by the DOW; for data refer to Appendix D (see attached CD). Ten (10) fire hydrants were chosen for the calibration of the model. The ten (10) fire hydrants used for calibration are shown on Exhibit 1 - Overall System Map in Appendix A. A comparison of pressures between the model and the field test pressures are shown in Table 15.

**Table 15: Fire Hydrant Pressure Comparisons**

<b>Fire Hydrant ID</b>	<b>Data from Field Testing (psi)</b>	<b>Data from Model (psi)</b>
C-105	60	53
C-120	81	87
C-1	33	27
C-16	68	61
C-55	49	48
C-34	87	89
C-83	70	61
C-149	80	81
C-131	52	55
C-126	74	79

## ***Lima Ola Development***

The Lima Ola Development was conceptually designed and integrated into the model. The water tanks to service the Lima Ola Development are located along Kaumualii Highway in two (2) separate pressure zones; 340-foot elevation and 402-foot elevation. Interconnecting the proposed Lima Ola Development and the existing Hanapepe-Eleele Water System showed no adverse effects on the existing transmission and distribution mains. However the only transmission main delivering water to the Eleele service zone is the 27-inch transmission line in Hanapepe Valley. Therefore prior to further development of Lima Ola beyond Phase 1, a 16-inch transmission line will be needed to interconnect the Hanapepe and Eleele water service zones along Kaumualii Highway. A copy of the Lima Ola Development water model can be accessed in Appendix D (see attached CD).

### **Maximum Day Demand (With Fire Flow) and Peak Hour Flow Analysis**

The results in Appendix C include the simulation results for the 340-foot and 402-foot elevation service zones that will service the Lima Ola Development.

The velocities in the pipe segments for the 340-foot elevation service zone range between 0 fps to 6.65 fps. The pressures at the various nodes in this service zone for the maximum day consumption with fire flow (community center) range between 21 psi to 55 psi. Our fire flow analysis showed no adverse effects on the existing system. The pressure at the critical hydrant (FH-6) in this service zone is 21 psi. The pressures at the various nodes in this service zone for peak hour consumption range between 48 psi to 74 psi. Exhibit 3 – 340-Foot Service Zone Pipe and Junction Map in Appendix A shows the schematics and results for this service zone.

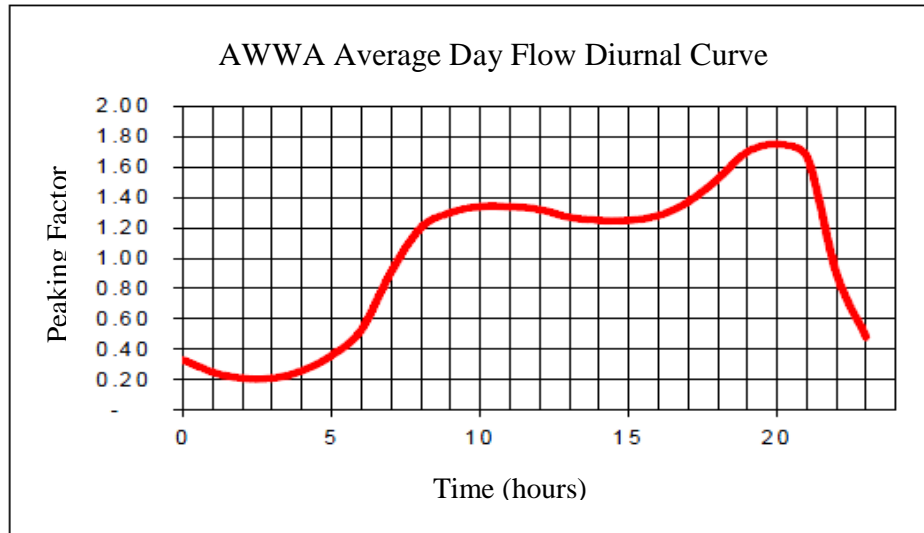
The velocities in the pipe segments for the 402-foot elevation service zone range between 0 fps to 3.57 fps. The pressures at the various nodes in this service zone for the maximum day consumption with fire flow range between 38 psi to 64 psi. Our fire flow analysis showed no adverse effects on the existing system. The pressure at the critical hydrant (FH-16) in this service zone is 38 psi. The pressures at the various nodes in this service zone for peak hour consumption range between 52 psi to 78 psi. Exhibit 4 – 402-Foot Service Zone Pipe and Junction Map in Appendix A includes the schematics and results for this service zone.

### **Extended Period Simulation Analysis**

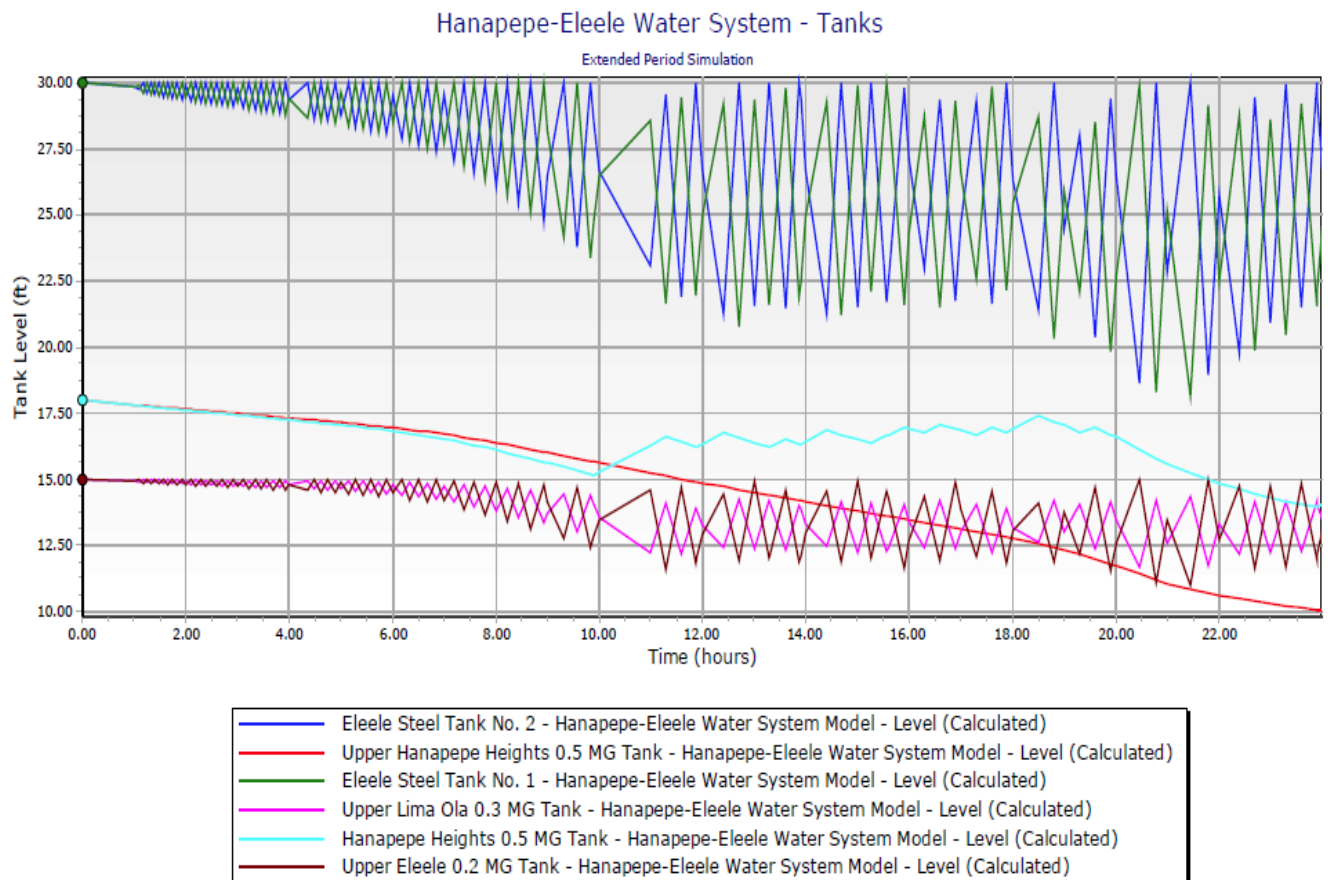
An extended period simulation (EPS) analysis was incorporated into the water model to analyze the existing water system with the proposed conditions over the course of a 24-hour period. A diurnal curve developed by AWWA, as shown in Figure 1, was used to model the variation of water demand throughout the day. The diurnal curve developed by AWWA was based on field measurements that provided a rational basis for varying the demands over a 24-hour period.

To simulate the water system over an extended time period, controls were programmed into the model to trigger the on and off sequence of the pumps based on the water level of the corresponding tank. These on and off controls of the pumps have been set to match the existing condition in the Hanapepe-Eleele Water System. For the proposed 0.3 MG water storage tank to be built at the 402-foot elevation to service subsequent phases 2, 3, and 4 of Lima Ola, the pump controls were set as the same as the existing 0.2 MG water storage tank at the 402-foot elevation. Monitoring

the tank levels throughout our EPS analysis show the existing and proposed water storage tanks emptying and filling throughout the day to maintain an adequate water level in each tank. This analysis was done to validate that there is sufficient water sources and pump capacity for the tanks to be up to a minimum of ¾ full at the end of the 24-hour period. Figure 2 shows the tank levels fluctuating over the 24-hour time period.



**Figure 1: AWWA Average Day Flow Diurnal Curve (Source: AWWA Manual M32)**



**Figure 2: Hanapepe-Elelee Water System – Tanks (EPS)**

Through our EPS analysis, there was one (1) water storage tank that was not  $\frac{3}{4}$  full at the end of the 24-hour period. The water level of the existing Upper Hanapepe Heights tank did not drop down to trigger the on sequence of the corresponding Hanapepe 4 pump. As shown in Figure 2, the Upper Hanapepe Heights tank does not refill within the 24-hour period. Although the Upper Hanapepe Heights tank does not adversely affect the proposed Lima Ola Development improvements to the existing Hanapepe-Eleele water system, this condition can be revised by triggering the Hanapepe 4 pump to turn on during the 24-hour period by increasing the water level, at which the pump turns on, in the Upper Hanapepe Heights tank.

The analysis also includes the proposed waterline connecting the existing Hanapepe water system to the existing Eleele water system, through a connection to Waialo Road. In the existing Hanapepe-Eleele Water System, water is pumped from the Hanapepe water system through a transmission line out of Hanapepe Valley to the two (2) 0.4 MG 340-foot Eleele tanks. The proposed waterline is a DOW Capital Improvement Project (CIP), part of the DOW's Water Plan 2020, that will provide an alternate means of allowing water to flow from Hanapepe to Eleele, increasing the reliability within the water system. The proposed waterline will improve the Hanapepe-Eleele Water System, but is shown as not being necessary to accommodate the Lima Ola Development. The proposed waterline was sized as a 16-inch waterline approximately 2,800 linear feet (LF).

The hydraulics of the 340-foot and 402-foot elevation service zones will not be affected by the addition of this new waterline.

Exhibit 5 – Schematic Diagram in Appendix A includes a schematic of the overall Hanapepe-Eleele water system with the different pressure zones that constitute the water system.

Approximately 9,700 linear feet (LF) of 8-inch waterline and 1,400 LF of 12-inch waterline is required for the proposed Lima Ola Development. The water model results confirm that the proposed infrastructure improvements meet the State of Hawaii, Water System Standards (2002).

## Cost Analysis

Tables 16 through 19 include a cost breakdown of the water system improvements to be implemented by the Kauai County Housing Agency for each phase of the proposed Lima Ola Development.

**Table 16: Cost for the Water System Design of the Lima Ola Development, Phase 1**

Item	Unit Count	Unit	Unit Cost (US Dollars)	Total Cost (US Dollars)
8" Waterline (including gate valves, bends etc.)	3,520	LF	210	739,200
12" Waterline (including gate valves, bends etc.)	1,015	LF	220	223,300
Fire Hydrant	12	EA	4,500	54,000
Water Lateral	42	EA	1,800	75,600
Chlorination and Testing	1	LS	50,000	50,000
Connection to Existing System	2	EA	10,000	20,000
<b>Total</b>				<b>\$ 1,162,100</b>

**Table 17: Cost for the Water System Design of the Lima Ola Development, Phase 2**

Item	Unit Count	Unit	Unit Cost (US Dollars)	Total Cost (US Dollars)
8" Waterline (including gate valves, bends etc.)	2,225	LF	210	467,250
Fire Hydrant	3	EA	4,500	13,500
Water Lateral	75	EA	1,800	135,000
Chlorination and Testing	1	LS	50,000	50,000
Connection to Existing System	1	EA	10,000	10,000
300,000-Gallon Water Tank	1	EA	700,000	700,000
350-GPM Booster Pump	2	EA	35,000	70,000
<b>Total</b>				<b>\$ 1,445,750</b>

**Table 18: Cost for the Water System Design of the Lima Ola Development, Phase 3**

Item	Unit Count	Unit	Unit Cost (US Dollars)	Total Cost (US Dollars)
8" Waterline (including gate valves, bends etc.)	2,363	LF	210	496,230
12" Waterline (including gate valves, bends etc.)	314	LF	220	69,080
Fire Hydrant	3	EA	4,500	13,500
Water Lateral	34	EA	1,800	61,200
Chlorination and Testing	1	LS	50,000	50,000
Connection to Existing System	1	EA	10,000	10,000
<b>Total</b>				<b>\$ 700,010</b>

**Table 19: Cost for the Water System Design of the Lima Ola Development, Phase 4**

<b>Item</b>	<b>Unit Count</b>	<b>Unit</b>	<b>Unit Cost (US Dollars)</b>	<b>Total Cost (US Dollars)</b>
8" Waterline (including gate valves, bends etc.)	1,505	LF	210	316,050
Fire Hydrant	3	EA	4,500	13,500
Water Lateral	18	EA	1,800	32,400
Chlorination and Testing	1	LS	50,000	50,000
Connection to Existing System	1	EA	10,000	10,000
			<b>Total</b>	<b>\$ 421,950</b>

**Total Cost for the Water System Design of the Lima Ola Development = \$ 3,729,810**

## Conclusions and Recommendations

This water master plan for the Lima Ola Development shows that the Hanapepe-Eleele water system is adequate to support the proposed Lima Ola Development, Phase 1. As for phases 2 through 4, water source availability will be re-evaluated at a later time due to uncertainty in Lima Ola's development schedule.

Transmission and storage facility improvements according to each development phase for the Lima Ola Development were analyzed and summarized below.

**Table 20: Summary of Required Improvements Per Phase**

	<b>Required Improvements</b>
Phase 1	Approximately 3,520 linear feet of 8-inch water line; 1,015 linear feet of 12-inch water line; 12 fire hydrants; 42 water laterals; and necessary chlorination and testing.
Phase 2*	300,000 gallon water storage tank at 402-foot elevation; 350 GPM booster pump at the 340-foot elevation; approximately 2,300 linear feet of 8-inch water line; 3 fire hydrants; 75 water laterals; and chlorination and testing. 16-inch transmission waterline along Kaumualii Highway interconnecting Hanapepe and Eleele service zones. (DOW CIP)
Phase 3*	Approximately 2,400 linear feet of 8-inch water line; 350 linear feet of 12-inch water line; 3 fire hydrants; 34 water laterals; and chlorination and testing.
Phase 4*	Approximately 1,500 linear feet of 8-inch water line; 3 fire hydrants; 18 water laterals; and chlorination and testing.

\*Required improvements addresses storage and transmission facilities for Phases 2 through 4 are based on the current layout of the Lima Ola Development and its associated water demands, which are subject to change. It is noted that due to the uncertainty of the development schedule for Phases 2 through 4 of this project and other potential developments in the vicinity, Phase 2 through 4 will be re-evaluated at the appropriate time when the planning and design of the particular phase commences.

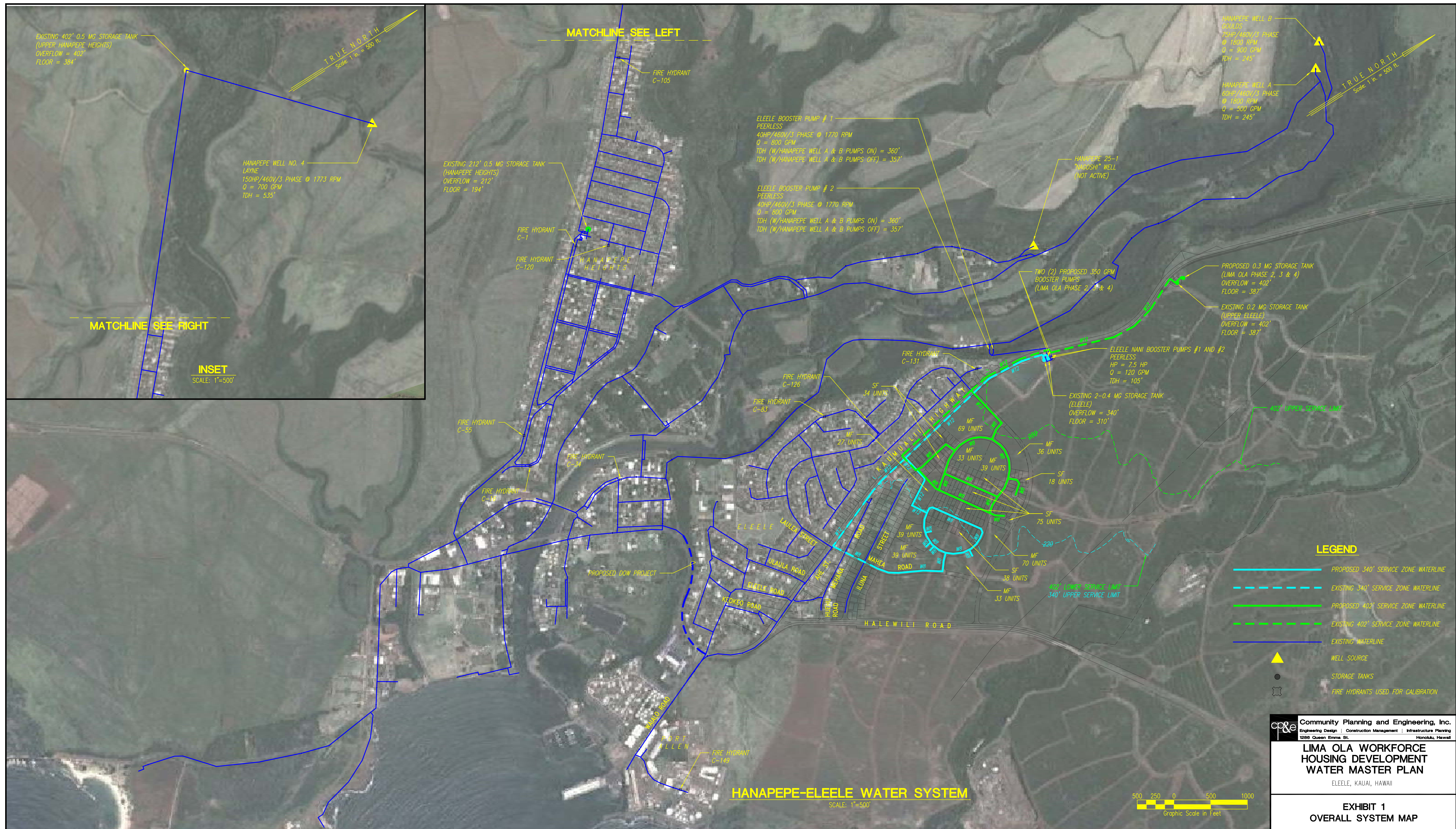
As previously stated the Hanapepe-Eleele Water System is able to accommodate Phase 1 of the proposed Lima Ola development. Due to the uncertainty of Lima Ola's development schedule and the schedule of other developments, subsequent phases (Phase 2 through 4) will be re-evaluated at the time when that phase(s) are implemented. If at the time of re-evaluation additional source is needed, then considerations will be discussed with County of Kauai, Department of Water to analyze viable options to address need. If in the later phases of the development another point of source is developed in the Eleele service zone, then the 16-inch interconnection waterline may not be necessary and the Hanapepe and Eleele water systems will not be totally dependent on each other. Any alterations to the development that deviates from this master plan is subject to an amendment of this water master plan.

## References

1. State of Hawaii, Water System Standards (2002).
2. Water Plan 2020, Department of Water, County of Kauai (March 2001).
3. Lima Ola Workforce Housing Development, Master Plan, County of Kauai, Kimura International (March 2012).
4. Lima Ola Feasibility Study, R.M. Towill Corporation (January 2013).



# Appendix A



EXISTING 402' 0.5 MG STORAGE TANK  
(UPPER HANAPEPE HEIGHTS)  
OVERFLOW = 402'  
FLOOR = 384'

TRUE NORTH  
Scale: 1 in. = 500 ft.

HANAPEPE WELL NO. 4  
LAYNE  
150HP/460V/3 PHASE @ 1773 RPM  
Q = 700 GPM  
TDH = 535'

EXISTING 212' 0.5 MG STORAGE TANK  
(HANAPEPE HEIGHTS)  
OVERFLOW = 212'  
FLOOR = 194'

ELEELE BOOSTER PUMP # 1  
PEERLESS  
40HP/460V/3 PHASE @ 1770 RPM  
Q = 800 GPM  
TDH (W/HANAPEPE WELL A & B PUMPS ON) = 360'  
TDH (W/HANAPEPE WELL A & B PUMPS OFF) = 357'

ELEELE BOOSTER PUMP # 2  
PEERLESS  
40HP/460V/3 PHASE @ 1770 RPM  
Q = 800 GPM  
TDH (W/HANAPEPE WELL A & B PUMPS ON) = 360'  
TDH (W/HANAPEPE WELL A & B PUMPS OFF) = 357'

HANAPEPE WELL B  
DEULOS  
75HP/460V/3 PHASE  
Q = 1500 GPM  
Q = 900 GPM  
TDH = 245'

HANAPEPE WELL A  
60HP/460V/3 PHASE  
Q = 1500 GPM  
Q = 500 GPM  
TDH = 245'

HANAPEPE 25-1  
"MAGOSHI" WELL  
(NOT ACTIVE)

TWO (2) PROPOSED 350 GPM  
BOOSTER PUMPS  
(LIMA OLA PHASE 2, 3 & 4)

PROPOSED 0.3 MG STORAGE TANK  
(LIMA OLA PHASE 2, 3 & 4)  
OVERFLOW = 402'  
FLOOR = 387'

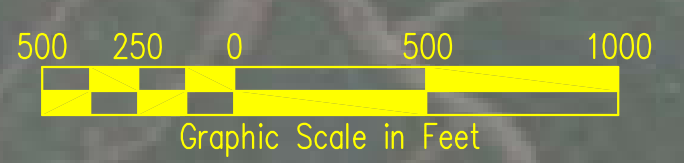
EXISTING 0.2 MG STORAGE TANK  
(UPPER ELEELE)  
OVERFLOW = 402'  
FLOOR = 387'

ELEELE NANI BOOSTER PUMPS #1 AND #2  
PEERLESS  
HP = 7.5 HP  
Q = 120 GPM  
TDH = 105'

EXISTING 2-0.4 MG STORAGE TANK  
(ELEELE)  
OVERFLOW = 340'  
FLOOR = 310'

- LEGEND**
- PROPOSED 340' SERVICE ZONE WATERLINE
  - - - - - EXISTING 340' SERVICE ZONE WATERLINE
  - PROPOSED 402' SERVICE ZONE WATERLINE
  - - - - - EXISTING 402' SERVICE ZONE WATERLINE
  - EXISTING WATERLINE
  - ▲ WELL SOURCE
  - STORAGE TANKS
  - FIRE HYDRANTS USED FOR CALIBRATION

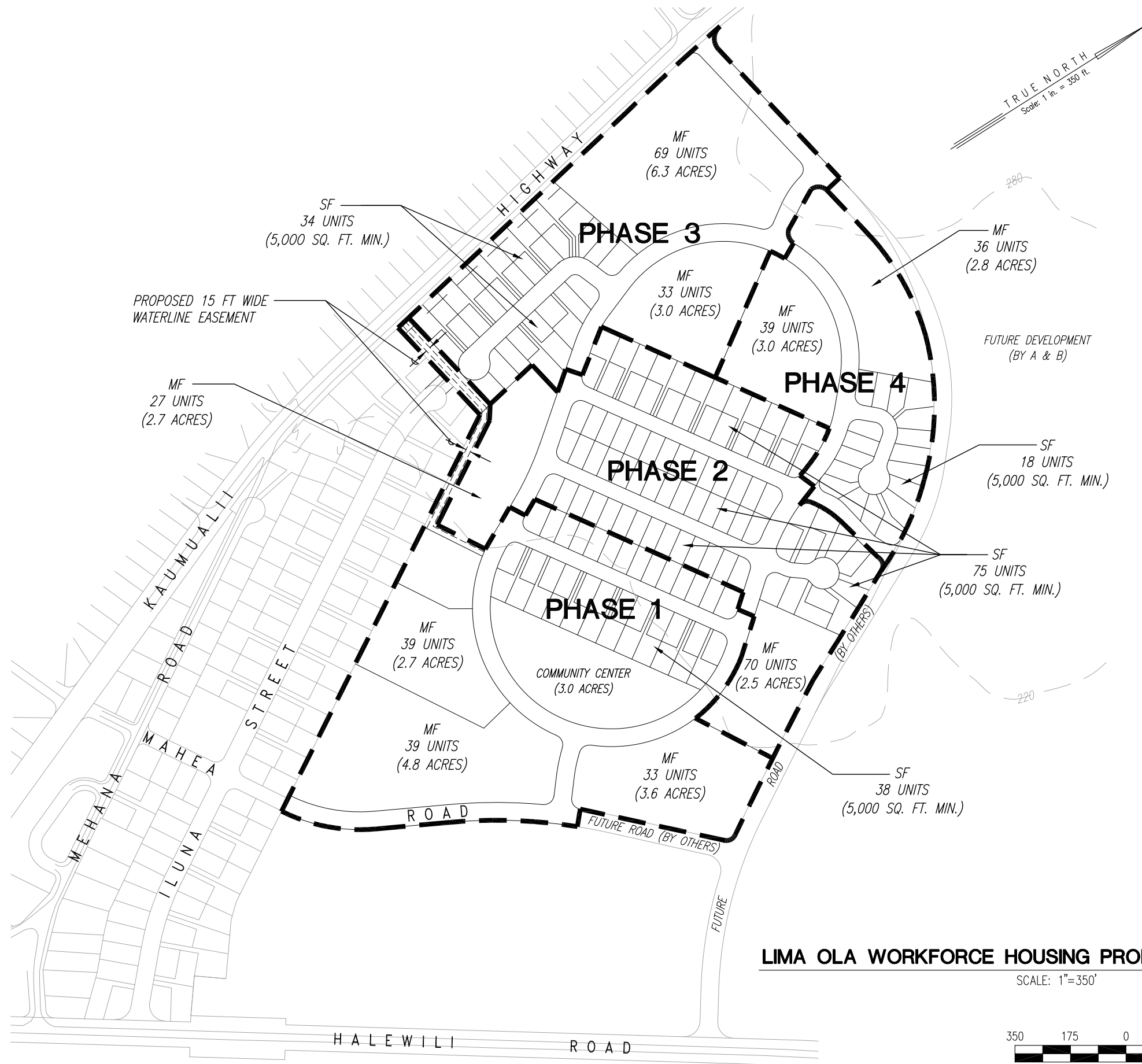
**HANAPEPE-ELEELE WATER SYSTEM**  
SCALE: 1"=500'



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**LIMA OLA WORKFORCE HOUSING DEVELOPMENT WATER MASTER PLAN**  
ELEELE, KAUAI, HAWAII

**EXHIBIT 1  
OVERALL SYSTEM MAP**



**LIMA OLA (PHASE 1)**

RESIDENTIAL UNIT TYPE	NO. OF UNITS
SINGLE FAMILY (SF)	38
MULTI FAMILY (MF)	111

**LIMA OLA (PHASE 2)**

RESIDENTIAL UNIT TYPE	NO. OF UNITS
SINGLE FAMILY (SF)	75
MULTI FAMILY (MF)	97

**LIMA OLA (PHASE 3)**

RESIDENTIAL UNIT TYPE	NO. OF UNITS
SINGLE FAMILY (SF)	34
MULTI FAMILY (MF)	102

**LIMA OLA (PHASE 4)**

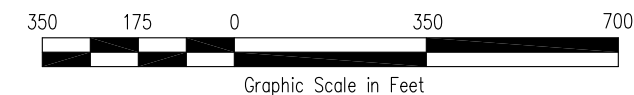
RESIDENTIAL UNIT TYPE	NO. OF UNITS
SINGLE FAMILY (SF)	18
MULTI FAMILY (MF)	75

**TOTAL LIMA OLA DEVELOPMENT**

RESIDENTIAL UNIT TYPE	NO. OF UNITS
SINGLE FAMILY (SF)	165
MULTI FAMILY (MF)	385
TOTAL	550

**LIMA OLA WORKFORCE HOUSING PROPOSED DEVELOPMENT**

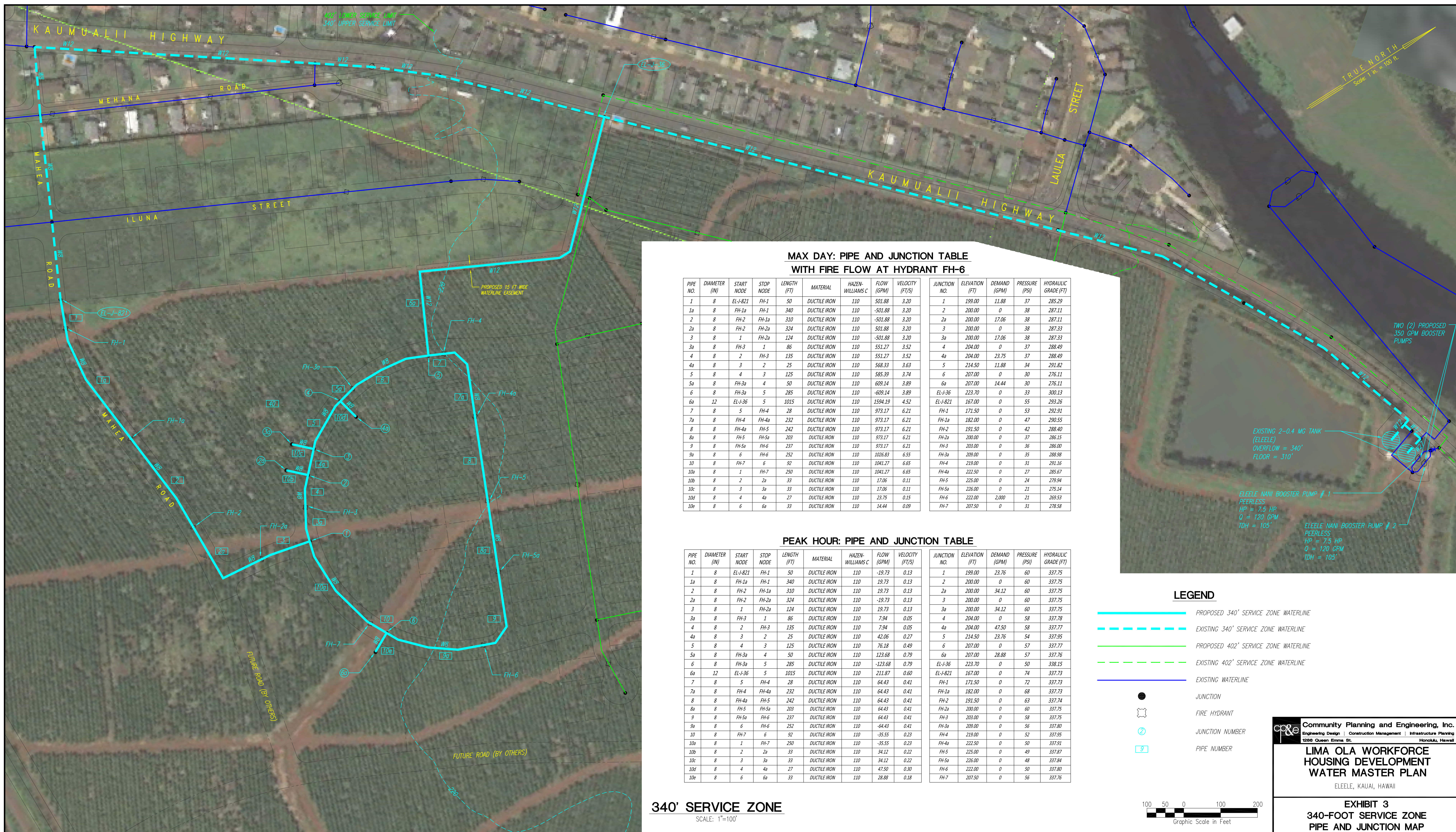
SCALE: 1"=350'



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**LIMA OLA WORKFORCE HOUSING DEVELOPMENT WATER MASTER PLAN**  
 ELEELE, KAUAI, HAWAII

**EXHIBIT 2  
 LIMA OLA WORKFORCE HOUSING PROPOSED DEVELOPMENT**



**MAX DAY: PIPE AND JUNCTION TABLE  
WITH FIRE FLOW AT HYDRANT FH-6**

PIPE NO.	DIAMETER (IN)	START NODE	STOP NODE	LENGTH (FT)	MATERIAL	HAZEN-WILLIAMS C	FLOW (GPM)	VELOCITY (FT/S)	JUNCTION NO.	ELEVATION (FT)	DEMAND (GPM)	PRESSURE (PSI)	HYDRAULIC GRADE (FT)
1	8	EL-J-821	FH-1	50	DUCTILE IRON	110	501.88	3.20	1	199.00	11.88	37	285.29
1a	8	FH-1a	FH-1	340	DUCTILE IRON	110	-501.88	3.20	2	200.00	0	38	287.11
2	8	FH-2	FH-1a	310	DUCTILE IRON	110	-501.88	3.20	2a	200.00	17.06	38	287.11
2a	8	FH-2	FH-2a	324	DUCTILE IRON	110	501.88	3.20	3	200.00	0	38	287.33
3	8	1	FH-2a	124	DUCTILE IRON	110	-501.88	3.20	3a	200.00	17.06	38	287.33
3a	8	FH-3	1	86	DUCTILE IRON	110	551.27	3.52	4	204.00	0	37	288.49
4	8	2	FH-3	135	DUCTILE IRON	110	551.27	3.52	4a	204.00	23.75	37	288.49
4a	8	3	2	25	DUCTILE IRON	110	568.33	3.63	5	214.50	11.88	34	291.82
5	8	4	3	125	DUCTILE IRON	110	585.39	3.74	6	207.00	0	30	276.11
5a	8	FH-3a	4	50	DUCTILE IRON	110	609.14	3.89	6a	207.00	14.44	30	276.11
6	8	FH-3a	5	285	DUCTILE IRON	110	-609.14	3.89	EL-J-36	223.70	0	33	300.13
6a	12	EL-J-36	5	1015	DUCTILE IRON	110	1594.19	4.52	EL-J-821	167.00	0	55	293.26
7	8	5	FH-4	28	DUCTILE IRON	110	973.17	6.21	FH-1	171.50	0	53	292.91
7a	8	FH-4	FH-4a	232	DUCTILE IRON	110	973.17	6.21	FH-1a	182.00	0	47	290.55
8	8	FH-4a	FH-5	242	DUCTILE IRON	110	973.17	6.21	FH-2	191.50	0	42	288.40
8a	8	FH-5	FH-5a	203	DUCTILE IRON	110	973.17	6.21	FH-2a	200.00	0	37	286.15
9	8	FH-5a	FH-6	237	DUCTILE IRON	110	973.17	6.21	FH-3	203.00	0	36	286.00
9a	8	6	FH-6	252	DUCTILE IRON	110	1026.83	6.55	FH-3a	209.00	0	35	288.98
10	8	FH-7	6	92	DUCTILE IRON	110	1041.27	6.65	FH-4	219.00	0	31	291.16
10a	8	1	FH-7	250	DUCTILE IRON	110	1041.27	6.65	FH-4a	222.50	0	27	285.67
10b	8	2	2a	33	DUCTILE IRON	110	17.06	0.11	FH-5	225.00	0	24	279.94
10c	8	3	3a	33	DUCTILE IRON	110	17.06	0.11	FH-5a	226.00	0	21	275.14
10d	8	4	4a	27	DUCTILE IRON	110	23.75	0.15	FH-6	222.00	2,000	21	269.53
10e	8	6	6a	33	DUCTILE IRON	110	14.44	0.09	FH-7	207.50	0	31	278.58

**PEAK HOUR: PIPE AND JUNCTION TABLE**

PIPE NO.	DIAMETER (IN)	START NODE	STOP NODE	LENGTH (FT)	MATERIAL	HAZEN-WILLIAMS C	FLOW (GPM)	VELOCITY (FT/S)	JUNCTION NO.	ELEVATION (FT)	DEMAND (GPM)	PRESSURE (PSI)	HYDRAULIC GRADE (FT)
1	8	EL-J-821	FH-1	50	DUCTILE IRON	110	-19.73	0.13	1	199.00	23.76	60	337.75
1a	8	FH-1a	FH-1	340	DUCTILE IRON	110	19.73	0.13	2	200.00	0	60	337.75
2	8	FH-2	FH-1a	310	DUCTILE IRON	110	19.73	0.13	2a	200.00	34.12	60	337.75
2a	8	FH-2	FH-2a	324	DUCTILE IRON	110	-19.73	0.13	3	200.00	0	60	337.75
3	8	1	FH-2a	124	DUCTILE IRON	110	19.73	0.13	3a	200.00	34.12	60	337.75
3a	8	FH-3	1	86	DUCTILE IRON	110	7.94	0.05	4	204.00	0	58	337.78
4	8	2	FH-3	135	DUCTILE IRON	110	7.94	0.05	4a	204.00	47.50	58	337.77
4a	8	3	2	25	DUCTILE IRON	110	42.06	0.27	5	214.50	23.76	54	337.95
5	8	4	3	125	DUCTILE IRON	110	76.18	0.49	6	207.00	0	57	337.77
5a	8	FH-3a	4	50	DUCTILE IRON	110	123.68	0.79	6a	207.00	28.88	57	337.76
6	8	FH-3a	5	285	DUCTILE IRON	110	-123.68	0.79	EL-J-36	223.70	0	50	338.15
6a	12	EL-J-36	5	1015	DUCTILE IRON	110	211.87	0.60	EL-J-821	167.00	0	74	337.73
7	8	5	FH-4	28	DUCTILE IRON	110	64.43	0.41	FH-1	171.50	0	72	337.73
7a	8	FH-4	FH-4a	232	DUCTILE IRON	110	64.43	0.41	FH-1a	182.00	0	68	337.73
8	8	FH-4a	FH-5	242	DUCTILE IRON	110	64.43	0.41	FH-2	191.50	0	63	337.74
8a	8	FH-5	FH-5a	203	DUCTILE IRON	110	64.43	0.41	FH-2a	200.00	0	60	337.75
9	8	FH-5a	FH-6	237	DUCTILE IRON	110	64.43	0.41	FH-3	203.00	0	58	337.75
9a	8	6	FH-6	252	DUCTILE IRON	110	-64.43	0.41	FH-3a	209.00	0	56	337.80
10	8	FH-7	6	92	DUCTILE IRON	110	-35.55	0.23	FH-4	219.00	0	52	337.95
10a	8	1	FH-7	250	DUCTILE IRON	110	-35.55	0.23	FH-4a	222.50	0	50	337.91
10b	8	2	2a	33	DUCTILE IRON	110	34.12	0.22	FH-5	225.00	0	49	337.87
10c	8	3	3a	33	DUCTILE IRON	110	34.12	0.22	FH-5a	226.00	0	48	337.84
10d	8	4	4a	27	DUCTILE IRON	110	47.50	0.30	FH-6	222.00	0	50	337.80
10e	8	6	6a	33	DUCTILE IRON	110	28.88	0.18	FH-7	207.50	0	56	337.76

**LEGEND**

- PROPOSED 340' SERVICE ZONE WATERLINE
- - - - EXISTING 340' SERVICE ZONE WATERLINE
- PROPOSED 402' SERVICE ZONE WATERLINE
- - - - EXISTING 402' SERVICE ZONE WATERLINE
- EXISTING WATERLINE
- JUNCTION
- FIRE HYDRANT
- ② JUNCTION NUMBER
- ⑨ PIPE NUMBER

**340' SERVICE ZONE**  
SCALE: 1"=100'



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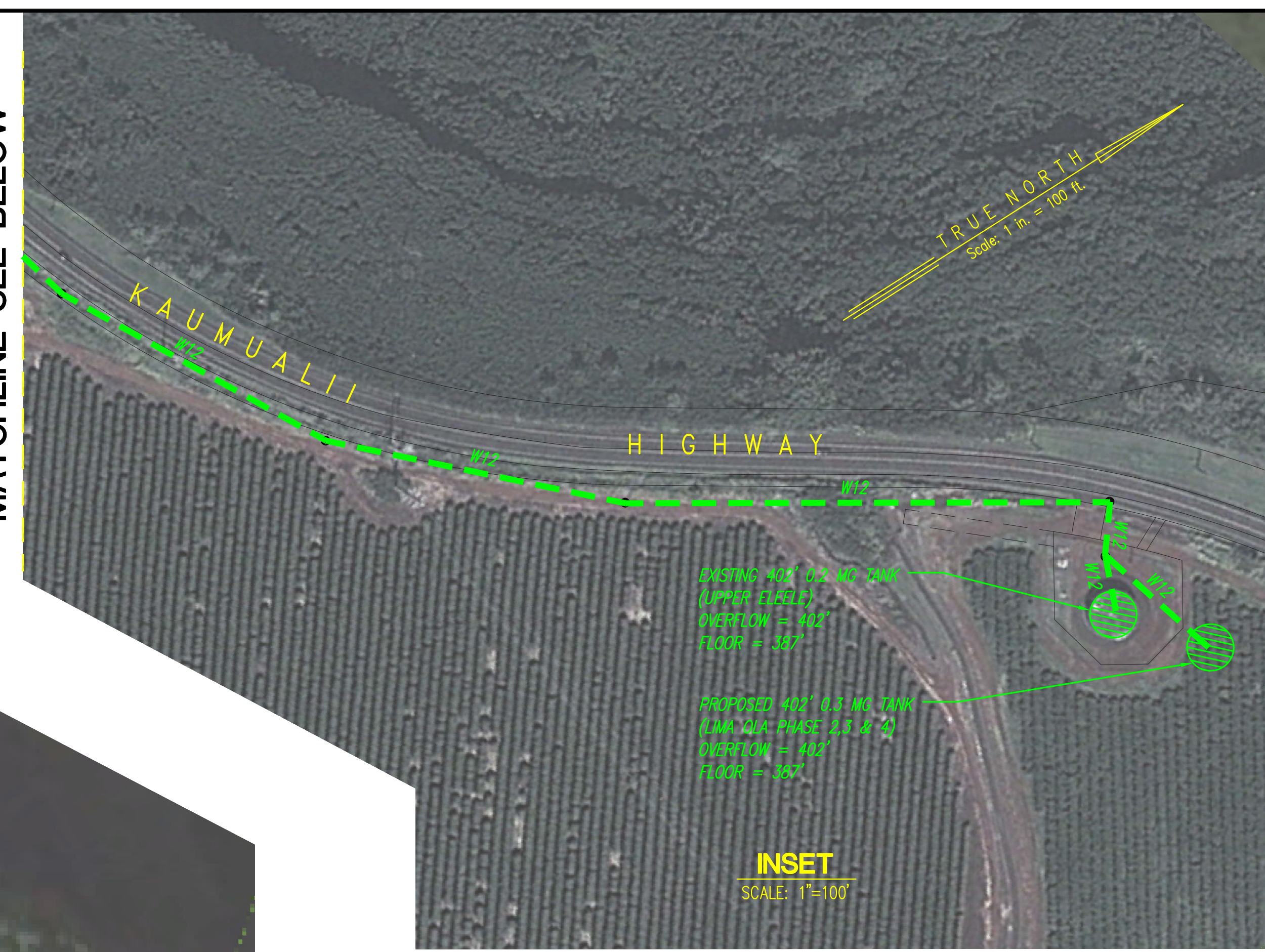
**LIMA OLA WORKFORCE HOUSING DEVELOPMENT WATER MASTER PLAN**  
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**EXHIBIT 3**  
**340-FOOT SERVICE ZONE PIPE AND JUNCTION MAP**



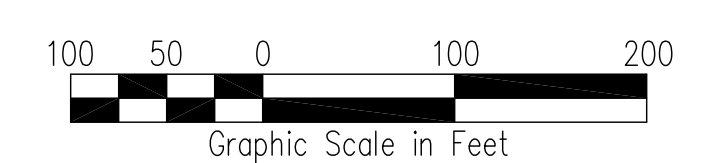
MATCHLINE SEE BELOW

MATCHLINE SEE ABOVE



**LEGEND**

- PROPOSED 340' SERVICE ZONE WATERLINE
- - - EXISTING 340' SERVICE ZONE WATERLINE
- PROPOSED 402' SERVICE ZONE WATERLINE
- - - EXISTING 402' SERVICE ZONE WATERLINE
- EXISTING WATERLINE
- JUNCTION
- FIRE HYDRANT
- ⑩ JUNCTION NUMBER
- ②④ PIPE NUMBER



**MAX DAY: PIPE AND NODE TABLE  
 WITH FIRE FLOW AT HYDRANT FH-16**

PIPE NO.	DIAMETER (IN)	START NODE	STOP NODE	LENGTH (FT)	MATERIAL	HAZEN-WILLIAMS C	FLOW (GPM)	VELOCITY (FT/S)
11	8	10	7	409	DUCTILE IRON	110	83.84	0.54
12	8	7	FH-9	386	DUCTILE IRON	110	33.61	0.21
13	8	FH-9	8	371	DUCTILE IRON	110	33.61	0.21
14	8	8	FH-10	125	DUCTILE IRON	110	8.12	0.05
15	8	FH-10	9	92	DUCTILE IRON	110	8.12	0.05
16	8	FH-8	7	86	DUCTILE IRON	110	-33.48	0.21
17	8	12	FH-8	151	DUCTILE IRON	110	-33.48	0.21
18	8	8	13	247	DUCTILE IRON	110	17.98	0.11
19	8	12	FH-11	391	DUCTILE IRON	110	28.95	0.18
20	8	FH-11	13	398	DUCTILE IRON	110	28.95	0.18
21	8	14	12	346	DUCTILE IRON	110	11.1	0.07
22	8	13	16	289	DUCTILE IRON	110	31.31	0.2
23	8	FH-14	14	226	DUCTILE IRON	110	-52.05	0.33
24	8	16	17	276	DUCTILE IRON	110	17.56	0.11
25	8	18	FH-14	169	DUCTILE IRON	110	-52.05	0.33
26	8	17	FH-15	124	DUCTILE IRON	110	-15.25	0.1
27	8	19	18	174	DUCTILE IRON	110	-7.43	0.05
28	8	FH-15	19	228	DUCTILE IRON	110	-15.25	0.1
29	8	10	11	55	DUCTILE IRON	110	86.92	0.55
30	8	FH-12	11	255	DUCTILE IRON	110	-65.66	0.42
31	8	14	FH-12	351	DUCTILE IRON	110	-65.66	0.42
32	8	FH-13	15	112	DUCTILE IRON	110	11.25	0.07
33	8	16	FH-13	240	DUCTILE IRON	110	11.25	0.07
34	8	FH-16	19	559	DUCTILE IRON	110	7.82	0.05
35	12	EL-J-3	FH-16	314	DUCTILE IRON	110	1,257.82	3.57
36	8	10	EL-J-810	33	DUCTILE IRON	110	-170.76	1.09

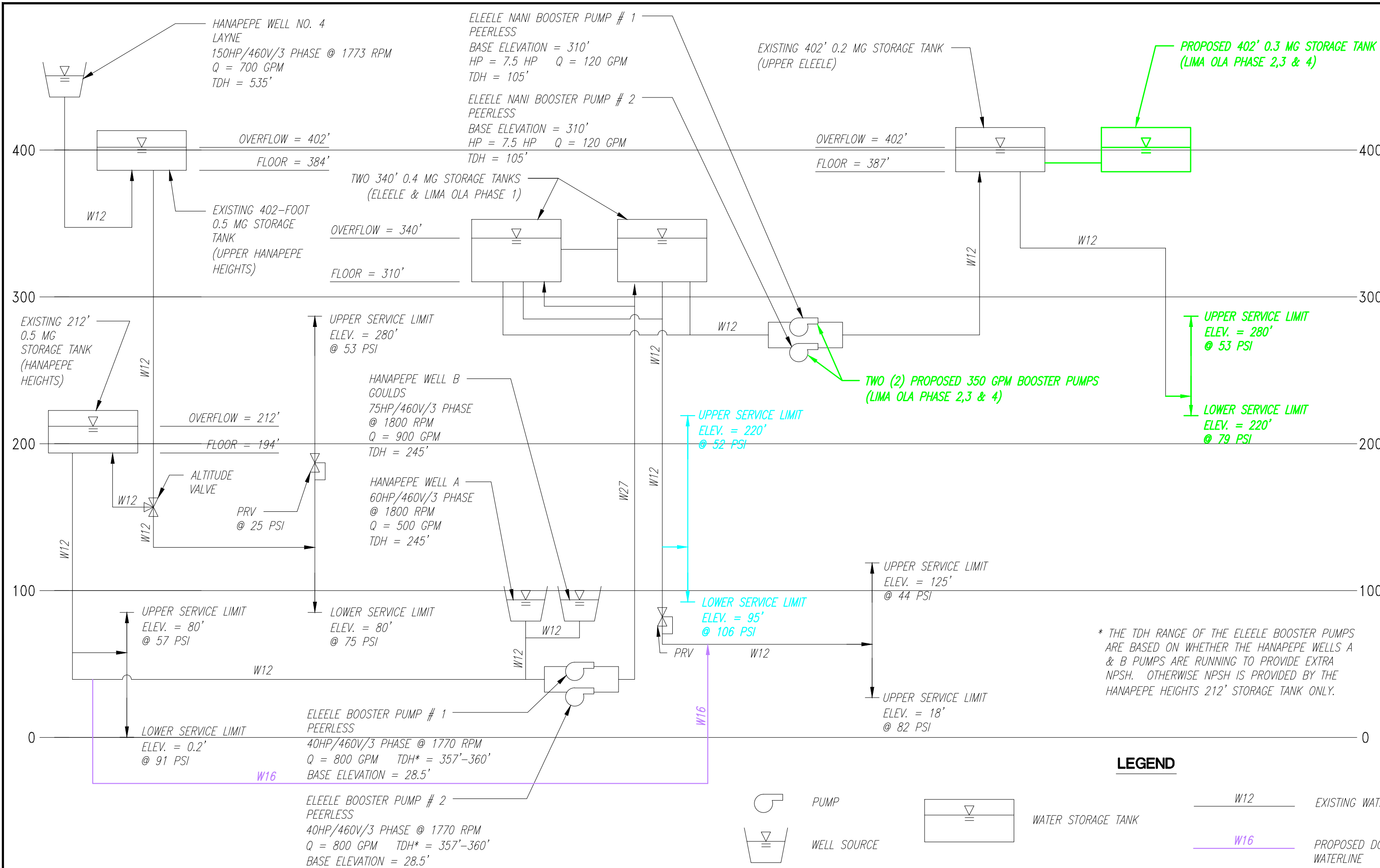
**PEAK HOUR PIPE AND NODE TABLE**

PIPE NO.	DIAMETER (IN)	START NODE	STOP NODE	LENGTH (FT)	MATERIAL	HAZEN-WILLIAMS C	FLOW (GPM)	VELOCITY (FT/S)	JUNCTION NO.	ELEVATION (FT)	DEMAND (GPM)	PRESSURE (PSI)	HYDRAULIC GRADE (FT)
11	8	10	7	409	DUCTILE IRON	110	65.1	0.42	7	219	16.76	64	366.81
12	8	7	FH-9	386	DUCTILE IRON	110	26.2	0.17	8	226	7.5	61	366.78
13	8	FH-9	8	371	DUCTILE IRON	110	26.2	0.17	9	228	8.12	60	366.78
14	8	8	FH-10	125	DUCTILE IRON	110	16.25	0.1	10	225	0	62	366.91
15	8	FH-10	9	92	DUCTILE IRON	110	16.25	0.1	11	230	21.26	59	366.9
16	8	FH-8	7	86	DUCTILE IRON	110	-5.39	0.03	12	226	15.62	61	366.8
17	8	12	FH-8	151	DUCTILE IRON	110	-5.39	0.03	13	231	15.62	59	366.77
18	8	8	13	247	DUCTILE IRON	110	-5.05	0.03	14	241	2.5	55	366.8
19	8	12	FH-11	391	DUCTILE IRON	110	25.16	0.16	15	232	11.25	58	366.76
20	8	FH-11	13	398	DUCTILE IRON	110	25.16	0.16	16	243	2.5	54	366.76
21	8	14	12	346	DUCTILE IRON	110	51.03	0.33	17	257.39	32.81	47	366.76
22	8	13	16	289	DUCTILE IRON	110	-11.13	0.07	18	256.25	44.62	48	366.76
23	8	FH-14	14	226	DUCTILE IRON	110	28.04	0.18	19	268	0	43	366.76
24	8	16	17	276	DUCTILE IRON	110	-38.64	0.25	EL-J-3	280	0.74	38	368.42
25	8	18	FH-14	169	DUCTILE IRON	110	28.04	0.18	EL-J-810	220	0	64	366.95
26	8	17	FH-15	124	DUCTILE IRON	110	-104.27	0.67	FH-8	221.54	0	63	366.81
27	8	19	18	174	DUCTILE IRON	110	117.28	0.75	FH-9	222.57	0	63	366.79
28	8	FH-15	19	228	DUCTILE IRON	110	-104.27	0.67	FH-10	227.15	0	61	366.78
29	8	10	11	55	DUCTILE IRON	110	70.51	0.45	FH-11	228.48	0	60	366.79
30	8	FH-12	11	255	DUCTILE IRON	110	-27.99	0.18	FH-12	234.63	0	57	366.86
31	8	14	FH-12	351	DUCTILE IRON	110	-27.99	0.18	FH-13	235.5	0	57	366.76
32	8	FH-13	15	112	DUCTILE IRON	110	22.5	0.14	FH-14	251.71	0	50	366.78
33	8	16	FH-13	240	DUCTILE IRON	110	22.5	0.14	FH-15	258.64	0	47	366.76
34	8	FH-16	19	559	DUCTILE IRON	110	221.55	1.41	FH-16	280	1,250.00	38	366.76
35	12	EL-J-3	FH-16	314	DUCTILE IRON	110	221.55	0.63					
36	8	10	EL-J-810	33	DUCTILE IRON	110	-135.61	0.87					

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**LIMA OLA WORKFORCE HOUSING DEVELOPMENT WATER MASTER PLAN**  
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**EXHIBIT 4  
 402-FOOT SERVICE ZONE PIPE AND JUNCTION MAP**



**LIMA OLA (PHASE 1)**

LAND USE	WATER DEMAND PER LAND USE	NO. OF UNITS	AREA (ACRES)	AVERAGE DEMAND	MAX DAILY	PEAK HOUR
SINGLE FAMILY OR DUPLEX	500	38	-	19,000	28,500	57,000
MULTI FAMILY	350	111	-	38,850	58,275	116,550
COMMUNITY CENTER	3,000	-	3	9,000	13,500	27,000
IRRIGATION	4,000	-	2.5	10,000	15,000	30,000
TOTAL	-	-	-	76,850	115,275	230,550

**LIMA OLA (PHASE 2)**

LAND USE	WATER DEMAND PER LAND USE	NO. OF UNITS	AREA (ACRES)	AVERAGE DEMAND	MAX DAILY	PEAK HOUR
SINGLE FAMILY OR DUPLEX	500	75	-	37,500	56,250	112,500
MULTI FAMILY	350	97	-	33,950	50,925	101,850
IRRIGATION	4,000	-	3.35	13,400	20,100	40,200
TOTAL	-	-	-	84,850	127,275	254,550

**LIMA OLA (PHASE 3)**

LAND USE	WATER DEMAND PER LAND USE	NO. OF UNITS	AREA (ACRES)	AVERAGE DEMAND	MAX DAILY	PEAK HOUR
SINGLE FAMILY OR DUPLEX	500	34	-	17,000	25,500	51,000
MULTI FAMILY	350	102	-	35,700	53,550	107,100
IRRIGATION	4,000	-	0.5	2,000	3,000	6,000
TOTAL	-	-	-	54,700	82,050	164,100

**LIMA OLA (PHASE 4)**

LAND USE	WATER DEMAND PER LAND USE	NO. OF UNITS	AREA (ACRES)	AVERAGE DEMAND	MAX DAILY	PEAK HOUR
SINGLE FAMILY OR DUPLEX	500	18	-	9,000	13,500	27,000
MULTI FAMILY	350	75	-	26,250	39,375	78,750
IRRIGATION	4,000	-	0.5	2,000	3,000	6,000
TOTAL	-	-	-	37,250	55,875	111,750

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**LIMA OLA WORKFORCE HOUSING DEVELOPMENT WATER MASTER PLAN**  
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**EXHIBIT 5 SCHEMATIC DIAGRAM**

# Appendix B

**Water Model Results for**  
**Hanapepe-Eleele Water System**  
**(Existing)**

**Pipe Table**



## FlexTable: Pipe Table

### Hanapee-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-1	12.0	HH-J-1	Upper Hanapee Heights 0.5MG Tank	4,549	Ductile Iron	100.0	-125.18	0.36
HH-P-2	12.0	HH-J-2	HH-J-1	231	Ductile Iron	100.0	-125.18	0.36
HH-P-3	6.0	HH-J-2	C-105	55	Ductile Iron	100.0	17.99	0.20
HH-P-4	6.0	C-105	HH-J-3	150	Ductile Iron	100.0	17.41	0.20
HH-P-5	6.0	HH-J-3	C-106	114	Ductile Iron	100.0	0.18	0.00
HH-P-7	6.0	HH-J-3	C-107	290	Ductile Iron	100.0	17.23	0.20
HH-P-8	6.0	C-107	HH-J-4	199	Ductile Iron	100.0	15.39	0.17
HH-P-9	6.0	HH-J-4	HH-J-5	208	Ductile Iron	100.0	-15.66	0.18
HH-P-10	12.0	HH-J-5	HH-J-2	486	Ductile Iron	100.0	-107.19	0.30
HH-P-11	6.0	C-108	HH-J-4	244	Ductile Iron	100.0	-30.63	0.35
HH-P-12	6.0	HH-J-6	C-108	48	Ductile Iron	100.0	-29.38	0.33
HH-P-13	2.5	HH-J-6	HH-J-7	149	PVC	150.0	0.79	0.05
HH-P-14	6.0	HH-J-8	HH-J-6	281	Ductile Iron	100.0	-27.84	0.32
HH-P-15	6.0	HH-J-9	HH-J-8	203	Ductile Iron	100.0	-11.88	0.13
HH-P-16	12.0	C-104	HH-J-9	511	Ductile Iron	100.0	89.03	0.25
HH-P-17	6.0	HH-J-5	C-104	66	Ductile Iron	100.0	90.51	1.03
HH-P-18	6.0	C-109	HH-J-8	223	Ductile Iron	100.0	-14.31	0.16
HH-P-19	6.0	HH-J-10	C-109	36	Ductile Iron	100.0	-13.65	0.15
HH-P-20	2.5	HH-J-10	HH-J-11	141	PVC	150.0	0.42	0.03
HH-P-21	6.0	C-110	HH-J-10	298	Ductile Iron	100.0	-11.91	0.14
HH-P-22	6.0	HH-J-12	C-110	142	Ductile Iron	100.0	-10.60	0.12
HH-P-23	2.5	HH-J-12	HH-J-13	129	PVC	150.0	0.00	0.00
HH-P-24	6.0	HH-J-14	HH-J-12	180	Ductile Iron	100.0	-10.11	0.11
HH-P-25	6.0	C-125	HH-J-14	468	Ductile Iron	100.0	4.73	0.05
HH-P-26	6.0	HH-J-15	C-125	436	Ductile Iron	100.0	8.04	0.09
HH-P-27	12.0	C-103	HH-J-15	169	Ductile Iron	100.0	99.53	0.28
HH-P-28	12.0	HH-J-9	C-103	64	Ductile Iron	100.0	100.48	0.29

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-29	6.0	C-111	HH-J-14	32	Ductile Iron	100.0	-14.19	0.16
HH-P-30	6.0	HH-J-16	C-111	190	Ductile Iron	100.0	-12.98	0.15
HH-P-31	6.0	C-124	HH-J-16	296	Ductile Iron	100.0	2.39	0.03
HH-P-32	6.0	HH-J-17	C-124	600	Ductile Iron	100.0	7.25	0.08
HH-P-33	12.0	C-102	HH-J-17	61	Ductile Iron	100.0	87.96	0.25
HH-P-34	12.0	HH-J-15	C-102	156	Ductile Iron	100.0	89.20	0.25
HH-P-35	6.0	C-112	HH-J-16	156	Ductile Iron	100.0	-13.66	0.15
HH-P-36	6.0	HH-J-18	C-112	48	Ductile Iron	100.0	-11.95	0.14
HH-P-37	6.0	C-123	HH-J-18	458	Ductile Iron	100.0	4.85	0.06
HH-P-38	6.0	HH-J-19	C-123	435	Ductile Iron	100.0	7.58	0.09
HH-P-39	12.0	HH-J-17	HH-J-19	197	Ductile Iron	100.0	79.73	0.23
HH-P-40	6.0	C-113	HH-J-18	188	Ductile Iron	100.0	-8.59	0.10
HH-P-41	6.0	HH-J-20	C-113	57	Ductile Iron	130.0	-8.39	0.10
HH-P-42	6.0	C-122	HH-J-20	548	Ductile Iron	100.0	3.32	0.04
HH-P-43	6.0	HH-J-21	C-122	341	Ductile Iron	100.0	6.83	0.08
HH-P-44	12.0	C-101	HH-J-21	170	Ductile Iron	100.0	69.35	0.20
HH-P-45	12.0	HH-J-19	C-101	76	Ductile Iron	100.0	70.83	0.20
HH-P-46	6.0	C-114	HH-J-20	191	Ductile Iron	100.0	-10.76	0.12
HH-P-47	6.0	HH-J-22	C-114	53	Ductile Iron	100.0	-9.58	0.11
HH-P-48	6.0	HH-J-23	HH-J-22	445	Ductile Iron	100.0	-2.32	0.03
HH-P-49	6.0	HH-J-24	HH-J-23	445	Ductile Iron	100.0	7.98	0.09
HH-P-50	12.0	C-100	HH-J-24	63	Ductile Iron	100.0	60.71	0.17
HH-P-51	12.0	HH-J-21	C-100	187	Ductile Iron	100.0	61.36	0.17
HH-P-52	6.0	HH-J-25	HH-J-22	250	Ductile Iron	100.0	-5.68	0.06
HH-P-53	6.0	HH-J-26	HH-J-25	217	Ductile Iron	100.0	-3.89	0.04
HH-P-54	2.5	HH-J-26	HH-J-27	128	PVC	150.0	1.41	0.09
HH-P-55	6.0	HH-J-28	HH-J-26	229	Ductile Iron	100.0	0.31	0.00
HH-P-56	2.5	HH-J-28	HH-J-29	124	PVC	150.0	1.24	0.08
HH-P-57	6.0	C-121	HH-J-28	203	Ductile Iron	100.0	5.99	0.07

## FlexTable: Pipe Table

### Hanapepe-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-58	6.0	HH-J-23	C-121	51	Ductile Iron	130.0	7.14	0.08
HH-P-59	6.0	C-118	HH-J-18	416	Ductile Iron	100.0	-7.32	0.08
HH-P-60	6.0	C-117	C-118	433	Ductile Iron	100.0	-7.32	0.08
HH-P-61	6.0	HH-J-30	C-117	61	Ductile Iron	100.0	-6.17	0.07
HH-P-62	6.0	C-119	HH-J-30	419	Ductile Iron	100.0	-1.78	0.02
HH-P-67	6.0	C-116	HH-J-34	211	Ductile Iron	130.0	(N/A)	(N/A)
HH-P-68	6.0	C-115	C-116	298	Ductile Iron	100.0	2.12	0.02
HH-P-69	6.0	HH-J-25	C-115	66	Ductile Iron	100.0	3.55	0.04
HH-P-74	6.0	C-9	HH-J-37	66	Ductile Iron	130.0	(N/A)	(N/A)
HH-P-75	6.0	C-120	C-9	463	Ductile Iron	100.0	2.09	0.02
HH-P-76	6.0	HH-J-28	C-120	51	Ductile Iron	100.0	3.78	0.04
HH-P-79	6.0	HH-J-41	HH-J-38	414	Ductile Iron	80.0	24.60	0.28
HH-P-81	12.0	HH-J-43	HH-J-42	494	Asbestos Cement	140.0	164.59	0.47
HH-P-82	12.0	HH-J-47	HH-J-43	87	Asbestos Cement	140.0	164.59	0.47
HH-P-83	12.0	HH-J-24	HH-J-44	213	Ductile Iron	100.0	52.05	0.15
HH-P-85	6.0	Hanapepe Heights Booster Pump #1	HH-J-45	41	Ductile Iron	130.0	0.00	0.00
HH-P-86	6.0	HH-J-45	Hanapepe Heights 0.5 MG Tank	51	Ductile Iron	80.0	-165.77	1.88
HH-P-87	6.0	HH-J-45	HH-J-46	41	Ductile Iron	80.0	165.77	1.88
HH-P-88	6.0	HH-J-47	HH-J-46	101	Ductile Iron	80.0	-164.59	1.87
HH-P-89	6.0	HH-J-48	HH-J-46	39	Ductile Iron	80.0	0.00	0.00
HH-P-91	6.0	HH-J-49	C-1	91	Ductile Iron	80.0	52.05	0.59
HH-P-92	6.0	C-1	HH-J-41	420	Ductile Iron	80.0	50.46	0.57
HH-P-93	6.0	HH-J-34	C-10	43	Ductile Iron	130.0	10.04	0.11
HH-P-94	6.0	C-10	HH-J-53	24	Ductile Iron	80.0	10.04	0.11

## FlexTable: Pipe Table

### Hanapepe-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-97	1.5	HH-J-56	HH-J-55	405	Ductile Iron	80.0	0.25	0.05
HH-P-100	6.0	C-8	HH-J-50	66	Cast iron	80.0	5.33	0.06
HH-P-101	6.0	C-3	HH-J-50	374	Asbestos Cement	140.0	5.64	0.06
HH-P-102	6.0	C-3	HH-J-51	47	Ductile Iron	80.0	-7.27	0.08
HH-P-103	6.0	C-2	HH-J-51	575	Ductile Iron	80.0	21.82	0.25
HH-P-104	6.0	HH-J-41	C-2	42	Ductile Iron	80.0	24.10	0.27
HH-P-105	6.0	HH-J-55	HH-J-57	27	Ductile Iron	80.0	2.64	0.03
HH-P-106	1.5	HH-J-57	HH-J-58	406	Ductile Iron	80.0	-0.25	0.05
HH-P-107	6.0	HH-J-58	HH-J-56	26	Ductile Iron	80.0	-1.39	0.02
HH-P-108	6.0	HH-J-50	HH-J-59	26	Cast iron	80.0	10.97	0.12
HH-P-109	1.5	HH-J-60	HH-J-59	421	Ductile Iron	80.0	0.09	0.02
HH-P-110	6.0	HH-J-51	HH-J-60	27	Ductile Iron	80.0	12.88	0.15
HH-P-115	1.0	HH-J-65	HH-J-64	333	Ductile Iron	80.0	-0.57	0.23
HH-P-116	2.0	HH-J-67	HH-J-66	106	Ductile Iron	80.0	0.11	0.01
HH-P-117	2.0	HH-J-58	HH-J-67	395	Ductile Iron	80.0	0.67	0.07
HH-P-118	6.0	HH-J-68	HH-J-67	25	Ductile Iron	80.0	-0.51	0.01
HH-P-119	6.0	HH-J-68	HH-J-69	201	Cast iron	80.0	9.35	0.11
HH-P-120	6.0	HH-J-69	HH-J-70	21	Ductile Iron	80.0	-1.60	0.02
HH-P-121	6.0	HH-J-70	C-4	333	Asbestos Cement	140.0	-1.60	0.02
HH-P-124	6.0	HH-J-59	C-7	301	Cast iron	80.0	10.56	0.12
HH-P-125	6.0	C-7	HH-J-68	95	Cast iron	80.0	9.39	0.11
HH-P-126	4.0	HH-J-86	HH-J-87	410	Ductile Iron	80.0	1.17	0.03
HH-P-128	1.0	HH-J-78a	HH-J-81	507	Cast iron	80.0	0.08	0.03
HH-P-129	6.0	HH-J-81	HH-J-82	43	Cast iron	80.0	-0.53	0.01
HH-P-130	4.0	HH-J-82	HH-J-83	60	Ductile Iron	80.0	-0.53	0.01
HH-P-131	4.0	HH-J-83	C-5	62	Ductile Iron	80.0	-0.53	0.01
HH-P-132	6.0	C-5	HH-J-84	30	Ductile Iron	80.0	-0.53	0.01
HH-P-133	2.0	HH-J-84	HH-J-86	436	Ductile Iron	80.0	-0.61	0.06

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-135	6.0	HH-J-80	HH-J-88	162	Cast iron	80.0	7.50	0.09
HH-P-136	2.0	HH-J-88	HH-J-89	30	Ductile Iron	80.0	0.20	0.02
HH-P-137	2.0	HH-J-89	HH-J-90	553	Ductile Iron	80.0	0.20	0.02
HH-P-138	2.0	HH-J-90	HH-J-91	81	Ductile Iron	80.0	0.20	0.02
HH-P-139	2.0	HH-J-91	HH-J-92	99	Ductile Iron	80.0	0.20	0.02
HH-P-140	2.0	HH-J-92	HH-J-93	62	Ductile Iron	80.0	0.20	0.02
HH-P-141	2.0	HH-J-93	HH-J-94	126	Ductile Iron	80.0	-0.23	0.02
HH-P-142	2.0	HH-J-94	HH-J-95	36	Ductile Iron	80.0	-0.23	0.02
HH-P-143	2.0	HH-J-95	HH-J-96	148	Ductile Iron	80.0	-0.23	0.02
HH-P-144	2.0	HH-J-96	HH-J-97	54	Ductile Iron	80.0	-0.23	0.02
HH-P-145	2.0	HH-J-97	C-6	305	Ductile Iron	80.0	-0.23	0.02
HH-P-146	2.0	C-6	HH-J-98	130	Ductile Iron	80.0	-0.23	0.02
HH-P-147	2.0	HH-J-98	HH-J-99	86	Ductile Iron	80.0	-0.23	0.02
HH-P-148	2.0	HH-J-99	HH-J-100	222	Ductile Iron	80.0	-0.23	0.02
HH-P-151	6.0	C-11	HH-J-74	149	Ductile Iron	80.0	1.51	0.02
HH-P-152	2.0	HH-J-74	HH-J-75	94	Ductile Iron	80.0	1.51	0.15
HH-P-153	6.0	HH-J-75	HH-J-76	68	Ductile Iron	80.0	1.51	0.02
HH-P-154	6.0	HH-J-76	HH-J-77	47	Ductile Iron	80.0	1.51	0.02
HH-P-155	6.0	HH-J-77	C-12	58	Ductile Iron	80.0	-0.06	0.00
HH-P-156	4.0	C-12	C-13	470	Cast iron	80.0	-0.89	0.02
HH-P-157	6.0	C-13	HH-J-78	115	Cast iron	80.0	-1.33	0.02
HH-P-158	6.0	HH-J-78	HH-J-79	272	Cast iron	80.0	8.84	0.10
HH-P-159	6.0	HH-J-79	C-14	74	Cast iron	80.0	8.84	0.10
HH-P-160	6.0	C-14	HH-J-80	55	Cast iron	80.0	8.09	0.09
HH-P-167	6.0	HH-J-105	HH-J-106	52	Cast iron	80.0	(N/A)	(N/A)
HH-P-168	12.0	HH-J-107	HH-J-106	315	Asbestos Cement	140.0	131.80	0.37
HH-P-169	12.0	C-55	HH-J-107	225	Asbestos Cement	140.0	131.80	0.37

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
HH-P-170	12.0	HH-J-85	C-55	530	Asbestos Cement	140.0	134.74	0.38
HH-P-171	12.0	HH-J-85	HH-J-42	1,743	Asbestos Cement	140.0	-134.74	0.38
HH-P-172	12.0	HH-J-106	HH-J-108	634	Asbestos Cement	140.0	131.80	0.37
HH-P-173	12.0	HH-J-108	HH-J-109	185	Asbestos Cement	140.0	131.80	0.37
HH-P-174	12.0	HH-J-109	HH-J-110	347	Asbestos Cement	140.0	131.80	0.37
HH-P-175	12.0	HH-J-110	J-56	92	Asbestos Cement	140.0	131.80	0.37
HH-P-1420	6.0	C-15	HH-J-88	268	Ductile Iron	80.0	-5.03	0.06
HH-P-1421	6.0	C-16	C-15	496	Ductile Iron	80.0	-2.80	0.03
HH-P-1422	6.0	HH-J-105	HH-J-103a	280	Ductile Iron	80.0	-1.42	0.02
HH-P-1423	6.0	J-848	HH-J-53	281	Ductile Iron	80.0	-4.17	0.05
P-1	6.0	HH-J-42	J-73	1,334	Ductile Iron	80.0	28.54	0.32
P-2	6.0	J-73	J-548	329	Ductile Iron	80.0	28.54	0.32
P-3	6.0	J-549	J-551	701	Ductile Iron	80.0	11.15	0.13
P-4	6.0	C-60	J-155	198	Ductile Iron	85.0	-4.36	0.05
P-5	6.0	J-149	C-59	321	Ductile Iron	85.0	0.32	0.00
P-6	6.0	J-712	J-713	491	Ductile Iron	85.0	41.18	0.47
P-38	6.0	HH-J-25	HH-J-30	253	Ductile Iron	100.0	-2.59	0.03
P-76	6.0	HH-J-38	HH-J-34	468	Ductile Iron	80.0	12.17	0.14
P-157	6.0	J-131	J-132	54	Cast iron	80.0	19.31	0.22
P-158	6.0	J-132	J-133	31	Cast iron	80.0	18.00	0.20
P-159	6.0	J-133	J-134	120	Cast iron	80.0	18.00	0.20
P-160	6.0	J-134	C-18	164	Ductile Iron	80.0	18.00	0.20
P-161	6.0	C-18	J-136	194	Ductile Iron	80.0	17.64	0.20
P-162	6.0	J-136	J-137	76	Ductile Iron	80.0	17.64	0.20

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-163	6.0	J-137	J-138	42	Ductile Iron	130.0	24.89	0.28
P-164	2.0	J-138	J-139	226	PVC	150.0	0.90	0.09
P-165	2.0	J-132	J-140	34	PVC	150.0	0.25	0.03
P-166	2.0	J-140	J-141	173	PVC	150.0	0.25	0.03
P-167	6.0	J-138	J-142	53	Cast iron	80.0	23.76	0.27
P-168	6.0	J-142	J-143	67	Ductile Iron	85.0	5.37	0.06
P-169	8.0	J-143	C-19	498	Asbestos Cement	140.0	5.37	0.03
P-170	8.0	C-19	J-145	109	Asbestos Cement	140.0	2.02	0.01
P-174	8.0	C-20	J-149	230	Asbestos Cement	140.0	0.32	0.00
P-177	8.0	C-59	J-152	157	Asbestos Cement	140.0	-1.00	0.01
P-178	8.0	J-152	J-153	263	Asbestos Cement	140.0	-1.00	0.01
P-179	8.0	J-153	J-154	198	Asbestos Cement	140.0	-3.47	0.02
P-184	6.0	J-158	J-159	624	Ductile Iron	80.0	9.64	0.11
P-185	2.5	J-159	J-160	111	PVC	150.0	1.05	0.07
P-186	2.5	J-160	J-161	83	PVC	150.0	1.05	0.07
P-187	2.5	J-161	J-162	89	PVC	150.0	1.05	0.07
P-188	2.5	J-162	J-163	125	PVC	150.0	1.05	0.07
P-189	2.5	J-163	J-164	401	PVC	150.0	1.05	0.07
P-190	2.5	J-164	C-22	141	PVC	150.0	1.05	0.07
P-191	2.5	C-22	J-166	240	PVC	150.0	0.45	0.03
P-192	2.5	J-166	J-167	101	PVC	150.0	0.45	0.03
P-195	12.0	J-169	J-170	64	Asbestos Cement	140.0	97.30	0.28

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-196	12.0	J-170	C-65	276	Asbestos Cement	140.0	25.38	0.07
P-198	8.0	J-172	J-173	179	Asbestos Cement	140.0	10.02	0.06
P-199	8.0	J-173	C-69	104	Ductile Iron	85.0	16.11	0.10
P-200	8.0	C-69	J-175	58	Ductile Iron	85.0	16.11	0.10
P-201	6.0	J-175	J-176	511	Ductile Iron	90.0	0.00	0.00
P-202	6.0	J-168	J-173	44	Cast iron	80.0	6.10	0.07
P-203	6.0	J-172	J-177	355	Asbestos Cement	140.0	12.85	0.15
P-204	6.0	J-177	C-63	89	Asbestos Cement	140.0	12.85	0.15
P-205	4.0	C-63	J-179	134	PVC	150.0	12.85	0.33
P-206	4.0	J-179	J-180	66	PVC	150.0	12.85	0.33
P-207	12.0	J-170	J-181	474	Asbestos Cement	140.0	71.44	0.20
P-210	12.0	J-183	J-184	310	Ductile Iron	85.0	18.63	0.05
P-213	1.5	J-186	J-187	468	PVC	150.0	1.23	0.22
P-214	2.0	J-188	J-187	148	PVC	150.0	4.18	0.43
P-216	6.0	J-189	J-190	614	Asbestos Cement	140.0	-4.48	0.05
P-218	12.0	J-191	J-186	73	Ductile Iron	80.0	-13.48	0.04
P-219	6.0	J-188	J-192	67	Ductile Iron	80.0	-4.18	0.05
P-221	2.5	J-191	J-192	611	PVC	150.0	1.88	0.12
P-222	2.0	J-192	J-193	195	PVC	150.0	0.82	0.08
P-223	2.0	J-193	J-194	129	PVC	150.0	0.82	0.08
P-224	8.0	J-189	J-195	134	Asbestos Cement	140.0	-3.00	0.02
P-225	8.0	J-195	C-62	271	Asbestos Cement	140.0	-3.81	0.02



**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-226	8.0	C-62	J-197	28	Ductile Iron	80.0	-3.81	0.02
P-233	4.0	J-201	J-203	193	Cast iron	80.0	-1.43	0.04
P-234	4.0	J-203	J-204	183	Cast iron	80.0	-1.43	0.04
P-235	4.0	J-204	J-205	198	Cast iron	80.0	-1.43	0.04
P-236	4.0	J-205	J-206	61	Cast iron	80.0	-2.17	0.06
P-237	6.0	J-198	J-207	48	Ductile Iron	80.0	0.50	0.01
P-239	6.0	J-201	J-209	37	Ductile Iron	80.0	-1.34	0.02
P-240	6.0	J-209	J-210	209	Cast iron	80.0	-3.77	0.04
P-242	6.0	J-211	J-206	219	Cast iron	80.0	-5.05	0.06
P-244	6.0	J-212	J-213	26	Ductile Iron	80.0	10.16	0.12
P-246	6.0	J-213	J-215	41	Cast iron	80.0	10.16	0.12
P-247	4.0	J-215	J-216	236	Cast iron	80.0	2.13	0.05
P-248	6.0	J-215	C-31	65	Ductile Iron	80.0	8.03	0.09
P-249	6.0	C-31	J-183	278	Asbestos Cement	140.0	5.37	0.06
P-250	8.0	J-175	J-218	82	Ductile Iron	85.0	16.11	0.10
P-251	8.0	J-218	J-219	234	Asbestos Cement	140.0	16.11	0.10
P-254	8.0	C-58	J-222	337	Ductile Iron	85.0	14.16	0.09
P-257	3.0	J-224	C-67	387	PVC	150.0	6.86	0.31
P-258	3.0	C-67	J-226	593	PVC	150.0	0.00	0.00
P-259	3.0	J-226	J-227	581	PVC	150.0	0.00	0.00
P-260	3.0	J-227	J-228	479	PVC	150.0	0.00	0.00
P-261	3.0	J-228	J-229	113	PVC	150.0	0.00	0.00
P-262	3.0	J-229	C-68	380	PVC	150.0	0.00	0.00
P-263	3.0	C-68	J-231	74	PVC	150.0	0.00	0.00
P-264	3.0	J-231	J-232	39	PVC	150.0	0.00	0.00
P-265	3.0	J-232	J-233	76	PVC	150.0	0.00	0.00
P-267	8.0	J-151	J-235	92	Ductile Iron	85.0	7.45	0.05
P-268	3.0	J-235	J-224	727	PVC	150.0	6.86	0.31

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-269	2.0	J-235	J-236	52	Ductile Iron	85.0	0.00	0.00
P-270	2.0	J-236	J-237	306	Ductile Iron	85.0	0.00	0.00
P-271	2.0	J-237	J-238	331	Ductile Iron	85.0	0.00	0.00
P-272	2.0	J-238	J-239	345	Ductile Iron	85.0	0.00	0.00
P-273	2.0	J-239	J-240	391	Ductile Iron	85.0	0.00	0.00
P-274	2.0	J-240	J-241	180	Ductile Iron	85.0	0.00	0.00
P-275	2.0	J-241	J-242	79	Ductile Iron	85.0	0.00	0.00
P-276	2.0	J-242	J-243	156	Ductile Iron	85.0	0.00	0.00
P-277	8.0	J-181	C-66	57	Asbestos Cement	140.0	13.99	0.09
P-280	8.0	C-25	J-247	178	Asbestos Cement	140.0	3.76	0.02
P-281	4.0	J-247	C-24	145	Cast iron	85.0	2.79	0.07
P-282	8.0	C-66	C-26	404	Asbestos Cement	140.0	11.33	0.07
P-283	8.0	C-26	C-25	516	Asbestos Cement	140.0	9.82	0.06
P-284	4.0	C-24	J-249	232	Cast iron	85.0	1.57	0.04
P-285	1.5	J-249	J-250	49	PVC	150.0	1.06	0.19
P-286	1.5	J-250	J-251	408	PVC	150.0	0.00	0.00
P-287	1.5	J-251	J-252	39	PVC	150.0	0.00	0.00
P-288	1.5	J-252	J-253	295	PVC	150.0	0.00	0.00
P-289	1.5	J-250	J-254	95	PVC	150.0	0.86	0.16
P-290	1.5	J-254	J-255	133	PVC	150.0	0.86	0.16
P-291	6.0	J-183	C-30	72	Asbestos Cement	140.0	26.10	0.30
P-292	6.0	C-30	J-257	330	Asbestos Cement	140.0	25.30	0.29
P-293	6.0	J-257	C-29	122	Asbestos Cement	140.0	25.30	0.29

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-295	6.0	C-29	J-260	39	Asbestos Cement	140.0	23.78	0.27
P-297	2.5	J-260	J-261	25	PVC	150.0	1.42	0.09
P-298	2.5	J-261	J-262	359	PVC	150.0	1.42	0.09
P-300	2.0	J-263	J-264	97	PVC	150.0	1.76	0.18
P-302	2.0	C-56	J-263	119	PVC	150.0	1.76	0.18
P-303	2.0	J-855	J-266	245	PVC	150.0	6.74	0.69
P-304	2.0	J-184	J-267	196	PVC	150.0	1.05	0.11
P-313	6.0	EL-J-84	EL-J-85	43	Cast iron	80.0	-2.95	0.03
P-315	6.0	EL-J-87	EL-J-88	133	Cast iron	80.0	-7.78	0.09
P-316	6.0	EL-J-88	EL-J-89	46	Cast iron	80.0	-7.78	0.09
P-317	8.0	EL-J-89	EL-J-81	199	Cast iron	80.0	6.92	0.04
P-318	8.0	EL-J-81	EL-J-80	213	Cast iron	80.0	4.19	0.03
P-319	6.0	EL-J-80	C-45	85	Cast iron	80.0	6.54	0.07
P-320	6.0	C-45	EL-J-90	83	Cast iron	80.0	6.18	0.07
P-322	4.0	EL-J-93	EL-J-94	297	Cast iron	80.0	2.31	0.06
P-323	4.0	EL-J-94	C-40	384	Cast iron	80.0	2.31	0.06
P-325	6.0	EL-J-95	EL-J-96	123	Cast iron	80.0	-1.11	0.01
P-326	6.0	EL-J-96	C-41	51	Cast iron	80.0	-1.11	0.01
P-328	6.0	EL-J-83	EL-J-84	67	Cast iron	80.0	-2.61	0.03
P-329	6.0	C-41	EL-J-82	47	Cast iron	80.0	-2.09	0.02
P-330	6.0	EL-J-82	EL-J-83	340	Cast iron	80.0	-2.61	0.03
P-331	2.0	EL-J-82	EL-J-81	520	PVC	150.0	-0.97	0.10
P-332	2.0	EL-J-90	EL-J-91	194	PVC	150.0	1.50	0.15
P-333	6.0	EL-J-93	EL-J-108	320	Ductile Iron	80.0	-8.39	0.10
P-334	6.0	EL-J-108	EL-J-107	115	Ductile Iron	80.0	-8.39	0.10
P-335	6.0	EL-J-90	EL-J-92	188	Cast iron	80.0	4.25	0.05
P-338	1.0	EL-J-100	EL-J-101	86	PVC	150.0	0.44	0.18
P-339	1.0	EL-J-101	EL-J-102	61	PVC	150.0	0.44	0.18
P-340	2.0	EL-J-100	EL-J-99	40	PVC	150.0	-2.02	0.21

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-341	2.0	EL-J-99	EL-J-98	288	PVC	150.0	-2.02	0.21
P-343	6.0	EL-J-79	EL-J-78	79	Cast iron	80.0	-5.80	0.07
P-344	16.0	EL-J-78	EL-J-97	18	Ductile Iron	80.0	69.67	0.11
P-346	16.0	EL-J-98	C-139	162	Ductile Iron	80.0	66.03	0.11
P-347	16.0	C-139	EL-J-103	121	Ductile Iron	80.0	66.03	0.11
P-348	16.0	EL-J-103	EL-J-104	188	Ductile Iron	80.0	66.03	0.11
P-349	16.0	EL-J-104	C-140	176	Ductile Iron	80.0	66.03	0.11
P-350	16.0	C-140	EL-J-105	165	Ductile Iron	80.0	64.03	0.10
P-351	16.0	EL-J-105	EL-J-106	175	Ductile Iron	80.0	64.03	0.10
P-356	12.0	C-142	C-143	277	Ductile Iron	80.0	45.61	0.13
P-358	12.0	C-143	C-144	381	Ductile Iron	80.0	22.88	0.06
P-359	12.0	C-144	C-145	369	Ductile Iron	80.0	16.10	0.05
P-363	12.0	J-318	J-320	80	Ductile Iron	130.0	15.39	0.04
P-364	12.0	J-320	J-321	73	Ductile Iron	130.0	15.39	0.04
P-365	12.0	J-321	C-147	83	Ductile Iron	130.0	15.39	0.04
P-366	12.0	C-147	J-323	97	Ductile Iron	130.0	14.23	0.04
P-367	12.0	J-323	J-324	108	Ductile Iron	130.0	14.23	0.04
P-368	12.0	J-324	C-148	121	Ductile Iron	130.0	14.23	0.04
P-370	12.0	C-149	J-327	49	Ductile Iron	130.0	12.30	0.03
P-371	6.0	J-320	J-328	137	Ductile Iron	130.0	0.00	0.00
P-376	12.0	EL-J-70	EL-J-55	605	Asbestos Cement	140.0	-101.91	0.29
P-378	12.0	EL-J-69	EL-J-68	12	Asbestos Cement	140.0	0.00	0.00
P-379	12.0	EL-J-68	EL-J-70	6	Asbestos Cement	140.0	-78.95	0.22
P-380	16.0	EL-J-68	EL-J-67	6	Ductile Iron	80.0	78.61	0.13
P-383	16.0	EL-J-67	EL-J-66	272	Ductile Iron	80.0	78.61	0.13
P-384	16.0	EL-J-66	EL-J-78	34	Ductile Iron	80.0	75.47	0.12

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-385	6.0	EL-J-66	EL-J-65	40	Asbestos Cement	140.0	2.93	0.03
P-388	6.0	EL-J-63	EL-J-60	62	Asbestos Cement	140.0	-17.47	0.20
P-389	3.0	EL-J-62	EL-J-61	67	PVC	150.0	0.00	0.00
P-390	3.0	EL-J-61	EL-J-60	107	PVC	150.0	0.00	0.00
P-391	6.0	EL-J-60	EL-J-59	123	Asbestos Cement	140.0	-17.97	0.20
P-393	8.0	EL-J-58	J-774	186	Ductile Iron	130.0	7.77	0.05
P-397	12.0	J-347	J-348	1,730	Asbestos Cement	140.0	-179.19	0.51
P-398	12.0	J-348	J-349	543	Asbestos Cement	140.0	-179.19	0.51
P-401	8.0	EL-J-55	EL-J-54	486	Asbestos Cement	140.0	58.73	0.37
P-403	8.0	EL-J-77	EL-J-74	86	Asbestos Cement	140.0	5.03	0.03
P-405	3.0	EL-J-76	EL-J-75	125	PVC	150.0	-1.22	0.06
P-408	3.0	EL-J-72	EL-J-73	184	PVC	150.0	1.22	0.06
P-411	8.0	EL-J-72	EL-J-71	242	Asbestos Cement	140.0	-1.76	0.01
P-412	8.0	EL-J-54	C-73	54	Asbestos Cement	140.0	8.24	0.05
P-413	8.0	C-73	EL-J-77	266	Asbestos Cement	140.0	5.03	0.03
P-414	8.0	EL-J-54	EL-J-53	208	Asbestos Cement	140.0	49.70	0.32
P-415	8.0	EL-J-53	EL-J-52	119	Asbestos Cement	140.0	49.70	0.32
P-416	8.0	EL-J-52	C-74	131	Asbestos Cement	140.0	49.70	0.32

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-417	8.0	C-74	EL-J-35	42	Asbestos Cement	140.0	49.05	0.31
P-418	8.0	EL-J-35	EL-J-36	258	Ductile Iron	90.0	20.63	0.13
P-419	6.0	EL-J-36	C-79	157	Ductile Iron	90.0	4.90	0.06
P-420	3.0	C-79	EL-J-37	82	PVC	150.0	2.47	0.11
P-422	8.0	EL-J-35	EL-J-34	186	Asbestos Cement	140.0	27.35	0.17
P-423	8.0	EL-J-34	C-75	171	Asbestos Cement	140.0	27.35	0.17
P-424	8.0	C-75	EL-J-33	163	Asbestos Cement	140.0	24.30	0.16
P-425	8.0	EL-J-33	EL-J-26	171	Asbestos Cement	140.0	24.30	0.16
P-426	8.0	EL-J-26	EL-J-48	259	Asbestos Cement	140.0	16.37	0.10
P-428	8.0	EL-J-47	EL-J-45	137	Asbestos Cement	140.0	7.58	0.05
P-429	6.0	EL-J-48	EL-J-49	121	Asbestos Cement	140.0	4.38	0.05
P-430	6.0	EL-J-49	EL-J-50	107	Asbestos Cement	140.0	4.38	0.05
P-431	6.0	EL-J-50	C-87	96	Asbestos Cement	140.0	4.38	0.05
P-432	3.0	C-87	EL-J-51	305	PVC	150.0	2.03	0.09
P-433	8.0	EL-J-36	EL-J-38	209	Asbestos Cement	140.0	14.49	0.09
P-435	8.0	EL-J-39	EL-J-40	179	Asbestos Cement	140.0	11.74	0.07
P-436	8.0	EL-J-40	C-81	196	Asbestos Cement	140.0	11.74	0.07

**FlexTable: Pipe Table**  
**Hanapee-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-437	8.0	C-81	EL-J-28	266	Asbestos Cement	140.0	11.74	0.07
P-438	8.0	EL-J-28	EL-J-27	245	Ductile Iron	90.0	4.30	0.03
P-439	8.0	EL-J-27	EL-J-26	120	Ductile Iron	90.0	4.30	0.03
P-441	8.0	EL-J-28	C-82	91	Asbestos Cement	140.0	7.44	0.05
P-442	8.0	C-82	EL-J-29	200	Asbestos Cement	140.0	7.44	0.05
P-443	8.0	EL-J-29	EL-J-31	85	Asbestos Cement	140.0	4.07	0.03
P-445	8.0	EL-J-32	C-84	103	Asbestos Cement	140.0	4.07	0.03
P-448	6.0	EL-J-29	EL-J-30	185	Asbestos Cement	140.0	3.37	0.04
P-449	6.0	EL-J-30	C-85	145	Asbestos Cement	140.0	3.37	0.04
P-452	8.0	EL-J-20	EL-J-21	253	Ductile Iron	90.0	-3.39	0.02
P-455	6.0	EL-J-45	EL-J-42	317	Asbestos Cement	140.0	3.01	0.03
P-456	6.0	EL-J-42	C-90	108	Asbestos Cement	140.0	-2.14	0.02
P-457	6.0	C-90	EL-J-41	92	Asbestos Cement	140.0	-3.12	0.04
P-458	6.0	EL-J-41	EL-J-19	143	Asbestos Cement	140.0	-3.12	0.04
P-459	6.0	EL-J-19	C-77	202	Asbestos Cement	140.0	-7.70	0.09
P-460	6.0	C-77	EL-J-20	55	Asbestos Cement	140.0	-9.08	0.10
P-461	6.0	EL-J-42	EL-J-43	110	Asbestos Cement	140.0	3.52	0.04

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-462	6.0	EL-J-43	C-88	77	Asbestos Cement	140.0	3.52	0.04
P-463	3.0	C-88	EL-J-44	201	PVC	150.0	2.05	0.09
P-464	6.0	EL-J-19	C-89	277	Asbestos Cement	140.0	2.59	0.03
P-467	8.0	EL-J-17	C-133	457	Ductile Iron	100.0	-3.27	0.02
P-468	8.0	C-133	EL-J-9	74	Ductile Iron	100.0	-4.88	0.03
P-469	8.0	EL-J-9	EL-J-8	247	Ductile Iron	100.0	-10.89	0.07
P-471	8.0	EL-J-7	EL-J-6	67	Ductile Iron	100.0	-15.68	0.10
P-472	8.0	EL-J-7	C-135	57	Ductile Iron	100.0	1.50	0.01
P-474	8.0	EL-J-8	C-136	92	Ductile Iron	100.0	2.06	0.01
P-479	8.0	C-137	EL-J-10	118	Ductile Iron	100.0	1.39	0.01
P-480	4.0	EL-J-24	C-127	99	PVC	150.0	-1.25	0.03
P-481	8.0	C-127	EL-J-23	280	Ductile Iron	100.0	-2.86	0.02
P-482	6.0	EL-J-23	C-126	50	Asbestos Cement	140.0	-2.86	0.03
P-483	6.0	C-126	EL-J-22	246	Asbestos Cement	140.0	-5.00	0.06
P-486	8.0	EL-J-25	C-128	103	Ductile Iron	100.0	-8.33	0.05
P-487	8.0	C-128	EL-J-10	195	Ductile Iron	100.0	-10.80	0.07
P-488	8.0	EL-J-10	EL-J-11	113	Ductile Iron	100.0	-9.41	0.06
P-489	8.0	EL-J-11	C-129	150	Ductile Iron	100.0	-9.41	0.06
P-490	8.0	C-129	EL-J-12	252	Ductile Iron	100.0	-10.77	0.07
P-491	8.0	EL-J-12	EL-J-13	139	Ductile Iron	100.0	-10.77	0.07
P-493	8.0	EL-J-14	EL-J-15	163	Ductile Iron	100.0	-10.77	0.07
P-495	12.0	EL-J-3	EL-J-4	1,296	Ductile Iron	100.0	0.22	0.00
P-496	8.0	EL-J-15	EL-J-16	118	Ductile Iron	100.0	1.20	0.01
P-497	8.0	EL-J-16	C-131	145	Ductile Iron	100.0	1.20	0.01
P-499	12.0	EL-J-3	EL-J-2	293	Ductile Iron	100.0	-29.04	0.08
P-500	12.0	EL-J-2	EL-J-1	507	Ductile Iron	100.0	-29.04	0.08



**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-503	12.0	J-448	J-197	33	Asbestos Cement	140.0	1.15	0.00
P-507	12.0	J-451	J-452	650	Asbestos Cement	140.0	-1.77	0.01
P-508	12.0	J-452	J-453	408	Asbestos Cement	140.0	-1.77	0.01
P-511	12.0	J-455	J-456	239	Asbestos Cement	140.0	-1.77	0.01
P-512	12.0	J-456	J-457	334	Asbestos Cement	140.0	-1.77	0.01
P-513	12.0	J-457	J-458	37	Asbestos Cement	140.0	-1.77	0.01
P-514	12.0	J-458	J-459	462	Asbestos Cement	140.0	-1.77	0.01
P-515	12.0	J-459	J-460	316	Asbestos Cement	140.0	-1.77	0.01
P-516	12.0	J-460	J-461	137	Asbestos Cement	140.0	-1.77	0.01
P-517	12.0	J-461	J-462	133	Asbestos Cement	140.0	-1.77	0.01
P-518	12.0	J-462	J-463	371	Asbestos Cement	140.0	-1.77	0.01
P-519	12.0	J-463	J-464	301	Asbestos Cement	140.0	-1.77	0.01
P-522	6.0	J-207	J-467	192	Ductile Iron	80.0	0.50	0.01
P-523	4.0	J-467	J-208	230	Ductile Iron	80.0	-0.06	0.00
P-524	4.0	J-467	J-468	34	Ductile Iron	80.0	0.56	0.01
P-525	4.0	J-468	J-469	251	Ductile Iron	80.0	-0.19	0.00
P-526	4.0	J-469	J-470	38	Ductile Iron	80.0	-0.19	0.00
P-527	4.0	J-470	J-208	26	Ductile Iron	80.0	0.06	0.00
P-535	6.0	J-470	J-476	80	Ductile Iron	80.0	-0.25	0.00

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-536	1.0	J-476	J-477	177	Ductile Iron	80.0	1.17	0.48
P-537	8.0	J-476	J-478	174	Ductile Iron	80.0	-1.76	0.01
P-539	3.0	J-153	J-480	276	Ductile Iron	85.0	1.83	0.08
P-540	3.0	J-480	J-481	627	Ductile Iron	85.0	1.83	0.08
P-541	3.0	J-481	J-482	47	Ductile Iron	85.0	1.83	0.08
P-542	8.0	J-482	J-483	565	Cast iron	80.0	-6.26	0.04
P-543	8.0	J-483	J-484	241	Ductile Iron	80.0	-6.26	0.04
P-544	8.0	J-484	C-97	130	Ductile Iron	80.0	-6.26	0.04
P-545	8.0	C-97	J-486	280	Ductile Iron	80.0	-6.26	0.04
P-546	8.0	J-486	J-487	53	Ductile Iron	80.0	-6.26	0.04
P-547	8.0	J-487	J-488	78	Ductile Iron	80.0	-6.26	0.04
P-548	8.0	J-488	J-489	79	Ductile Iron	80.0	-6.26	0.04
P-549	8.0	J-489	J-490	230	Ductile Iron	80.0	-6.26	0.04
P-550	8.0	J-490	J-491	263	Ductile Iron	80.0	-6.26	0.04
P-551	8.0	J-491	J-492	84	Cast iron	80.0	1.97	0.01
P-552	8.0	J-492	J-167	803	Cast iron	80.0	1.97	0.01
P-553	8.0	J-167	J-493	34	Ductile Iron	80.0	2.42	0.02
P-554	8.0	J-493	J-494	155	Cast iron	80.0	4.05	0.03
P-555	8.0	J-494	J-495	376	Cast iron	80.0	4.05	0.03
P-556	8.0	J-495	J-496	293	Cast iron	80.0	4.05	0.03
P-557	8.0	J-496	J-497	666	Cast iron	80.0	4.05	0.03
P-558	8.0	J-497	J-498	424	Cast iron	80.0	4.05	0.03
P-559	8.0	J-498	J-499	692	Cast iron	80.0	4.05	0.03
P-560	8.0	J-499	J-500	415	Cast iron	80.0	4.05	0.03
P-561	8.0	J-500	J-501	248	Cast iron	80.0	4.05	0.03
P-565	8.0	J-504	J-505	764	Cast iron	85.0	1.77	0.01
P-568	8.0	J-507	J-508	688	Cast iron	85.0	1.77	0.01
P-575	8.0	J-514	J-515	369	Cast iron	85.0	1.77	0.01
P-576	8.0	J-515	J-516	434	Cast iron	85.0	1.77	0.01

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-578	12.0	J-519	J-520	207	Asbestos Cement	140.0	0.00	0.00
P-579	12.0	J-520	J-521	267	Asbestos Cement	140.0	0.00	0.00
P-580	12.0	J-521	J-522	244	Asbestos Cement	140.0	0.00	0.00
P-582	8.0	J-524	J-516	117	Asbestos Cement	140.0	0.00	0.00
P-583	12.0	J-516	J-525	199	Asbestos Cement	140.0	1.77	0.01
P-584	12.0	J-525	J-522	133	Asbestos Cement	140.0	1.77	0.01
P-585	12.0	J-522	J-526	224	Asbestos Cement	140.0	1.77	0.01
P-586	12.0	J-526	J-527	104	Asbestos Cement	140.0	1.77	0.01
P-587	12.0	J-527	J-528	122	Asbestos Cement	140.0	1.77	0.01
P-588	12.0	J-528	J-529	439	Asbestos Cement	140.0	1.77	0.01
P-589	12.0	J-529	J-530	81	Asbestos Cement	140.0	1.77	0.01
P-590	12.0	J-530	J-531	138	Asbestos Cement	140.0	1.77	0.01
P-591	12.0	J-531	J-532	332	Asbestos Cement	140.0	1.77	0.01
P-592	12.0	J-532	J-533	522	Asbestos Cement	140.0	1.77	0.01
P-593	12.0	J-533	J-534	601	Asbestos Cement	140.0	1.77	0.01

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-594	12.0	J-534	J-535	579	Asbestos Cement	140.0	1.77	0.01
P-599	12.0	J-539	J-540	94	Asbestos Cement	140.0	1.77	0.01
P-600	12.0	J-540	J-541	187	Asbestos Cement	140.0	1.77	0.01
P-601	12.0	J-541	J-542	105	Asbestos Cement	140.0	1.77	0.01
P-606	12.0	J-546	J-466	255	Asbestos Cement	140.0	1.77	0.01
P-609	8.0	J-548	J-549	60	Asbestos Cement	140.0	11.15	0.07
P-612	8.0	J-551	J-552	77	Asbestos Cement	140.0	11.15	0.07
P-614	8.0	J-552	J-553	92	Asbestos Cement	140.0	11.15	0.07
P-615	8.0	J-553	J-554	109	Asbestos Cement	140.0	11.15	0.07
P-616	8.0	J-554	J-555	409	Asbestos Cement	140.0	11.15	0.07
P-617	8.0	J-555	J-556	121	Asbestos Cement	140.0	11.15	0.07
P-619	8.0	J-556	J-557	111	Asbestos Cement	140.0	11.15	0.07
P-620	8.0	J-557	C-47	50	Asbestos Cement	140.0	6.78	0.04
P-622	8.0	J-559	J-560	178	Asbestos Cement	140.0	6.35	0.04
P-625	8.0	C-48	C-49	591	Asbestos Cement	140.0	6.35	0.04

## FlexTable: Pipe Table

### Hanapepe-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-630	8.0	J-567	C-51	256	Asbestos Cement	140.0	-0.63	0.00
P-631	8.0	C-51	J-569	109	Asbestos Cement	140.0	-2.24	0.01
P-633	8.0	J-569	J-571	158	Asbestos Cement	140.0	-2.24	0.01
P-634	8.0	J-571	J-572	149	Asbestos Cement	140.0	-2.24	0.01
P-635	8.0	J-572	J-573	123	Asbestos Cement	140.0	0.00	0.00
P-636	8.0	J-573	J-574	130	Asbestos Cement	140.0	0.00	0.00
P-639	8.0	J-576	J-501	64	Cast iron	80.0	-2.24	0.01
P-640	6.0	J-159	J-491	484	Cast iron	80.0	8.23	0.09
P-641	1.5	J-156	J-577	174	Ductile Iron	85.0	2.42	0.44
P-643	4.0	J-578	J-579	242	Ductile Iron	85.0	-8.16	0.21
P-644	4.0	J-579	C-27	205	Ductile Iron	85.0	-8.16	0.21
P-645	4.0	C-27	J-581	71	Ductile Iron	85.0	-8.84	0.23
P-646	4.0	J-581	J-582	34	Ductile Iron	85.0	-8.84	0.23
P-647	2.0	J-582	J-583	82	PVC	150.0	5.52	0.56
P-656	4.0	J-585	J-582	71	Cast iron	85.0	14.88	0.38
P-657	6.0	J-56	C-52	311	Cast iron	80.0	7.37	0.08
P-658	6.0	C-52	J-168	425	Cast iron	80.0	6.10	0.07
P-659	12.0	C-65	C-64	286	Asbestos Cement	140.0	25.38	0.07
P-660	12.0	C-64	J-172	88	Asbestos Cement	140.0	22.87	0.06
P-661	6.0	EL-J-85	EL-J-86	232	Asbestos Cement	140.0	3.48	0.04
P-682	8.0	J-222	C-23	85	Ductile Iron	85.0	7.45	0.05
P-684	8.0	C-23	C-151	232	Ductile Iron	85.0	7.45	0.05

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-685	8.0	C-151	J-151	47	Ductile Iron	85.0	7.45	0.05
P-687	12.0	J-349	J-606	549	Asbestos Cement	140.0	-179.19	0.51
P-695	27.0	J-613	J-613-A	30	CMP	100.0	0.00	0.00
P-696	27.0	J-613-A	J-614	57	CMP	100.0	0.00	0.00
P-697	27.0	J-614	J-615	761	Concrete (steel forms)	140.0	0.00	0.00
P-704	12.0	EL-J-1	J-618	412	Ductile Iron	100.0	-29.04	0.08
P-707	12.0	J-618	J-619	50	Ductile Iron	100.0	-29.04	0.08
P-708	12.0	J-619	J-620	892	Ductile Iron	100.0	-29.04	0.08
P-709	12.0	J-620	J-621	311	Ductile Iron	100.0	-29.04	0.08
P-710	12.0	J-621	J-622	315	Ductile Iron	100.0	-29.04	0.08
P-711	12.0	J-622	J-623	499	Ductile Iron	100.0	-29.04	0.08
P-712	12.0	J-623	J-624	93	Ductile Iron	100.0	-29.04	0.08
P-817	6.0	HH-J-64	HH-J-77	23	Ductile Iron	80.0	-0.45	0.01
P-821	8.0	J-154	C-60	45	Asbestos Cement	140.0	-3.47	0.02
P-835	6.0	HH-J-85	HH-J-84	52	Ductile Iron	80.0	(N/A)	(N/A)
P-852	4.0	J-137	C-28	118	Ductile Iron	85.0	-7.25	0.19
P-853	4.0	C-28	J-578	196	Ductile Iron	85.0	-8.16	0.21
P-856	6.0	J-56	C-17	580	Cast iron	80.0	22.73	0.26
P-857	6.0	C-17	J-131	227	Cast iron	80.0	19.31	0.22
P-860	12.0	J-56	C-53	64	Asbestos Cement	140.0	99.68	0.28
P-863	12.0	C-53	C-54	197	Asbestos Cement	140.0	97.82	0.28
P-864	12.0	C-54	J-169	43	Asbestos Cement	140.0	97.82	0.28
P-874	8.0	J-222	C-150	135	Ductile Iron	100.0	0.00	0.00
P-875	2.5	C-150	J-234	145	Ductile Iron	100.0	0.00	0.00

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-891	12.0	J-184	AV-10	309	Asbestos Cement	140.0	17.45	0.05
P-892	12.0	AV-10	J-186	60	Ductile Iron	85.0	17.45	0.05
P-893	4.0	J-192	C-39	28	Cast iron	80.0	-3.39	0.09
P-896	12.0	J-190	C-38	300	Asbestos Cement	140.0	-10.86	0.03
P-897	12.0	C-38	J-191	39	Asbestos Cement	140.0	-11.60	0.03
P-900	12.0	C-37	J-190	45	Ductile Iron	80.0	-4.32	0.01
P-902	4.0	C-39	C-36	273	Cast iron	80.0	-4.20	0.11
P-903	4.0	C-36	J-189	50	Cast iron	80.0	-6.00	0.15
P-906	12.0	J-197	C-35	272	Ductile Iron	80.0	-2.81	0.01
P-907	12.0	C-35	J-198	66	Ductile Iron	80.0	-3.82	0.01
P-909	12.0	J-200	AV-11	116	Ductile Iron	80.0	5.01	0.01
P-910	12.0	AV-11	J-198	62	Ductile Iron	80.0	5.01	0.01
P-914	6.0	J-210	C-33	86	Cast iron	80.0	-3.77	0.04
P-915	6.0	C-33	J-211	98	Cast iron	80.0	-5.05	0.06
P-917	6.0	J-206	C-32	24	Cast iron	80.0	-8.04	0.09
P-918	6.0	C-32	J-212	121	Ductile Iron	80.0	-8.05	0.09
P-920	12.0	J-448	C-70	55	Asbestos Cement	140.0	-1.15	0.00
P-921	12.0	C-70	J-449	129	Ductile Iron	85.0	-1.77	0.01
P-923	12.0	J-449	AV-13	81	Asbestos Cement	140.0	-1.77	0.01
P-924	12.0	AV-13	J-451	88	Asbestos Cement	140.0	-1.77	0.01
P-926	6.0	EL-J-85	C-42	125	Cast iron	80.0	-6.67	0.08
P-927	6.0	C-42	EL-J-87	423	Cast iron	80.0	-7.78	0.09
P-931	6.0	EL-J-92	C-43	194	Cast iron	80.0	-0.65	0.01
P-932	6.0	C-43	EL-J-93	202	Cast iron	80.0	-1.78	0.02

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-934	4.0	EL-J-92	C-44	367	Cast iron	80.0	3.33	0.09
P-935	2.0	C-44	EL-J-100	101	PVC	150.0	1.11	0.11
P-938	16.0	AV-14	EL-J-106	145	Ductile Iron	80.0	-64.03	0.10
P-939	16.0	EL-J-107	C-141	47	Ductile Iron	80.0	-63.83	0.10
P-940	16.0	C-141	AV-14	66	Ductile Iron	80.0	-64.03	0.10
P-944	4.0	EL-J-80	C-46	573	Cast iron	80.0	-3.16	0.08
P-945	4.0	C-46	EL-J-79	52	Cast iron	80.0	-5.80	0.15
P-949	16.0	EL-J-97	C-138	52	Ductile Iron	80.0	69.67	0.11
P-950	16.0	C-138	EL-J-98	274	Ductile Iron	80.0	68.65	0.11
P-954	6.0	C-93	EL-J-65	36	Asbestos Cement	140.0	-2.58	0.03
P-955	6.0	C-93	EL-J-64	149	Asbestos Cement	140.0	2.53	0.03
P-957	6.0	EL-J-64	C-94	62	Asbestos Cement	140.0	2.53	0.03
P-958	6.0	C-94	EL-J-63	71	Asbestos Cement	140.0	-17.47	0.20
P-960	6.0	EL-J-59	C-95	73	Asbestos Cement	140.0	-17.97	0.20
P-963	8.0	C-95	AV-15	83	Ductile Iron	80.0	-18.55	0.12
P-964	8.0	AV-15	EL-J-58	402	Ductile Iron	80.0	-18.55	0.12
P-965	8.0	EL-J-71	C-99	365	Cast iron	80.0	-20.32	0.13
P-966	8.0	C-99	EL-J-70	240	Cast iron	80.0	-22.44	0.14
P-969	8.0	EL-J-89	C-98	42	Cast iron	80.0	-15.81	0.10
P-970	8.0	C-98	EL-J-71	178	Cast iron	80.0	-16.94	0.11
P-972	8.0	EL-J-74	C-71	93	Asbestos Cement	140.0	1.19	0.01
P-973	8.0	C-71	EL-J-72	118	Asbestos Cement	140.0	-0.32	0.00
P-975	3.0	EL-J-75	C-72	23	PVC	150.0	-1.22	0.06



**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-976	8.0	C-72	EL-J-74	171	Asbestos Cement	140.0	-2.95	0.02
P-982	8.0	EL-J-38	C-80	133	Asbestos Cement	140.0	14.49	0.09
P-983	8.0	C-80	EL-J-39	46	Asbestos Cement	140.0	13.04	0.08
P-986	12.0	J-453	AV-18	321	Asbestos Cement	140.0	-1.77	0.01
P-987	12.0	AV-18	J-455	256	Asbestos Cement	140.0	-1.77	0.01
P-992	8.0	EL-J-26	C-76	96	Asbestos Cement	140.0	10.58	0.07
P-993	8.0	C-76	EL-J-20	422	Asbestos Cement	140.0	7.84	0.05
P-999	3.0	EL-J-46	C-91	274	PVC	150.0	-1.43	0.06
P-1000	6.0	C-91	EL-J-45	24	Asbestos Cement	140.0	-2.42	0.03
P-1006	8.0	EL-J-21	C-78	210	Ductile Iron	90.0	-3.39	0.02
P-1009	6.0	C-78	AV-21	28	Ductile Iron	90.0	-4.07	0.05
P-1010	8.0	AV-21	C-84	423	Asbestos Cement	140.0	-4.07	0.03
P-1013	8.0	EL-J-31	C-83	61	Asbestos Cement	140.0	4.07	0.03
P-1014	8.0	C-83	EL-J-32	338	Asbestos Cement	140.0	4.07	0.03
P-1021	8.0	EL-J-9	AV-23	165	Ductile Iron	100.0	2.82	0.02
P-1022	8.0	AV-23	C-137	63	Ductile Iron	100.0	2.82	0.02
P-1024	8.0	EL-J-18	C-132	246	Ductile Iron	100.0	-1.45	0.01
P-1025	8.0	C-132	EL-J-17	34	Ductile Iron	130.0	-3.27	0.02
P-1030	8.0	EL-J-8	C-134	138	Ductile Iron	100.0	-13.54	0.09
P-1031	8.0	C-134	EL-J-7	135	Ductile Iron	100.0	-13.98	0.09

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1034	8.0	EL-J-13	C-130	87	Ductile Iron	100.0	-10.77	0.07
P-1035	8.0	C-130	EL-J-14	56	Ductile Iron	100.0	-10.77	0.07
P-1040	12.0	J-464	AV-27	563	Asbestos Cement	140.0	-1.77	0.01
P-1041	12.0	AV-27	J-466	525	Asbestos Cement	140.0	-1.77	0.01
P-1042	12.0	J-546	AV-28	319	Asbestos Cement	140.0	-1.77	0.01
P-1043	12.0	AV-28	J-544	605	Asbestos Cement	140.0	-1.77	0.01
P-1044	12.0	J-544	AV-29	501	Asbestos Cement	140.0	-1.77	0.01
P-1045	12.0	AV-29	J-542	218	Asbestos Cement	140.0	-1.77	0.01
P-1046	12.0	J-539	AV-30	425	Asbestos Cement	140.0	-1.77	0.01
P-1047	12.0	AV-30	J-537	224	Asbestos Cement	140.0	-1.77	0.01
P-1048	12.0	J-537	AV-31	200	Asbestos Cement	140.0	-1.77	0.01
P-1049	12.0	AV-31	J-535	110	Asbestos Cement	140.0	-1.77	0.01
P-1050	8.0	J-572	AV-32	102	Cast iron	80.0	-2.24	0.01
P-1051	8.0	AV-32	J-576	66	Cast iron	80.0	-2.24	0.01
P-1053	8.0	C-50	AV-33	236	Asbestos Cement	140.0	-0.63	0.00
P-1054	8.0	AV-33	J-567	292	Asbestos Cement	140.0	-0.63	0.00
P-1056	8.0	C-49	AV-34	191	Asbestos Cement	140.0	-0.63	0.00

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1057	8.0	AV-34	C-50	250	Asbestos Cement	140.0	-0.63	0.00
P-1060	8.0	C-48	AV-35	210	Asbestos Cement	140.0	-6.35	0.04
P-1061	8.0	AV-35	J-560	259	Asbestos Cement	140.0	-6.35	0.04
P-1070	6.0	J-156	AV-38	33	Ductile Iron	85.0	-7.14	0.08
P-1071	8.0	AV-38	J-548	445	Asbestos Cement	140.0	-7.14	0.05
P-1072	8.0	J-155	C-61	292	Asbestos Cement	140.0	-4.36	0.03
P-1073	8.0	C-61	J-156	99	Asbestos Cement	140.0	-4.36	0.03
P-1075	6.0	C-21	J-482	46	Cast iron	85.0	-1.03	0.01
P-1078	12.0	C-148	AV-32	185	Ductile Iron	130.0	12.57	0.04
P-1079	12.0	AV-32	C-149	160	Ductile Iron	130.0	12.57	0.04
P-1083	12.0	J-318	AV-40	93	Ductile Iron	80.0	-15.87	0.05
P-1084	12.0	AV-40	C-145	35	Ductile Iron	80.0	-15.87	0.05
P-1090	8.0	EL-J-58	C-152	33	Ductile Iron	130.0	-26.32	0.17
P-1095	12.0	C-92	EL-J-56	587	Asbestos Cement	140.0	-152.87	0.43
P-1097	8.0	C-152	C-153	431	Ductile Iron	80.0	-26.32	0.17
P-1098	8.0	C-153	EL-J-57	285	Ductile Iron	80.0	-26.32	0.17
P-1100	8.0	AV-41	EL-J-57	67	Ductile Iron	80.0	0.00	0.00
P-1101	12.0	EL-J-56	AV-42	154	Asbestos Cement	140.0	-179.19	0.51
P-1102	12.0	AV-42	J-347	186	Asbestos Cement	140.0	-179.19	0.51
P-1118	12.0	J-585	AV-45	37	Asbestos Cement	140.0	-57.45	0.16

## FlexTable: Pipe Table

### Hanapepe-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1119	12.0	AV-45	J-181	34	Asbestos Cement	140.0	-57.45	0.16
P-1120	12.0	J-585	J-712	210	Asbestos Cement	140.0	41.57	0.12
P-1123	12.0	J-713	J-183	158	Ductile Iron	85.0	39.36	0.11
P-1124	12.0	J-200	C-34	105	Ductile Iron	80.0	-5.01	0.01
P-1125	12.0	C-34	J-201	28	Ductile Iron	80.0	-5.80	0.02
P-1128	8.0	J-145	AV-46	232	Asbestos Cement	140.0	2.02	0.01
P-1129	8.0	AV-46	C-20	238	Asbestos Cement	140.0	2.02	0.01
P-1130	2.5	HH-J-31	HH-J-34	267	PVC	150.0	-1.32	0.09
P-1133	12.0	J-606	J-609	21	Asbestos Cement	140.0	-179.19	0.51
P-1134	12.0	J-609	Eleele Steel Tank No. 1	53	Ductile Iron	130.0	-142.29	0.40
P-1137	12.0	Upper Eleele 0.2MG Tank	J-624	69	Ductile Iron	100.0	29.04	0.08
P-1141	8.0	EL-J-15	EL-J-5	38	Ductile Iron	100.0	-12.33	0.08
P-1142	12.0	EL-J-5	EL-J-3	190	Ductile Iron	100.0	-28.41	0.08
P-1143	8.0	EL-J-6	EL-J-5	56	Ductile Iron	100.0	-15.68	0.10
P-1144	8.0	J-512	J-508	907	Cast iron	85.0	-1.77	0.01
P-1145	8.0	J-512	J-514	629	Cast iron	85.0	1.77	0.01
P-1146	8.0	J-507	J-505	520	Cast iron	85.0	-1.77	0.01
P-1149	8.0	J-504	J-501	464	Cast iron	85.0	-1.77	0.01
P-1151	8.0	J-722	J-493	100	Asbestos Cement	140.0	4.15	0.03
P-1154	6.0	J-142	J-212	289	Cast iron	80.0	18.21	0.21
P-1165	12.0	Eleele Steel Tank No. 2	J-740	34	Ductile Iron	130.0	0.00	0.00
P-1169	6.0	J-742	J-619	25	Ductile Iron	130.0	0.00	0.00

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1172	12.0	Eleele Steel Tank No. 2	J-743	54	Ductile Iron	130.0	36.90	0.10
P-1199	6.0	J-548	J-158	34	Ductile Iron	80.0	10.07	0.11
P-1220	12.0	Upper Hanapepe Heights 0.5MG Tank	Hanapepe No. 4 Pump	3,632	Ductile Iron	100.0	0.00	0.00
P-1221	12.0	Hanapepe No. 4	Hanapepe No. 4 Pump	10	Ductile Iron	100.0	0.00	0.00
P-1222	12.0	Hanapepe Well B Pump	Hanapepe Well B	2	Ductile Iron	85.0	0.00	0.00
P-1223	12.0	Hanapepe Well B Pump	J-519	186	Asbestos Cement	140.0	0.00	0.00
P-1227	6.0	J-524	Hanapepe Well A Pump	72	Ductile Iron	85.0	0.00	0.00
P-1228	6.0	Hanapepe Well A Pump	Hanapepe Well A	12	Ductile Iron	85.0	0.00	0.00
P-1237	12.0	EL-J-55	J-774	21	Asbestos Cement	140.0	-160.64	0.46
P-1238	12.0	J-774	C-92	176	Asbestos Cement	140.0	-152.87	0.43
P-1239	6.0	EL-J-56	EL-J-57	59	Ductile Iron	80.0	26.32	0.30
P-1242	12.0	J-744	J-609	26	Ductile Iron	130.0	36.91	0.10
P-1244	6.0	J-613	J-740	48	Ductile Iron	130.0	0.00	0.00
P-1245	6.0	J-744	J-743	19	Ductile Iron	130.0	-36.90	0.42
P-1290	8.0	J-815	J-819	203	Ductile Iron	100.0	0.00	0.00
P-1292	8.0	EL-J-58	J-813	292	Ductile Iron	100.0	0.00	0.00
P-1295	8.0	J-819	H-303	150	Ductile Iron	100.0	0.00	0.00
P-1296	8.0	H-303	J-820	15	Ductile Iron	100.0	0.00	0.00
P-1297	6.0	J-815	H-304	56	Ductile Iron	100.0	0.00	0.00
P-1298	6.0	H-304	J-813	319	Ductile Iron	100.0	0.00	0.00

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1299	8.0	J-812	H-305	285	Ductile Iron	100.0	0.00	0.00
P-1300	8.0	H-305	J-813	804	Ductile Iron	100.0	0.00	0.00
P-1301	6.0	J-811	H-306	98	Ductile Iron	100.0	0.00	0.00
P-1302	6.0	H-306	J-812	88	Ductile Iron	100.0	0.00	0.00
P-1303	6.0	HH-J-105	HH-J-105a	63	Ductile Iron	80.0	0.73	0.01
P-1304	4.0	HH-J-81	HH-J-100	29	Ductile Iron	80.0	0.29	0.01
P-1305	4.0	HH-J-100	HH-J-80	94	Ductile Iron	80.0	-0.21	0.01
P-1306	6.0	C-16	HH-J-103a	66	Cast iron	80.0	1.35	0.02
P-1308	6.0	HH-J-93	HH-J-103a	23	Ductile Iron	80.0	0.19	0.00
P-1309	6.0	HH-J-60	HH-J-73	616	Ductile Iron	80.0	10.18	0.12
P-1310	6.0	HH-J-73	HH-J-86	26	Ductile Iron	80.0	3.53	0.04
P-1311	6.0	C-4	HH-J-73	61	Ductile Iron	80.0	-4.30	0.05
P-1312	6.0	HH-J-69	HH-J-87	38	Cast iron	80.0	10.45	0.12
P-1313	6.0	HH-J-87	HH-J-78a	64	Cast iron	80.0	11.62	0.13
P-1314	6.0	HH-J-78a	HH-J-78	63	Ductile Iron	80.0	11.08	0.13
P-1316	6.0	J-828	Hanapepe Heights Booster Pump #1	44	Ductile Iron	130.0	0.00	0.00
P-1318	6.0	HH-J-45	Hanapepe Heights Booster Pump #2	42	Ductile Iron	130.0	0.00	0.00
P-1319	6.0	Hanapepe Heights Booster Pump #2	J-828	45	Ductile Iron	130.0	0.00	0.00
P-1320	6.0	HH-J-46	J-829	55	Ductile Iron	80.0	0.00	0.00
P-1322	6.0	J-831	HH-J-44	43	Ductile Iron	130.0	-52.05	0.59
P-1323	6.0	J-828	J-831	12	Ductile Iron	130.0	0.00	0.00
P-1325	6.0	J-830	J-832	51	Ductile Iron	80.0	-52.05	0.59
P-1326	6.0	J-832	J-831	98	Ductile Iron	80.0	-52.05	0.59
P-1327	12.0	J-832	R-5	15	Ductile Iron	80.0	0.00	0.00

## FlexTable: Pipe Table Hanapepe-Eleele Water System

Current Time: 0.000 hours

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1328	6.0	HH-J-49	J-833	21	Ductile Iron	80.0	-52.05	0.59
P-1331	6.0	J-834	J-830	14	Ductile Iron	80.0	-52.05	0.59
P-1333	6.0	J-833	PRV2-5	13	Ductile Iron	80.0	-52.05	0.59
P-1334	6.0	PRV2-5	J-834	12	Ductile Iron	80.0	-52.05	0.59
P-1335	6.0	J-833	PRV2-4	28	Ductile Iron	80.0	0.00	0.00
P-1336	6.0	PRV2-4	J-834	28	Ductile Iron	80.0	0.00	0.00
P-1339	6.0	J-466	Eleele Booster Pump #1	87	Ductile Iron	130.0	0.00	0.00
P-1340	27.0	Eleele Booster Pump #1	J-615	93	Concrete (steel forms)	140.0	0.00	0.00
P-1341	6.0	J-615	Eleele Booster Pump #2	91	Ductile Iron	130.0	0.00	0.00
P-1342	6.0	Eleele Booster Pump #2	J-466	83	Ductile Iron	130.0	0.00	0.00
P-1343	6.0	J-744	J-747	159	Ductile Iron	130.0	0.00	0.00
P-1344	6.0	J-747	Eleele Nani Booster Pump #2	43	Ductile Iron	130.0	0.00	0.00
P-1345	6.0	Eleele Nani Booster Pump #2	J-742	43	Ductile Iron	130.0	0.00	0.00
P-1346	6.0	J-742	Eleele Nani Booster Pump #1	42	Ductile Iron	130.0	0.00	0.00
P-1347	6.0	Eleele Nani Booster Pump #1	J-747	42	Ductile Iron	130.0	0.00	0.00
P-1348	6.0	C-47	J-559	263	Ductile Iron	80.0	6.35	0.07
P-1349	8.0	J-557	J-835	35	Asbestos Cement	140.0	4.15	0.03

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1352	8.0	J-835	J-837	26	Asbestos Cement	140.0	4.15	0.03
P-1353	8.0	J-837	J-722	134	Asbestos Cement	140.0	4.15	0.03
P-1355	6.0	J-835	Awaawa Road 6" PRV	26	Ductile Iron	80.0	(N/A)	(N/A)
P-1356	6.0	Awaawa Road 6" PRV	J-837	27	Ductile Iron	80.0	(N/A)	(N/A)
P-1362	6.0	PRV2-3	J-842	171	Ductile Iron	80.0	0.00	0.00
P-1363	6.0	J-842	C-142	72	Ductile Iron	80.0	45.61	0.52
P-1364	6.0	J-842	J-843	5	Ductile Iron	80.0	-45.61	0.52
P-1365	6.0	J-843	PRV2-6	171	Ductile Iron	80.0	-45.61	0.52
P-1366	6.0	PRV2-6	J-844	114	Ductile Iron	80.0	-45.61	0.52
P-1367	6.0	EL-J-107	J-845	46	Ductile Iron	80.0	45.61	0.52
P-1368	6.0	J-845	PRV2-3	114	Ductile Iron	80.0	0.00	0.00
P-1369	6.0	J-844	J-845	5	Ductile Iron	80.0	-45.61	0.52
P-1370	6.0	J-478	J-482	255	Ductile Iron	80.0	-1.76	0.02
P-1371	6.0	HH-J-38	J-846	309	Cast iron	80.0	11.58	0.13
P-1372	6.0	J-846	C-8	249	Cast iron	80.0	6.46	0.07
P-1373	6.0	HH-J-37	J-847	309	Ductile Iron	80.0	-0.80	0.01
P-1374	6.0	J-847	HH-J-56	317	Ductile Iron	80.0	2.21	0.03
P-1375	6.0	J-846	J-847	29	Ductile Iron	80.0	3.99	0.05
P-1377	6.0	J-848	HH-J-55	310	Ductile Iron	80.0	2.86	0.03
P-1378	6.0	HH-J-53	J-849	254	Ductile Iron	80.0	4.40	0.05
P-1379	6.0	J-849	C-11	249	Ductile Iron	80.0	3.07	0.03
P-1380	6.0	J-848	J-849	29	Ductile Iron	80.0	-0.40	0.00
P-1381	6.0	HH-J-31	HH-J-31a	41	Ductile Iron	80.0	0.62	0.01
P-1383	6.0	J-260	J-852	358	Asbestos Cement	140.0	13.45	0.15



**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1384	6.0	J-852	J-259	165	Asbestos Cement	140.0	5.26	0.06
P-1385	6.0	J-262	J-852	21	Ductile Iron	100.0	-8.19	0.09
P-1386	6.0	J-205	J-853	33	Ductile Iron	80.0	0.38	0.00
P-1389	6.0	J-262	J-855	115	Asbestos Cement	140.0	9.61	0.11
P-1390	6.0	J-855	C-56	25	Asbestos Cement	140.0	2.03	0.02
P-1391	6.0	C-40	J-856	286	Cast iron	80.0	2.31	0.03
P-1392	6.0	J-856	EL-J-95	92	Cast iron	80.0	-1.11	0.01
P-1393	6.0	EL-J-91	J-856	175	Ductile Iron	80.0	-1.37	0.02
P-1394	6.0	EL-J-76	EL-J-76a	150	Ductile Iron	90.0	1.22	0.01
P-1396	6.0	EL-J-37	EL-J-37a	124	Ductile Iron	90.0	2.47	0.03
P-1397	6.0	C-89	EL-J-19a	143	Ductile Iron	90.0	0.60	0.01
P-1398	6.0	C-85	EL-J-30a	219	Ductile Iron	90.0	1.43	0.02
P-1399	6.0	EL-J-22	EL-J-22a	142	Ductile Iron	100.0	1.35	0.02
P-1400	6.0	C-131	EL-J-16a	64	Ductile Iron	100.0	0.73	0.01
P-1401	6.0	C-135	EL-J-7a	95	Ductile Iron	100.0	1.16	0.01
P-1402	6.0	C-136	EL-J-8a	94	Ductile Iron	100.0	1.36	0.02
P-1403	6.0	J-201	J-865	61	Ductile Iron	80.0	-3.03	0.03
P-1404	6.0	J-865	C-37	197	Ductile Iron	80.0	-3.71	0.04
P-1405	6.0	EL-J-86	J-866	119	Asbestos Cement	140.0	3.48	0.04
P-1406	6.0	J-866	C-96	15	Asbestos Cement	140.0	1.38	0.02
P-1407	6.0	C-119	J-868	19	Ductile Iron	130.0	0.46	0.01
P-1408	6.0	J-868	HH-J-31	137	Ductile Iron	130.0	(N/A)	(N/A)
P-1409	6.0	C-106	J-869	69	Ductile Iron	100.0	0.00	0.00
P-1410	8.0	EL-J-48	C-86	140	Asbestos Cement	140.0	11.01	0.07

**FlexTable: Pipe Table**  
**Hanapepe-Eleele Water System**

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
P-1411	8.0	C-86	EL-J-47	278	Asbestos Cement	140.0	7.58	0.05
P-1412	8.0	EL-J-22	J-870	67	Ductile Iron	100.0	-6.60	0.04
P-1413	8.0	J-870	EL-J-25	271	Ductile Iron	100.0	-8.33	0.05
P-1414	6.0	EL-J-39	EL-J-871	265	Ductile Iron	90.0	0.00	0.00
P-1415	6.0	C-57	J-219	726	Ductile Iron	85.0	-16.11	0.18
P-1416	8.0	C-57	J-872	26	Ductile Iron	85.0	16.11	0.10
P-1417	8.0	J-872	C-58	227	Ductile Iron	85.0	16.11	0.10
P-1418	12.0	J-318	C-146	212	Ductile Iron	80.0	0.00	0.00
P-1419	12.0	C-146	J-319	20	Ductile Iron	80.0	0.00	0.00
P-1424	2.0	HH-J-64	HH-J-57	255	Steel	100.0	-1.10	0.11

**Water Model Results for**  
**Hanapepe-Eleele Water System**  
**(Existing)**

**Junction Table**

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EL-J-1	288.00	0.00	49	401.98
EL-J-2	278.00	0.00	54	401.98
EL-J-3	280.00	0.41	53	401.98
EL-J-4	220.00	0.22	79	401.98
EL-J-5	280.00	0.40	53	401.98
EL-J-6	261.00	0.00	61	401.98
EL-J-7	270.00	0.20	57	401.98
EL-J-7a	270.00	1.16	57	401.98
EL-J-8	240.00	0.59	70	401.97
EL-J-8a	240.00	1.36	70	401.97
EL-J-9	240.00	3.19	70	401.97
EL-J-10	240.00	0.00	70	401.97
EL-J-11	246.00	0.00	68	401.97
EL-J-12	248.00	0.00	67	401.98
EL-J-13	249.00	0.00	66	401.98
EL-J-14	270.00	0.00	57	401.98
EL-J-15	270.00	0.36	57	401.98
EL-J-16	261.00	0.00	61	401.98
EL-J-16a	280.00	0.73	53	401.98
EL-J-17	233.00	0.00	73	401.97
EL-J-18	220.00	1.45	79	401.97
EL-J-19	205.00	1.99	58	339.56
EL-J-19a	220.00	0.60	52	339.56
EL-J-20	200.00	2.15	61	339.57
EL-J-21	210.00	0.00	56	339.57
EL-J-22	210.00	0.25	83	401.97
EL-J-22a	205.00	1.35	85	401.97
EL-J-23	197.00	0.00	89	401.97
EL-J-24	200.00	1.25	88	401.97

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EL-J-25	234.00	0.00	73	401.97
EL-J-26	180.00	1.65	69	339.57
EL-J-27	180.00	0.00	69	339.57
EL-J-28	180.00	0.00	69	339.57
EL-J-29	190.00	0.00	65	339.57
EL-J-30	183.00	0.00	68	339.57
EL-J-30a	195.00	1.43	63	339.57
EL-J-31	177.00	0.00	70	339.57
EL-J-32	198.00	0.00	61	339.57
EL-J-33	173.00	0.00	72	339.57
EL-J-34	169.00	0.00	74	339.58
EL-J-35	165.00	1.07	76	339.58
EL-J-36	165.00	1.24	76	339.57
EL-J-37	157.00	0.00	79	339.57
EL-J-37a	160.00	2.47	78	339.57
EL-J-38	164.00	0.00	76	339.57
EL-J-39	165.00	1.30	76	339.57
EL-J-40	165.00	0.00	76	339.57
EL-J-41	203.00	0.00	59	339.56
EL-J-42	205.00	1.63	58	339.56
EL-J-43	197.00	0.00	62	339.56
EL-J-44	195.00	2.05	63	339.56
EL-J-45	190.00	2.15	65	339.56
EL-J-46	175.00	1.43	71	339.56
EL-J-47	185.00	0.00	67	339.56
EL-J-48	180.00	0.98	69	339.57
EL-J-49	178.00	0.00	70	339.57
EL-J-50	175.00	0.00	71	339.56
EL-J-51	170.00	2.03	74	339.56

## FlexTable: Junction Table

### Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EL-J-52	158.00	0.00	79	339.59
EL-J-53	159.00	0.00	78	339.60
EL-J-54	160.00	0.79	78	339.61
EL-J-55	170.00	0.00	74	339.65
EL-J-56	193.00	0.00	64	339.71
EL-J-57	200.00	0.00	61	339.69
EL-J-58	160.00	0.00	78	339.65
EL-J-59	144.00	0.00	85	339.64
EL-J-60	140.00	0.50	87	339.63
EL-J-61	130.00	0.00	91	339.63
EL-J-62	130.00	0.00	91	339.63
EL-J-63	139.00	0.00	87	339.63
EL-J-64	135.00	0.00	89	339.63
EL-J-65	135.00	0.35	89	339.63
EL-J-66	135.00	0.21	89	339.63
EL-J-67	150.00	0.00	82	339.63
EL-J-68	150.00	0.34	82	339.63
EL-J-69	150.00	0.00	82	339.63
EL-J-70	150.00	0.52	82	339.63
EL-J-71	130.00	1.62	91	339.61
EL-J-72	140.00	0.22	87	339.61
EL-J-73	140.00	1.22	87	339.61
EL-J-74	145.00	0.89	84	339.61
EL-J-75	153.00	0.00	81	339.61
EL-J-76	156.00	0.00	80	339.61
EL-J-76a	165.00	1.22	76	339.61
EL-J-77	150.00	0.00	82	339.61
EL-J-78	130.00	0.00	91	339.63
EL-J-79	124.00	0.00	93	339.63

## FlexTable: Junction Table Hanapepe-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EL-J-80	115.00	0.81	97	339.60
EL-J-81	125.00	1.77	93	339.60
EL-J-82	120.00	1.48	95	339.59
EL-J-83	124.00	0.00	93	339.59
EL-J-84	130.00	0.34	91	339.59
EL-J-85	130.00	0.24	91	339.59
EL-J-86	131.00	0.00	90	339.59
EL-J-87	132.00	0.00	90	339.60
EL-J-88	129.00	0.00	91	339.60
EL-J-89	130.00	1.11	91	339.61
EL-J-90	100.00	0.43	104	339.60
EL-J-91	100.00	2.87	104	339.59
EL-J-92	85.00	1.57	110	339.60
EL-J-93	80.00	4.30	113	339.60
EL-J-94	85.00	0.00	110	339.60
EL-J-95	105.00	0.00	102	339.59
EL-J-96	111.00	0.00	99	339.59
EL-J-97	124.00	0.00	93	339.63
EL-J-98	125.00	0.60	93	339.62
EL-J-99	98.00	0.00	105	339.59
EL-J-100	100.00	2.69	104	339.58
EL-J-101	93.00	0.00	107	339.57
EL-J-102	110.00	0.44	100	339.55
EL-J-103	120.00	0.00	95	339.62
EL-J-104	85.00	0.00	110	339.62
EL-J-105	74.00	0.00	115	339.62
EL-J-106	70.00	0.00	117	339.61
EL-J-107	68.00	9.83	118	339.61
EL-J-108	75.00	0.00	115	339.61

## FlexTable: Junction Table Hanapepe-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
EL-J-871	160.00	0.00	78	339.57
HH-J-1	280.00	0.00	53	401.60
HH-J-2	280.00	0.00	53	401.58
HH-J-3	280.00	0.00	53	401.57
HH-J-4	270.00	0.42	57	401.54
HH-J-5	270.00	1.02	57	401.55
HH-J-6	236.00	0.75	72	401.48
HH-J-7	236.00	0.79	72	401.48
HH-J-8	230.00	1.66	74	401.44
HH-J-9	255.00	0.43	63	401.43
HH-J-10	225.00	1.32	76	401.43
HH-J-11	225.00	0.42	76	401.43
HH-J-12	225.00	0.49	76	401.41
HH-J-13	225.00	0.00	76	401.41
HH-J-14	250.00	0.64	66	401.41
HH-J-15	250.00	2.29	66	401.42
HH-J-16	245.00	1.72	68	401.40
HH-J-17	245.00	0.98	68	401.41
HH-J-18	240.00	0.89	70	401.39
HH-J-19	240.00	1.31	70	401.40
HH-J-20	220.00	0.95	79	401.39
HH-J-21	220.00	1.16	79	401.39
HH-J-22	210.00	1.58	83	401.38
HH-J-23	210.00	3.15	83	401.38
HH-J-24	180.00	0.68	96	401.39
HH-J-25	200.00	0.84	87	401.38
HH-J-26	200.00	2.79	87	401.38
HH-J-27	200.00	1.41	87	401.37
HH-J-28	200.00	0.66	87	401.38



## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
HH-J-29	200.00	1.24	87	401.38
HH-J-30	200.00	1.80	87	401.38
HH-J-31	170.00	0.70	81	356.02
HH-J-31a	170.00	0.62	81	356.02
HH-J-34	180.00	0.81	76	356.03
HH-J-37	180.00	0.80	76	356.03
HH-J-38	180.00	0.85	76	356.05
HH-J-41	180.00	1.76	76	356.13
HH-J-42	180.00	1.31	13	210.70
HH-J-43	194.00	0.00	7	210.74
HH-J-44	195.00	0.00	89	401.38
HH-J-45	195.00	0.00	7	211.67
HH-J-46	195.00	1.18	7	211.40
HH-J-47	194.00	0.00	7	210.75
HH-J-48	195.00	0.00	7	211.40
HH-J-49	194.00	0.00	70	356.50
HH-J-50	165.00	0.00	83	356.03
HH-J-51	160.00	1.68	85	356.03
HH-J-53	180.00	1.47	76	356.02
HH-J-55	170.00	0.47	81	356.02
HH-J-56	165.00	0.57	83	356.03
HH-J-57	170.00	1.78	81	356.02
HH-J-58	165.00	0.47	83	356.03
HH-J-59	165.00	0.50	83	356.03
HH-J-60	160.00	2.61	85	356.03
HH-J-64	165.00	0.98	83	356.00
HH-J-65	150.00	0.57	89	355.63
HH-J-66	160.00	0.11	85	356.01
HH-J-67	155.00	0.05	87	356.01

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
HH-J-68	155.00	0.55	87	356.01
HH-J-69	150.00	0.49	89	356.01
HH-J-70	136.00	0.00	95	356.01
HH-J-73	130.00	2.35	98	356.01
HH-J-74	172.00	0.00	80	356.02
HH-J-75	169.00	0.00	81	356.00
HH-J-76	167.00	0.00	82	356.00
HH-J-77	165.00	1.13	83	356.00
HH-J-78	150.00	0.91	89	356.00
HH-J-78a	150.00	0.46	89	356.00
HH-J-79	135.00	0.00	96	355.99
HH-J-80	120.00	0.38	102	355.99
HH-J-81	120.00	0.32	102	355.99
HH-J-82	113.00	0.00	105	355.99
HH-J-83	112.00	0.00	106	355.99
HH-J-84	110.00	0.08	107	355.99
HH-J-85	110.00	0.00	44	210.61
HH-J-86	130.00	1.75	98	356.01
HH-J-87	150.00	0.00	89	356.01
HH-J-88	120.00	2.27	102	355.99
HH-J-89	119.00	0.00	103	355.99
HH-J-90	94.00	0.00	114	355.98
HH-J-91	93.00	0.00	114	355.98
HH-J-92	89.00	0.00	116	355.98
HH-J-93	90.00	0.24	115	355.98
HH-J-94	82.00	0.00	119	355.98
HH-J-95	80.00	0.00	120	355.98
HH-J-96	85.00	0.00	117	355.98
HH-J-97	88.00	0.00	116	355.98

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
HH-J-98	110.00	0.00	107	355.99
HH-J-99	113.00	0.00	105	355.99
HH-J-100	120.00	0.27	102	355.99
HH-J-103a	90.00	0.12	115	355.98
HH-J-105	80.00	0.69	120	355.98
HH-J-105a	80.00	0.73	120	355.98
HH-J-106	80.00	0.00	57	210.55
HH-J-107	90.00	0.00	52	210.57
HH-J-108	38.00	0.00	75	210.52
HH-J-109	37.00	0.00	75	210.51
HH-J-110	34.00	0.00	77	210.49
J-56	35.00	2.02	76	210.49
J-73	161.00	0.00	21	210.37
J-131	32.00	0.00	77	210.37
J-132	30.00	1.06	78	210.36
J-133	30.00	0.00	78	210.36
J-134	30.00	0.00	78	210.34
J-136	28.00	0.00	79	210.31
J-137	20.00	0.00	82	210.30
J-138	20.00	0.23	82	210.29
J-139	30.00	0.90	78	210.29
J-140	30.00	0.00	78	210.36
J-141	30.00	0.25	78	210.36
J-142	20.00	0.18	82	210.28
J-143	18.00	0.00	83	210.28
J-145	38.00	0.00	75	210.28
J-149	36.00	0.00	76	210.28
J-151	19.00	0.00	83	210.40
J-152	35.00	0.00	76	210.28

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-153	40.00	0.64	74	210.28
J-154	34.00	0.00	76	210.28
J-155	37.00	0.00	75	210.28
J-156	35.00	0.36	76	210.29
J-158	35.00	0.43	76	210.29
J-159	30.00	0.36	78	210.26
J-160	30.00	0.00	78	210.26
J-161	31.00	0.00	78	210.26
J-162	33.00	0.00	77	210.26
J-163	34.00	0.00	76	210.26
J-164	37.00	0.00	75	210.25
J-166	21.00	0.00	82	210.25
J-167	15.00	0.00	85	210.25
J-168	30.00	0.00	78	210.48
J-169	30.00	0.52	78	210.48
J-170	30.00	0.48	78	210.48
J-172	30.00	0.00	78	210.48
J-173	30.00	0.01	78	210.48
J-175	40.00	0.00	74	210.47
J-176	20.00	0.00	83	210.47
J-177	20.00	0.00	83	210.47
J-179	17.00	0.00	84	210.45
J-180	17.00	12.85	84	210.44
J-181	10.00	0.00	87	210.47
J-183	10.00	0.00	87	210.25
J-184	10.00	0.13	87	210.25
J-186	10.00	2.74	87	210.25
J-187	20.00	5.41	82	210.15
J-188	20.00	0.00	82	210.22

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-189	20.00	1.48	82	210.24
J-190	10.00	2.06	87	210.25
J-191	10.00	0.00	87	210.25
J-192	20.00	0.27	82	210.22
J-193	25.00	0.00	80	210.22
J-194	30.00	0.82	78	210.22
J-195	10.00	0.81	87	210.24
J-197	20.00	0.15	82	210.24
J-198	10.00	0.69	87	210.24
J-200	21.00	0.00	82	210.24
J-201	5.00	0.00	89	210.24
J-203	6.00	0.00	89	210.25
J-204	8.00	0.00	88	210.25
J-205	10.00	0.36	87	210.25
J-206	10.00	0.82	87	210.25
J-207	10.00	0.00	87	210.24
J-208	18.00	0.00	83	210.24
J-209	6.00	2.43	89	210.24
J-210	10.00	0.00	87	210.25
J-211	10.00	0.00	87	210.25
J-212	10.00	0.00	87	210.25
J-213	10.00	0.00	87	210.25
J-215	10.00	0.00	87	210.25
J-216	10.00	2.13	87	210.25
J-218	32.00	0.00	77	210.47
J-219	20.00	0.00	83	210.47
J-222	30.00	6.71	78	210.40
J-224	15.00	0.00	85	210.28
J-226	15.00	0.00	85	210.22

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-227	15.00	0.00	85	210.22
J-228	15.00	0.00	85	210.22
J-229	15.00	0.00	85	210.22
J-231	15.00	0.00	85	210.22
J-232	15.00	0.00	85	210.22
J-233	10.00	0.00	87	210.22
J-234	20.00	0.00	83	210.40
J-235	20.00	0.59	83	210.40
J-236	18.00	0.00	83	210.40
J-237	18.00	0.00	83	210.40
J-238	15.00	0.00	85	210.40
J-239	16.00	0.00	84	210.40
J-240	15.00	0.00	85	210.40
J-241	16.00	0.00	84	210.40
J-242	16.00	0.00	84	210.40
J-243	20.00	0.00	83	210.40
J-247	5.00	0.97	89	210.47
J-249	10.00	0.51	87	210.46
J-250	10.00	0.20	87	210.45
J-251	10.00	0.00	87	210.45
J-252	10.00	0.00	87	210.45
J-253	10.00	0.00	87	210.45
J-254	10.00	0.00	87	210.44
J-255	10.00	0.86	87	210.43
J-257	10.00	0.00	87	210.22
J-259	10.00	5.26	87	210.20
J-260	10.00	8.91	87	210.21
J-261	10.00	0.00	87	210.21
J-262	10.00	0.00	87	210.20

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-263	6.00	0.00	89	210.19
J-264	10.00	1.76	87	210.18
J-266	10.00	6.74	87	209.92
J-267	10.00	1.05	87	210.24
J-318	25.00	0.48	56	154.30
J-319	18.00	0.00	59	154.30
J-320	26.00	0.00	56	154.30
J-321	28.00	0.00	55	154.30
J-323	34.00	0.00	52	154.30
J-324	38.00	0.00	50	154.30
J-327	37.00	12.30	51	154.29
J-328	28.00	0.00	55	154.30
J-347	205.00	0.00	58	339.74
J-348	276.00	0.00	28	339.89
J-349	288.00	0.00	23	339.94
J-448	20.00	0.00	82	210.24
J-449	16.00	0.00	84	210.24
J-451	11.00	0.00	86	210.24
J-452	70.00	0.00	61	210.24
J-453	112.00	0.00	43	210.24
J-455	112.00	0.00	43	210.24
J-456	130.00	0.00	35	210.24
J-457	144.00	0.00	29	210.24
J-458	140.00	0.00	30	210.24
J-459	30.00	0.00	78	210.24
J-460	20.00	0.00	82	210.24
J-461	17.00	0.00	84	210.24
J-462	17.00	0.00	84	210.24
J-463	15.00	0.00	85	210.24

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-464	16.00	0.00	84	210.24
J-466	40.00	0.00	74	210.24
J-467	10.00	0.00	87	210.24
J-468	10.00	0.75	87	210.24
J-469	20.00	0.00	82	210.24
J-470	10.00	0.00	87	210.24
J-476	10.00	0.34	87	210.24
J-477	10.00	1.17	86	209.51
J-478	18.00	0.00	83	210.24
J-480	28.00	0.00	79	210.27
J-481	20.00	0.00	82	210.25
J-482	20.00	5.30	82	210.24
J-483	16.00	0.00	84	210.25
J-484	15.00	0.00	85	210.25
J-486	16.00	0.00	84	210.25
J-487	16.00	0.00	84	210.25
J-488	16.00	0.00	84	210.25
J-489	16.00	0.00	84	210.25
J-490	19.00	0.00	83	210.25
J-491	20.00	0.00	82	210.25
J-492	19.00	0.00	83	210.25
J-493	15.00	2.52	85	210.25
J-494	19.00	0.00	83	210.25
J-495	15.00	0.00	85	210.25
J-496	14.00	0.00	85	210.25
J-497	10.00	0.00	87	210.25
J-498	8.00	0.00	88	210.25
J-499	8.00	0.00	88	210.25
J-500	13.00	0.00	86	210.25



## FlexTable: Junction Table

### Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-501	30.00	0.03	78	210.25
J-504	30.00	0.00	78	210.25
J-505	21.00	0.00	82	210.25
J-507	26.00	0.00	80	210.25
J-508	25.00	0.00	80	210.25
J-512	28.00	0.00	79	210.25
J-514	31.00	0.00	78	210.24
J-515	35.00	0.00	76	210.24
J-516	80.00	0.00	56	210.24
J-519	52.00	0.00	69	210.24
J-520	34.00	0.00	76	210.24
J-521	32.00	0.00	77	210.24
J-522	60.00	0.00	65	210.24
J-524	76.00	0.00	58	210.24
J-525	34.00	0.00	76	210.24
J-526	22.00	0.00	82	210.24
J-527	22.00	0.00	82	210.24
J-528	29.00	0.00	79	210.24
J-529	35.00	0.00	76	210.24
J-530	34.00	0.00	76	210.24
J-531	33.00	0.00	77	210.24
J-532	29.00	0.00	79	210.24
J-533	27.00	0.00	79	210.24
J-534	40.00	0.00	74	210.24
J-535	16.00	0.00	84	210.24
J-537	40.00	0.00	74	210.24
J-539	34.00	0.00	76	210.24
J-540	38.00	0.00	75	210.24
J-541	35.00	0.00	76	210.24

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-542	32.00	0.00	77	210.24
J-544	25.00	0.00	80	210.24
J-546	18.00	0.00	83	210.24
J-548	35.00	0.18	76	210.29
J-549	32.00	0.00	77	210.29
J-551	30.00	0.00	78	210.26
J-552	31.00	0.00	78	210.26
J-553	34.00	0.00	76	210.25
J-554	34.00	0.00	76	210.25
J-555	37.00	0.00	75	210.25
J-556	30.00	0.00	78	210.25
J-557	16.00	0.23	84	210.25
J-559	17.00	0.00	84	210.25
J-560	16.00	0.00	84	210.25
J-567	29.00	0.00	79	210.25
J-569	18.00	0.00	83	210.25
J-571	20.00	0.00	82	210.25
J-572	30.00	0.00	78	210.25
J-573	29.00	0.00	79	210.25
J-574	27.00	0.00	79	210.25
J-576	15.00	0.00	85	210.25
J-577	30.00	2.42	78	209.94
J-578	17.00	0.00	84	210.34
J-579	14.00	0.00	85	210.38
J-581	10.00	0.00	87	210.43
J-582	10.00	0.52	87	210.43
J-583	10.00	5.52	87	210.37
J-585	10.00	1.00	87	210.47
J-606	310.00	0.00	13	339.99

## FlexTable: Junction Table Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-609	310.00	0.00	13	340.00
J-613	310.00	0.00	13	340.00
J-613-A	310.00	0.00	13	340.00
J-614	290.00	0.00	22	340.00
J-615	55.00	0.00	124	340.00
J-618	294.00	0.00	47	401.99
J-619	310.00	0.00	40	401.99
J-620	326.00	0.00	33	401.99
J-621	330.00	0.00	31	401.99
J-622	358.00	0.00	19	402.00
J-623	365.00	0.00	16	402.00
J-624	365.00	0.00	16	402.00
J-712	10.00	0.39	87	210.47
J-713	10.00	1.82	87	210.25
J-722	21.00	0.00	82	210.25
J-740	310.00	0.00	13	340.00
J-742	310.00	0.00	40	401.99
J-743	310.00	0.00	13	340.00
J-744	310.00	0.00	13	340.00
J-747	310.00	0.00	13	340.00
J-774	168.76	0.00	74	339.65
J-811	190.00	0.00	65	339.65
J-812	205.00	0.00	58	339.65
J-813	160.00	0.00	78	339.65
J-815	165.00	0.00	76	339.65
J-819	144.00	0.00	85	339.65
J-820	130.00	0.00	91	339.65
J-828	195.00	0.00	89	401.37
J-829	195.00	0.00	7	211.40

## FlexTable: Junction Table

### Hanapee-Eleele Water System

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
J-830	195.00	0.00	89	401.26
J-831	195.00	0.00	89	401.37
J-832	194.00	0.00	90	401.29
J-833	195.00	0.00	70	356.52
J-834	195.00	0.00	89	401.24
J-835	16.00	0.00	84	210.25
J-837	16.00	0.00	84	210.25
J-842	55.07	0.00	43	154.35
J-843	62.00	0.00	40	154.35
J-844	62.00	0.00	120	339.58
J-845	62.00	0.00	120	339.58
J-846	170.00	1.13	81	356.04
J-847	170.00	0.98	81	356.04
J-848	170.00	1.71	81	356.02
J-849	170.00	0.93	81	356.02
J-852	10.00	0.00	87	210.20
J-853	10.00	0.38	87	210.25
J-855	10.00	0.84	87	210.20
J-856	95.00	2.05	106	339.59
J-865	10.00	0.68	87	210.24
J-866	140.00	2.10	87	339.59
J-868	190.00	0.46	92	401.38
J-869	280.00	0.00	53	401.57
J-870	210.00	1.73	83	401.97
J-872	20.00	0.00	83	210.41

# Appendix C

**Water Model Results for**

**Hanapepe-Eleele Water System**

**With Lima Ola Development**

**(Proposed)**

**340' Service Zone**

FlexTable: Pipe Table  
 340' Service Zone  
 Max Daily Demand with Fire Flow at Hydrant FH-6

**Current Time: 2.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
1	8.0	EL-J-821	FH-1	50	Ductile Iron	110.0	501.88	3.20
1a	8.0	FH-1a	FH-1	340	Ductile Iron	110.0	-501.88	3.20
2	8.0	FH-2	FH-1a	310	Ductile Iron	110.0	-501.88	3.20
2a	8.0	FH-2	FH-2a	324	Ductile Iron	110.0	501.88	3.20
3	8.0	1	FH-2a	124	Ductile Iron	110.0	-501.88	3.20
3a	8.0	FH-3	1	86	Ductile Iron	110.0	551.27	3.52
4	8.0	2	FH-3	135	Ductile Iron	110.0	551.27	3.52
4a	8.0	3	2	25	Ductile Iron	110.0	568.33	3.63
5	8.0	4	3	125	Ductile Iron	110.0	585.39	3.74
5a	8.0	FH-3a	4	50	Ductile Iron	110.0	609.14	3.89
6	8.0	FH-3a	5	285	Ductile Iron	110.0	-609.14	3.89
6a	12.0	EL-J-36	5	1015	Ductile Iron	110.0	1594.19	4.52
7	8.0	5	FH-4	28	Ductile Iron	110.0	973.17	6.21
7a	8.0	FH-4	FH-4a	232	Ductile Iron	110.0	973.17	6.21
8	8.0	FH-4a	FH-5	242	Ductile Iron	110.0	973.17	6.21
8a	8.0	FH-5	FH-5a	203	Ductile Iron	110.0	973.17	6.21
9	8.0	FH-5a	FH-6	237	Ductile Iron	110.0	973.17	6.21
9a	8.0	6	FH-6	252	Ductile Iron	110.0	1026.83	6.55
10	8.0	FH-7	6	92	Ductile Iron	110.0	1041.27	6.65
10a	8.0	1	FH-7	250	Ductile Iron	110.0	1041.27	6.65
10b	8.0	2	2a	33	Ductile Iron	110.0	17.06	0.11
10c	8.0	3	3a	33	Ductile Iron	110.0	17.06	0.11
10d	8.0	4	4a	27	Ductile Iron	110.0	23.75	0.15
10e	8.0	6	6a	33	Ductile Iron	110.0	14.44	0.09

FlexTable: Junction Table  
 340' Service Zone  
 Max Daily Demand with Fire Flow at Hydrant FH-6

**Current Time: 2.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
1	199.00	11.88	37	285.29
2	200.00	0.00	38	287.11
2a	200.00	17.06	38	287.11
3	200.00	0.00	38	287.33
3a	200.00	17.06	38	287.33
4	204.00	0.00	37	288.49
4a	204.00	23.75	37	288.49
5	214.50	11.88	34	291.82
6	207.00	0.00	30	276.11
6a	207.00	14.44	30	276.11
EL-J-36	223.70	0.00	33	300.13
EL-J-821	167.00	0.00	55	293.26



FlexTable: Pipe Table  
340' Service Zone  
Peak Hour Flow

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (ft)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
1	8.0	EL-J-821	FH-1	50	Ductile Iron	110.0	-19.73	0.13
1a	8.0	FH-1a	FH-1	340	Ductile Iron	110.0	19.73	0.13
2	8.0	FH-2	FH-1a	310	Ductile Iron	110.0	19.73	0.13
2a	8.0	FH-2	FH-2a	324	Ductile Iron	110.0	-19.73	0.13
3	8.0	1	FH-2a	124	Ductile Iron	110.0	19.73	0.13
3a	8.0	FH-3	1	86	Ductile Iron	110.0	7.94	0.05
4	8.0	2	FH-3	135	Ductile Iron	110.0	7.94	0.05
4a	8.0	3	2	25	Ductile Iron	110.0	42.06	0.27
5	8.0	4	3	125	Ductile Iron	110.0	76.18	0.49
5a	8.0	FH-3a	4	50	Ductile Iron	110.0	123.68	0.79
6	8.0	FH-3a	5	285	Ductile Iron	110.0	-123.68	0.79
6a	12.0	EL-J-36	5	1015	Ductile Iron	110.0	211.87	0.60
7	8.0	5	FH-4	28	Ductile Iron	110.0	64.43	0.41
7a	8.0	FH-4	FH-4a	232	Ductile Iron	110.0	64.43	0.41
8	8.0	FH-4a	FH-5	242	Ductile Iron	110.0	64.43	0.41
8a	8.0	FH-5	FH-5a	203	Ductile Iron	110.0	64.43	0.41
9	8.0	FH-5a	FH-6	237	Ductile Iron	110.0	64.43	0.41
9a	8.0	6	FH-6	252	Ductile Iron	110.0	-64.43	0.41
10	8.0	FH-7	6	92	Ductile Iron	110.0	-35.55	0.23
10a	8.0	1	FH-7	250	Ductile Iron	110.0	-35.55	0.23
10b	8.0	2	2a	33	Ductile Iron	110.0	34.12	0.22
10c	8.0	3	3a	33	Ductile Iron	110.0	34.12	0.22
10d	8.0	4	4a	27	Ductile Iron	110.0	47.50	0.30
10e	8.0	6	6a	33	Ductile Iron	110.0	28.88	0.18

FlexTable: Junction Table  
 340' Service Zone  
 Peak Hour Flow

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
1	199.00	23.76	60	337.75
2	200.00	0.00	60	337.75
2a	200.00	34.12	60	337.75
3	200.00	0.00	60	337.75
3a	200.00	34.12	60	337.75
4	204.00	0.00	58	337.78
4a	204.00	47.50	58	337.77
5	214.50	23.76	54	337.95
6	207.00	0.00	57	337.77
6a	207.00	28.88	57	337.76
EL-J-36	223.70	0.00	50	338.15
EL-J-821	167.00	0.00	74	337.73

**Water Model Results for**  
**Hanapepe-Eleele Water System**  
**With Lima Ola Development**  
**(Proposed)**

**402' Service Zone**

FlexTable: Pipe Table  
 402' Service Zone  
 Max Daily Demand with Fire Flow at Hydrant FH-16

**Current Time : 2.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen-Williams	Flow (gpm)	Velocity (ft/s)
11	8.0	10	7	409	Ductile Iron	110.0	83.84	0.54
12	8.0	7	FH-9	386	Ductile Iron	110.0	33.61	0.21
13	8.0	FH-9	8	371	Ductile Iron	110.0	33.61	0.21
14	8.0	8	FH-10	125	Ductile Iron	110.0	8.12	0.05
15	8.0	FH-10	9	92	Ductile Iron	110.0	8.12	0.05
16	8.0	FH-8	7	86	Ductile Iron	110.0	-33.48	0.21
17	8.0	12	FH-8	151	Ductile Iron	110.0	-33.48	0.21
18	8.0	8	13	247	Ductile Iron	110.0	17.98	0.11
19	8.0	12	FH-11	391	Ductile Iron	110.0	28.95	0.18
20	8.0	FH-11	13	398	Ductile Iron	110.0	28.95	0.18
21	8.0	14	12	346	Ductile Iron	110.0	11.10	0.07
22	8.0	13	16	289	Ductile Iron	110.0	31.31	0.20
23	8.0	FH-14	14	226	Ductile Iron	110.0	-52.05	0.33
24	8.0	16	17	276	Ductile Iron	110.0	17.56	0.11
25	8.0	18	FH-14	169	Ductile Iron	110.0	-52.05	0.33
26	8.0	17	FH-15	124	Ductile Iron	110.0	-15.25	0.10
27	8.0	19	18	174	Ductile Iron	110.0	-7.43	0.05
28	8.0	FH-15	19	228	Ductile Iron	110.0	-15.25	0.10
29	8.0	10	11	55	Ductile Iron	110.0	86.92	0.55
30	8.0	FH-12	11	255	Ductile Iron	110.0	-65.66	0.42
31	8.0	14	FH-12	351	Ductile Iron	110.0	-65.66	0.42
32	8.0	FH-13	15	112	Ductile Iron	110.0	11.25	0.07
33	8.0	16	FH-13	240	Ductile Iron	110.0	11.25	0.07
34	8.0	FH-16	19	559	Ductile Iron	110.0	7.82	0.05
35	12.0	EL-J-3	FH-16	314	Ductile Iron	110.0	1,257.82	3.57
36	8.0	10	EL-J-810	33	Ductile Iron	110.0	-170.76	1.09

FlexTable: Junction Table  
 402' Service Zone  
 Max Daily Demand with Fire Flow at Hydrant FH-16

**Current Time: 2.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
7	219.00	16.76	64	366.81
8	226.00	7.50	61	366.78
9	228.00	8.12	60	366.78
10	225.00	0.00	62	366.91
11	230.00	21.26	59	366.90
12	226.00	15.62	61	366.80
13	231.00	15.62	59	366.77
14	241.00	2.50	55	366.80
15	232.00	11.25	58	366.76
16	243.00	2.50	54	366.76
17	257.39	32.81	47	366.76
18	256.25	44.62	48	366.76
19	268.00	0.00	43	366.76
EL-J-3	280.00	0.74	38	368.42
EL-J-810	220.00	0.00	64	366.95

FlexTable: Pipe Table  
 402' Service Zone  
 Peak Hour Flow

**Current Time: 0.000 hours**

Pipe No.	Diameter (in)	Start Node	Stop Node	Length (Scaled) (ft)	Material	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)
11	8.0	10	7	409	Ductile Iron	110.0	65.10	0.42
12	8.0	7	FH-9	386	Ductile Iron	110.0	26.20	0.17
13	8.0	FH-9	8	371	Ductile Iron	110.0	26.20	0.17
14	8.0	8	FH-10	125	Ductile Iron	110.0	16.25	0.10
15	8.0	FH-10	9	92	Ductile Iron	110.0	16.25	0.10
16	8.0	FH-8	7	86	Ductile Iron	110.0	-5.39	0.03
17	8.0	12	FH-8	151	Ductile Iron	110.0	-5.39	0.03
18	8.0	8	13	247	Ductile Iron	110.0	-5.05	0.03
19	8.0	12	FH-11	391	Ductile Iron	110.0	25.16	0.16
20	8.0	FH-11	13	398	Ductile Iron	110.0	25.16	0.16
21	8.0	14	12	346	Ductile Iron	110.0	51.03	0.33
22	8.0	13	16	289	Ductile Iron	110.0	-11.13	0.07
23	8.0	FH-14	14	226	Ductile Iron	110.0	28.04	0.18
24	8.0	16	17	276	Ductile Iron	110.0	-38.64	0.25
25	8.0	18	FH-14	169	Ductile Iron	110.0	28.04	0.18
26	8.0	17	FH-15	124	Ductile Iron	110.0	-104.27	0.67
27	8.0	19	18	174	Ductile Iron	110.0	117.28	0.75
28	8.0	FH-15	19	228	Ductile Iron	110.0	-104.27	0.67
29	8.0	10	11	55	Ductile Iron	110.0	70.51	0.45
30	8.0	FH-12	11	255	Ductile Iron	110.0	-27.99	0.18
31	8.0	14	FH-12	351	Ductile Iron	110.0	-27.99	0.18
32	8.0	FH-13	15	112	Ductile Iron	110.0	22.50	0.14
33	8.0	16	FH-13	240	Ductile Iron	110.0	22.50	0.14
34	8.0	FH-16	19	559	Ductile Iron	110.0	221.55	1.41
35	12.0	EL-J-3	FH-16	314	Ductile Iron	110.0	221.55	0.63
36	8.0	10	EL-J-810	33	Ductile Iron	110.0	-135.61	0.87

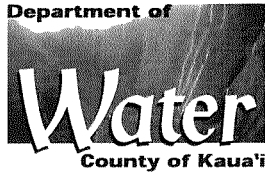
FlexTable: Junction Table  
 402' Service Zone  
 Peak Hour Flow

**Current Time: 0.000 hours**

Junction No.	Elevation (ft)	Demand (gpm)	Pressure (psi)	Hydraulic Grade (ft)
7	219.00	33.52	78	398.10
8	226.00	15.00	75	398.08
9	228.00	16.25	74	398.07
10	225.00	0.00	75	398.16
11	230.00	42.52	73	398.15
12	226.00	31.25	75	398.10
13	231.00	31.25	72	398.08
14	241.00	5.00	68	398.13
15	232.00	22.50	72	398.07
16	243.00	5.00	67	398.08
17	257.39	65.63	61	398.09
18	256.25	89.24	62	398.15
19	268.00	0.00	56	398.23
EL-J-3	280.00	1.48	52	399.15
EL-J-810	220.00	0.00	77	398.18

# Appendix D





*Water has no substitute.....Conserve it*

October 5, 2015

Anson Murayama  
Community Planning and Engineering, Inc.  
1286 Queen Emma Street  
Honolulu, HI 96813

Dear Anson Murayama:

Subject: Water Master Plan for Lima Ola Workforce Housing Development dated September 2015, Eleele, Kauai

This is in regard to your resubmittal of the Water Master Plan for Lima Ola Workforce Housing Development received by the Department of Water (DOW) on September 9, 2015.

The "Water Master Plan for Lima Ola Workforce Housing Development" dated September 2015 and prepared by Community Planning and Engineering is approved by the DOW.

Please submit six copies of the approved master plan with the hydraulic model.

If you have any questions, please contact Mr. Edward Doi at (808) 245-5417.

Sincerely,

A handwritten signature in black ink, appearing to read "K Saiki".

Kirk Saiki  
Manager & Chief Engineer

RF:ml  
WMP-Lima Ola Sept 2015, Murayama

**RECEIVED**  
OCT - 7 2015

**COMMUNITY PLANNING AND ENGINEERING INC.**



*Water has no substitute.....Conserve it*

COUNTY OF KAUAI  
HOUSING AGENCY

12 MAY 17 P1:21

May 14, 2012

Mr. Eugene Jimenez, Housing Director  
Kauai County Housing Agency  
4444 Rice Street, Suite 330  
Lihue, HI 96766

Dear Mr. Jimenez:

Subject: LIMA OLA WORKFORCE HOUSING DEVELOPMENT MASTER PLAN, Dated  
March 2012, TMK: 2-1-01:054, Eleele, Kauai

This is in regard to your letter dated April 9, 2012 transmitting the final report for the Lima Ola Workforce Housing Development Master Plan, dated March 2012. As identified, the proposed land use includes six categories of residential lots with a total count of 400 units on 43.1 acres plus green space and roadways on 31.9 acres which totals 75 acres.

Please be made aware that any actual subdivision or development of this area will be dependent on the adequacy of the source, storage, and transmission facilities existing at that time. At the present time, the major portions of the proposed development are outside the service area for which the Department's Water Plan 2020 was prepared. If this area is to be fully developed, new source, storage, and transmission water system facilities will be required to be developed to serve the additional water demands of the area. Presently, the Department's Water Plan 2020 does not include water facility improvements for the proposed area or development.

Prior to the Department of Water (DOW) recommending final subdivision, water meter service, or building permit approval, the applicant may be required to:

1. Prepare and receive DOW's approval of a water master plan for the full development of this area. The plan shall include necessary water system facilities required for the proposed project and project's phasing, as applicable.
2. Prepare and receive DOW's approval of construction drawings for the necessary water system facilities and construct said facilities. These facilities shall include but not be limited to:
  - a) All water facilities required in the approved Water Master Plan.
  - b) The domestic service connections.
  - c) The fire service connections, as applicable.
  - d) The interior plumbing plans with the appropriate backflow prevention device(s), as necessary.

Mr. Eugene Jimenez, Housing Director  
Kauai County Housing Agency

Subject: LIMA OLA WORKFORCE HOUSING DEVELOPMENT MASTER PLAN, Dated March 2012,  
TMK: 2-1-01:054, Eleele, Kauai

May 14, 2012  
Page 2

3. Pay the applicable charges in effect at the time of payment to the Department. At the present time, these charges shall include but not be limited to:
  - a) The Facilities Reserve Charge (FRC) of \$4,600 per 5/8-inch water meter/dwelling unit.
  - b) For Multi-family dwellings, the FRC shall be based on \$4,600 per unit or the FRC based on the approved water meter size; whichever amount is greater.

FRC offsets may apply in accordance with the DOW Rules and Regulations. The applicant is made aware that applicable FRC liability shall be offset by up to 33% each where water source or water storage improvements are constructed and up to 50% where transmission mains are constructed; provided that the total amount of all offsets shall not exceed 100% of the applicant's FRC liability, and provided further that the offset for any source or storage improvements or transmission main shall not exceed the actual cost of the source or storage improvement or transmission main.

4. Receive a "Certification of Completion" for the construction of the necessary water system facilities from the DOW.

If you have any questions concerning the construction drawings or Certification of Completion, please contact Mr. Keith Aoki at (808) 245-5411. For other questions, please contact Mr. Edward Doi at (808) 245-5417.

Sincerely,



Gregg Fujikawa  
Chief of Water Resources and Planning Division

ED:loo  
T-13909 Eleele, Jimenez-Workforce Housing Master Plan-March 2012

# ***Appendix E: HUD Environmental Assessment***



**U.S. Department of Housing and Urban  
Development**

451 Seventh Street, SW  
Washington, DC 20410  
www.hud.gov

[espanol.hud.gov](http://espanol.hud.gov)

# **Environmental Assessment Determinations and Compliance Findings for HUD-assisted Projects 24 CFR Part 58**

## **Project Information**

**Project Name:** Lima Ola Subdivision Off-Site Water System Improvements

**Responsible Entity:** Kaua'i County Housing Agency

**Grant Recipient** (if different than Responsible Entity): Same

**State/Local Identifier:** State of Hawai'i / 'Ele'ele, County of Kaua'i

**Preparer:** Kaimana Environmental Solutions LLC

**Certifying Officer Name and Title:** Derek S.K. Kawakami - Kaua'i County Mayor

**Grant Recipient** (if different than Responsible Entity): Same

**Consultant** (if applicable): Kaimana Environmental Solutions LLC  
PO Box 11890  
Honolulu, HI 96828

**Direct Comments to:** Max Solmssen, Environmental Planner – Kaimana  
Environmental Solutions LLC / Email: [max@kaimanaenv.com](mailto:max@kaimanaenv.com)

## **Project Location:**

The project site is located on the southwest side of the Island of Kaua‘i, northeast of the town of ‘Ele‘ele, and includes two Kaua‘i County-owned parcels of land currently developed for municipal water tank pumping and storage. One (1) existing 0.2 million gallon municipal water storage tank is located within Tax Map Key (TMK) parcel (4) 2-1-001: 049, and two (2) 0.4 million gallon county municipal water storage tanks are located at TMK parcel (4) 2-1-001: 046 (project site).

## **Description of the Proposed Project** [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:

The proposed project includes the design and construction of one (1) 0.3 million gallon County municipal water storage tank that would be located adjacent to the existing 0.2 million gallon County municipal water storage tank within TMK parcel (4) 2-1-001: 049. The proposed project also includes the upsizing of two existing booster pumps that serve the two existing 0.4 million gallon water storage tanks, which are located approximately 2,200 feet southwest of the existing 0.2 million gallon water tank, along Kaumuali‘i Highway, within TMK parcel (4) 2-1-001: 046. The booster pumps are planned to be upsized from 120 gallons per minute to 350 gallons per minute. The planned project includes required potable water service upgrades, as part of the County of Kaua‘i Lima Ola affordable housing subdivision, which is located southwest of the project site.

## **Statement of Purpose and Need for the Proposal** [40 CFR 1508.9(b)]:

The purpose of the proposed project is to provide additional water storage capacity to support the need generated by the County of Kaua‘i Lima Ola affordable housing subdivision.

## **Existing Conditions and Trends** [24 CFR 58.40(a)]:

The project site is located along Kaumuali‘i Highway adjacent to a residential area and to commercial coffee crop fields (Lima Ola Work Force Development, ‘Ele‘ele Heights subdivision and Kaua‘i Coffee Company croplands). The Port Allen mixed use commercial/industrial area is located to the southwest/downgradient of the Lima Ola Work Force Development and ‘Ele‘ele Heights subdivision. The project site is located in close proximity to transportation corridors, jobs, shopping and other vital community services. The trend in the area includes infill density development around the urban core of ‘Ele‘ele.

## **Funding Information**

<b>Grant Number</b>	<b>HUD Program</b>	<b>Funding Amount</b>
B-23-CP-HI-0482	Community Project Funding Grant	\$5,000,000.00

**Estimated Total HUD Funded Amount: \$5,000,000.00**

**Estimated Total Project Cost (HUD and non-HUD funds) [24 CFR 58.32(d)]:**

\$5,000,000.00

**Compliance with 24 CFR 50.4, 58.5, and 58.6 Laws and Authorities**

Record below the compliance or conformance determinations for each statute, executive order, or regulation. Provide credible, traceable, and supportive source documentation for each authority. Where applicable, complete the necessary reviews or consultations and obtain or note applicable permits of approvals. Clearly note citations, dates/names/titles of contacts, and page references. Attach additional documentation as appropriate.

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 and 58.6</b>		
<b>Airport Hazards</b>  24 CFR Part 51 Subpart D	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project site is located approximately 3 miles from the nearest airport (Port Allen Airport), and no military airports are located within the vicinity of the project site.
<b>Coastal Barrier Resources</b>  Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project site is located approximately 1.5 miles from the nearest shoreline, and is outside the Tsunami Evacuation Area. No coastal resources are anticipated to be impacted by the proposed project.
<b>Flood Insurance</b>  Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project site is located in Federal Emergency Management Agency (FEMA) Flood Zone X: area of minimal flood hazard, and is therefore not anticipated to be impacted by flooding.
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 &amp; 58.5</b>		
<b>Clean Air</b>  Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	Yes    No <input checked="" type="checkbox"/> <input type="checkbox"/>	Based on data gathered by the State of Hawai'i DOH Clean Air Branch, the entire State of Hawai'i is in compliance (attainment) for all the above criteria

		<p>pollutants, except on the Big Island during times of naturally occurring impacts from volcanic activity. There is a DOH air quality measurement station in Niualu, within the vicinity of the project area near Nawiliwili Harbor.</p> <p>Dust would be generated on a short-term basis during construction site work. In order to mitigate airborne dust (particulate matter) impacts to the surrounding environment, all construction activities would need to adhere to County of Kaua'i DPW Interim Construction Best Management Practices (BMPs) for Sediment and Erosion Control. BMPs include watering active work areas and unpaved work roads; use of dust fences; establishment of a routine road cleaning and tire washing program; establishment of landscaping or hardened surface early in the construction schedule; and monitoring dust at the project boundary during construction (COK, 2004). With these mitigation measures in place there would be no significant impact to air quality from the proposed action during construction. Once completed, it is not anticipated that there would be any significant long-term air quality impacts from the operation of the proposed development since the water system operations would not include any significant source of dust or other air emissions.</p>
<p><b>Coastal Zone Management</b></p> <p>Coastal Zone Management Act, sections 307(c) &amp; (d)</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>While the entire State of Hawai'i is located within the designated coastal zone, the project site is not located in the coastal area/Special Management Area (SMA), and is well outside the Tsunami Evacuation Zone.</p>
<p><b>Contamination and Toxic Substances</b></p> <p>24 CFR Part 50.3(i) &amp; 58.5(i)(2)</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>During construction of the proposed water system improvements, non-hazardous green waste and native soil will be disturbed from grading activities.</p>



Construction materials, such as concrete, pumps, and prefabricated metal. Construction vehicles and earth moving equipment fueled by petroleum products will be used onsite. The contractor would need to conduct regular inspections and maintenance of vehicles and equipment to assure that no petroleum spills or leaks occur. Any excess green waste, soil and construction materials generated onsite will be recycled or properly disposed at the Kekaha Landfill or another approved facility in accordance with County rules.

Since the project site has been used for commercial agricultural fields, it is possible that soils onsite may contain elevated levels of pesticides and/or arsenic. It is recommended that site soils be tested for arsenic and pesticides prior to land disturbance, if not completed previously, in order to determine if any residual chemical contamination is present in soil. If soil is shown to contain elevated levels of these target chemicals, worker and environmental protection measures must be implemented in accordance with DOH and OSHA rules.

Once in operation, the water tank and booster pumps would not generate or store any significant quantities of hazardous materials. Small quantities of petroleum, paints and coatings may be utilized by County maintenance staff. All potentially hazardous materials would need to be properly stored out of the sun/elements in flammable lockers within secure designated areas. The facility would not generate any significant quantity of solid waste. There would be no significant short-term or long-term impacts to the affected

		environment from solid or hazardous waste.
<p><b>Endangered Species</b></p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>A field survey of the project area was conducted by a trained biologist. The field survey methodology included inspection of the project site and recordation of the existing plant and animal species and/or species habitats observed. The survey found that vegetation at the project area is dominated by introduced (non-native) plant species. Coffee plantation and weedy scrub species dominate the site. Two native plant species were documented at the project site, both questionably indigenous; pōpolo and ‘uhaloa. Both of these species are considered widespread throughout the Hawaiian Islands. A total of 12 bird species, representing 8 separate families, were recorded during the station count. Avian diversity and densities were in keeping with the location and vegetation present within the study site. Three species—Scaly-breasted munia (<i>Lonchura punctulata</i>), Zebra Dove (<i>Geopelia striata</i>), and Cattle Egret (<i>Bulbucus ibis</i>) were the most abundant species observed. No terrestrial mammalian species were detected during this survey. It is most likely that non-native animals such as dogs (<i>Canis lupus familiaris</i>), cats (<i>Felis catus</i>), and pigs (<i>Sus scrofa</i>) transit the general area from time to time. No federally or state protected species were observed in the project area during the biological survey. Although not observed in the project area during the survey, several federally or state listed animal species may occasionally occur in or traverse the project area. No designated critical habitat occurs in the project area</p>

		Mitigation measures to avoid impacts to protected species that may traverse the project site are included in section 2.4 of the EA.
<b>Explosive and Flammable Hazards</b>  24 CFR Part 51 Subpart C	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	Construction vehicles and equipment would utilize machinery fueled by flammable fuel (i.e., gasoline). Off-site fueling and safe fueling practices would mitigate any hazards from these flammable materials. Once in operation the main source of flammable materials would be county vehicles visiting the site for maintenance/operation of the water system, which does not represent a significant source of explosive or flammable hazards since vehicles would be fueled off-site.
<b>Farmlands Protection</b>  Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	Kaua'i Coffee Company coffee fields surround the proposed water tank area, and a small portion of the coffee fields would be taken for expansion of the project area parcel. However, this would not represent a significant impact to Kaua'i Coffee since the amount of land that would be taken out of use for the proposed project would be minimal. Therefore, the proposed development would not result in any impact to farmlands.
<b>Floodplain Management</b>  Executive Order 11988, particularly section 2(a); 24 CFR Part 55	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project site is not located within a floodplain. Several human-made irrigation ditches and the Kapa Reservoir are located in close proximity to the project site. These water resources would not be impacted by the proposed project since construction BMPs in compliance with Kaua'i County Building Code would be instituted during construction. Therefore, there would be no impact to floodplains, and the proposed development would have little to no risk of inundation. Further, the

		proposed water tank would be designed in accordance with County code to include any required drainage features such as drywells and stormwater swales/retention area.
<b>Historic Preservation</b>  National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	An archaeological survey was completed for the project site. No significant historical or cultural resources were found to be associated with the project site. Therefore, no archaeological monitoring, or other mitigation measures are recommended during construction of the proposed water tank, where ground disturbance is planned.
<b>Noise Abatement and Control</b>  Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	Based on the maximum generalized outdoor noise levels at the nearest residences to the project site ('Ele'ele Heights), the HDOH Community Noise Rule criteria is not anticipated to be exceeded during construction. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, and working during daylight hours.
<b>Sole Source Aquifers</b>  Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	There are no designated waterways protected under the Wild and Scenic Rivers Act in the State of Hawai'i. And there are no streams that run through the project site.
<b>Wetlands Protection</b>  Executive Order 11990, particularly sections 2 and 5	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	There are no designated wetlands located at the project site.
<b>Wild and Scenic Rivers</b>  Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	There are no designated waterways protected under the Wild and Scenic Rivers Act in the State of Hawai'i. And there are no streams that run through the project site.

ENVIRONMENTAL JUSTICE		
<p><b>Environmental Justice</b></p> <p>Executive Order 12898</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>The proposed project would result in the creation of short and long-term jobs for the local community. Construction jobs would be created during the construction of the proposed water tank and system upgrades. Once in operation, the facility may result in additional county jobs to manage the water system.</p> <p>The proposed project is not anticipated to result in any short or long-term adverse impacts to socioeconomic conditions since it would not cause loss of any jobs or housing, and would not result in tax revenue loss. The project would have beneficial economic and social impacts since it would result in job creation and potable water system improvements, resulting in more community resiliency.</p>

**Environmental Assessment Factors** [24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27]  
Recorded below is the qualitative and quantitative significance of the effects of the proposal on the character, features and resources of the project area. Each factor has been evaluated and documented, as appropriate and in proportion to its relevance to the proposed action. Verifiable source documentation has been provided and described in support of each determination, as appropriate. Credible, traceable and supportive source documentation for each authority has been provided. Where applicable, the necessary reviews or consultations have been completed and applicable permits of approvals have been obtained or noted. Citations, dates/names/titles of contacts, and page references are clear. Additional documentation is attached, as appropriate. **All conditions, attenuation or mitigation measures have been clearly identified.**

**Impact Codes:** Use an impact code from the following list to make the determination of impact for each factor.

- (1) Minor beneficial impact
- (2) No impact anticipated
- (3) Minor Adverse Impact – May require mitigation
- (4) Significant or potentially significant impact requiring avoidance or modification which may require an Environmental Impact Statement

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>LAND DEVELOPMENT</b>		
Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design	2	The project site is located within the State Agricultural land use district, and within the County Agricultural Zoning District. The project would be compatible with its State and County zoning designations since it represents vital infrastructure development that is allowed in both the State and County Agricultural districts.
Soil Suitability/ Slope/ Erosion/ Drainage/ Storm Water Runoff	2	<p>The project site is located in a flat buildable area. The proposed action would result in short-term less than significant impacts to soils during construction from grading and construction of the water tank. Soils would be temporarily excavated and stockpiled onsite during the construction period. Exposed soils are susceptible to erosion, especially if it rains heavily during site work periods.</p> <p>Adverse impacts from soil erosion and runoff would be minimized as a result of erosion and sedimentation control measures that would be implemented during construction. Proposed construction would need to comply with Kaua'i County BMP standards addressing soil and erosion control (e.g., silt fencing, covering and protecting soil stockpiles with tarps and filter socks, surface revegetation as soon as possible). These mitigation measures would minimize soil migration from the proposed construction area. The topography of the project site would remain similar to existing conditions following construction.</p> <p>Once completed, the proposed development would include a small amount of hardened surfaces for the building slab under the water tank, driveway and parking area. All hardened surfaces would need appropriate drainage features in compliance with County code (i.e., drywells, swales and drainage culverts). As a result, soil and topography impacts are anticipated to be short-term and insignificant.</p>
Hazards and Nuisances including Site Safety and Noise	2	During construction of the proposed development, non-hazardous green waste and native soil will be generated from grading activities. Construction materials, such as concrete, paints and coatings will also be used onsite during construction. Construction vehicles and earth

	<p>moving equipment fueled by petroleum products will be used onsite. The contractor would need to conduct regular inspections and maintenance of vehicles and equipment to assure that no petroleum spills or leaks occur. Any excess green waste, soil and construction materials generated onsite will be recycled or properly disposed at the Kekaha Landfill or another approved facility in accordance with County rules.</p> <p>Once in operation the main source of flammable materials would be county vehicles visiting the site for maintenance/operation of the water system, which does not represent a significant source of explosive or flammable hazards since vehicles would be fueled off-site.</p> <p>The site has been used for commercial croplands. Former commercial croplands in Hawaii have been known to contain elevated levels of lead, arsenic and organochlorine pesticides. It is recommended that site soils be tested for these target constituents prior to land disturbance, if not completed previously, in order to determine if any residual chemical contamination is present in soil. If soil is shown to contain elevated levels of these target chemicals, worker and environmental protection measures must be implemented in accordance with DOH and OSHA rules.</p> <p>Under the proposed action, short-term noise impacts from construction activities would occur. Development of the project site would involve excavation, grading, and use of other typical mechanized construction equipment/tools. Based on the maximum generalized outdoor noise levels at the nearest residences across the street from the project site, HDOH Community Noise Rule criteria will not likely be exceeded during construction of the project. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc.</p>
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Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>SOCIOECONOMIC</b>		
Employment and Income Patterns	1	<p>The proposed project would result in the creation of short-term jobs for the local community. Construction jobs would be created during the construction of the proposed development.</p> <p>The proposed project is not anticipated to result in any short or long-term adverse impacts to socioeconomic conditions since it would not cause loss of any jobs or housing, and would not result in tax revenue loss. The project would have</p>

		beneficial economic and social impacts since it would result in increased potable water supply storage for the affected community.
Demographic Character Changes, Displacement	2	The proposed project would not result in direct significant demographic character changes or displacement.
Environmental Justice	1	The proposed project would result in the creation of short and long-term jobs for the local community.  The proposed project is not anticipated to result in any short or long-term adverse impacts to socioeconomic conditions since it would not cause loss of any jobs or housing, and would not result in tax revenue loss. The project would have beneficial social impacts since it would result in increased resiliency for the local community.

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>COMMUNITY FACILITIES AND SERVICES</b>		
Educational and Cultural Facilities	2	The proposed project is not anticipated to adversely impact any existing educational or cultural facilities.
Commercial Facilities	2	The proposed project is not anticipated to adversely impact any existing commercial facilities.
Health Care and Social Services	2	The project would not impact any health care or social services.
Solid Waste Disposal / Recycling	2	During construction of the proposed development, non-hazardous green waste and native soil will be generated from grading activities. Construction materials will also be used onsite during construction. Construction vehicles and earth moving equipment fueled by petroleum products will be used onsite. The contractor would need to conduct regular inspections and maintenance of vehicles and equipment to assure that no petroleum spills or leaks occur. Any excess green waste, soil and construction materials generated onsite will be recycled or properly disposed at the Kekaha Landfill or another approved facility in accordance with County rules.



		<p>Once in operation, the proposed water system facility would not generate any solid or potentially hazardous waste. All solid waste would be properly collected by municipal solid waste service and disposed at the Kekaha Landfill. There would be no significant short-term or long-term impacts to the affected environment from solid waste.</p>
Waste Water / Sanitary Sewers	2	<p>A private wastewater septic tank is present at the project site, within the pump house that services one bathroom used by County Department of Water maintenance workers onsite. There are no additional planned wastewater utility upgrades as part of the proposed action</p>
Water Supply	2	<p>The project site includes a municipal potable water system. There is one potable water supply line present at the project site that services the bathroom at the pump house.</p>
Public Safety - Police, Fire and Emergency Medical	2	<p>The nearest police station to the project site is located approximately 8.2 miles to the west at: 3990 Ka'ana Street Līhu'e, HI 96766. The nearest fire station is located approximately 3.3 miles to the east at: 2 Kaumualii Hwy, Kalaheo, HI 96741. The nearest emergency medical facility is located approximately 8.5 miles to the west at: 4643 Waimea Canyon Dr, Waimea, HI 96796. The proposed water system upgrades would not have a any impact on police, fire or emergency medical services in the area.</p>
Parks, Open Space and Recreation	2	<p>The proposed action is not proposed in an area that includes any open space or recreational areas, such as parks or playgrounds. Therefore, there would be no impact to open space or recreational resources.</p>
Transportation and Accessibility	2	<p>The proposed project would not displace or affect any existing transportation corridors or access to any bus stops, roads or pedestrian pathways.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>NATURAL FEATURES</b>		
Unique Natural Features, Water Resources	2	The project site does not include any unique natural features, such as streams, springs, or hills.
Vegetation, Wildlife	2	Vegetation at the project area is dominated by introduced (non-native) plant species. Coffee plantation and weedy scrub species dominate the site. Two native plant species were documented at the project site, both questionably indigenous; pōpolo and 'uhaloa. Both of these species are considered widespread throughout the Hawaiian Islands. No federally or state listed species were observed in the project area during the survey. Although not observed in the project area during the survey, several federally or state listed animal species may occasionally occur in or traverse the project area. Mitigation measures to protect these biological resources are included in Section 2.4 of the EA, and later in this HUD ER.
Other Factors	2	Not applicable.

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>CLIMATE AND ENERGY</b>		
Climate Change Impacts	2	There are no anticipated significant impacts to climate change from the proposed project, since the construction period would be temporary and there are no significant emissions from the operation of the proposed water system facility.
Energy Efficiency	2	The proposed facility would be built using modern practices and materials in accordance with County building code.

**Additional Studies Performed:**

Biological Resources Survey  
Archaeological Survey  
Lima Ola Water Master Plan

**Field Inspection** (Date and completed by):

February 27, 2024. Completed by Max Solmssen – Kaimana Environmental Solutions LLC

**List of Sources, Agencies and Persons Consulted** [40 CFR 1508.9(b)]:

See Table 1, and Appendix E of the EA for Agencies and Persons Consulted

**Sources:**

CPE, 2016. Lima Ola Work Force Housing Development Final Environmental Assessment-Finding of No Significant Impact. June 2016. Prepared by Community Planning and Engineering, Inc.

CPE, 2019. Water Master Plan for Lima Ola Workforce Housing Development, 'Ele'ele, Kaua'i, Hawai'i. May 2019. Prepared by Community Planning and Engineering, Inc.

COK, 2004. Interim Construction Best Management Practices (BMP'S) for Sediment and Erosion Control for the County of Kaua'i. April 2, 2004.

DOH, 2024. DOH Clean Air Branch air quality data. Accessed at:

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DOH, 2014. Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 54 Water Quality Standards. November 15, 2014.

FEMA, 2024. FEMA Flood Maps Service Center. Accessed at:

<https://msc.fema.gov/portal/home>

Fletcher et. al, 2002. Fletcher III, Charles H., et. al. 2002. Atlas of Natural Hazards in the Hawaiian Coastal Zone. Geologic Investigation Series I-2761, O'ahu. United States Geological Survey).

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

Giambelluca et. al, 2014. Giambelluca, T.W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger. 2014. Evapotranspiration of Hawai'i. Final report submitted to the U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawai'i.

IPCC, 2022. AR6 Synthesis Report: Climate Change 2022. Accessed at: [www.ipcc.ch/report/sixth-assessment-report-cycle/](http://www.ipcc.ch/report/sixth-assessment-report-cycle/)

LeGrande, 2024. A Natural Resources Assessment of the Proposed Lima Ola Subdivision Off-Site Water System Improvements, 'Ele'ele Island of Kaua'i. June 20, 2024. Prepared by LeGrande Biological Surveys Inc.

Macdonald et al., 1960. Geology and Groundwater Resources of the Island Of Kauai, Hawaii

Mink and Lau, 1990. John. F. Mink and L. Stephen Lau, Aquifer Identification and Classification for Maui: Groundwater Protection Strategy for Hawai'i, Technical Report No. 185. February, 1990.

NOAA, 2023. National Oceanic and Atmospheric Administration Tsunami Evacuation Map. Accessed at: [tsunami.coast.noaa.gov](http://tsunami.coast.noaa.gov).

USDA, 2024. United States Department of Agriculture, National Resources Conservation Service Web Soil Survey.

PacIOOS, 2023. Pacific Islands Ocean Observing System. Accessed at: [www.pacioos.Hawai'i.edu/shoreline/slr-Hawai'i/](http://www.pacioos.Hawai'i.edu/shoreline/slr-Hawai'i/)

Pacific Legacy, 2024. Literature Review and Field Inspection for the Proposed Off-Site Water System Improvements Project for the Lima Ola Subdivision, 'Ele'ele, Hanapēpē Ahupua'a, Kona Moku, Kaua'i Island. March 2024.

SOEST, 2023. University of Hawai'i School of Ocean and Earth Science and Technology, Coastal Geology Group. <http://www.soest.Hawai'i.edu>.

US Census Bureau, 2023. US Census Bureau Data. Accessed at: [census.gov](http://census.gov).

USFWS, 2024. United States Fish and Wildlife Service National Wetlands Inventory Mapper

### **List of Permits to be Obtained:**

HRS 343 Compliance  
HRS 6E Compliance  
County Grubbing and Grading Permit  
County Building Permit  
NEPA Compliance

### **Public Outreach [24 CFR 50.23 & 58.43]:**

A 30-day public comment period will commence upon publication of the draft EA in the State Environmental Notice. A public meeting to discuss the project may be held during the 30-day public comment period, if deemed necessary by the County. Comments and input gathered during the 30-day public comment period will be presented and addressed in the final environmental decision document.

### **Cumulative Impact Analysis [24 CFR 58.32]:**

The proposed water service infrastructure upgrades are planned as part of the Kaua'i County Housing Agency Lima Ola Affordable Housing Development, which is a stand alone project being initiated based on the needs of the community. The proposed action would represent an incremental increase in long-term resource use. However, the proposed action would not represent a significant source of greenhouse gas emissions. There are no significant adverse cumulative impacts anticipated from the proposed action.

### **Alternatives [24 CFR 58.40(e); 40 CFR 1508.9]**

**Alternative 2: Reduced System Upgrades** – Under Alternative 2, the proposed water system upgrades would include an increase in booster pumping capacity of the existing system, but no development of a new water storage tank. This alternative was eliminated from further consideration since it would not fulfill the project purpose and need to deliver adequate potable water supply storage to the affected community.

**Alternative 3 (Proposed Action)** –The proposed water system upgrades would be implemented as planned; which would include a new water storage tank and upsizing of two existing booster pumps. Alternative 3 was carried forward for analysis in this EA since it best fulfills the project purpose and need to provide the required water supply to the affected community.

### **No Action Alternative [24 CFR 58.40(e)]:**

**Alternative 1: No Action** – Under Alternative 1, the proposed water system upgrades would not be implemented. Although the no action alternative does not address the

project purpose and need, it was carried forward for analysis in the EA in compliance with the provisions of NEPA.

**Summary of Findings and Conclusions:**

Based on the research, studies and outreach conducted as part of this Environmental Assessment, it is determined that the proposed project would not result in a significant environmental impact. Therefore, a finding of no significant impact (FONSI) is anticipated for this project.

**Mitigation Measures and Conditions [40 CFR 1505.2(c)]**

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure
Air Quality	In order to mitigate airborne dust (particulate matter) impacts to the surrounding environment, all construction activities would need to adhere to County of Kaua'i DPW Interim Construction Best Management Practices (BMPs) for Sediment and Erosion Control.
Soils and Erosion	Adverse impacts from soil erosion and runoff would be minimized as a result of erosion and sedimentation control measures that would be implemented during construction. Proposed construction would need to comply with Kaua'i County BMP standards addressing soil and erosion control (e.g., silt fencing, covering and protecting soil stockpiles with tarps and filter socks, surface revegetation as soon as possible) (COK, 2004).
Noise	The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. Work hours should be kept to daylight hours only.
Biological Resources	Establish a wildlife education and observation program for all construction and operational

personnel. Staff should be trained to identify listed wildlife that may be found on-site (including listed waterbirds and seabirds, and the Hawaiian goose) and to take appropriate steps if listed wildlife species are found.

If downed listed species are observed at the project area, notify USFWS and DOFAW. Implement speed limits on site to reduce the risk of collision to listed wildlife.

### ***Nēnē***

Nēnē geese were not observed within the project area or in the general surrounding areas. The habitat is not conducive for foraging and/or loafing. Generally human impacts to this species revolve around vehicular interactions, human feeding, and disturbance to nesting birds, eggs, chicks, and goslings. These potential threats can be minimized to the maximum extent practicable by implementing the following minimization measures:

- Don't feed birds especially if they approach for handouts.
- Secure all food rubbish in close trash receptacles.
- Establish a 15 mile an hour speed limit within the site.

### ***Listed Water Birds***

None of the four extant endemic endangered waterbird species or subspecies were observed at the project site. They are Hawaiian Duck, Hawaiian Coot (*Fulica alai*), the Hawaiian endemic subspecies of both the Common Gallinule, and the Black-necked Stilt. The drainage canal to the southwest of the project site was surveyed for any signs of these species as irrigation canals are often used for foraging, loafing and possibly nesting by these species. No waterbirds were observed within or near the project area during the survey. Potential human impacts to these four species during clearing and grubbing are the same as those posed by these activities to Nēnē.

### ***Listed Seabirds***

It is likely that the endangered Hawaiian Petrel, Band-rumped Storm-Petrel (*Hydrobates castro*), and the threatened Newell's Shearwater (*Puffinus newelli*) over-fly the project area between April and the middle of December each year in small numbers. The primary cause of mortality in Hawaiian Petrels, Newell's Shearwaters and Band-rumped Storm- Petrels in Hawai'i is thought to be predation by alien mammalian species at the nesting colonies. Collision with manmade structures is considered the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with man-made structures and, if not killed outright, become easy targets of opportunity for feral mammals. These species have been recovered along roadways and in facilities adjacent to the project area. No suitable nesting habitat exists within or close to the project area for any of these three seabird species. The principal potential impact that current habitat modifications or changes pose to protected seabirds is an increased threat that birds will be downed after becoming disoriented by lights. The two ways outdoor lighting can pose a threat to nocturnally flying seabirds is if: 1) during construction it is deemed expedient or necessary to conduct nighttime construction activities; or, 2) following build-out, security lighting is operated during the seabird nesting season.

If night-time construction activity or equipment maintenance is proposed during any construction phases of the project, all associated lights should be shielded, and when large flood/work lights are used, they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground. Deleterious impacts to transiting seabirds can be avoided if construction occurs during daylight hours and all outdoor lighting installed is fully "dark sky compliant" in accordance with State DLNR definitions. DLNR recommends



avoiding construction-related nighttime lighting between September 15 and December 15.

***Hawaiian Hoary Bat***

It is probable that the 'ōpe'ape'a – the endemic Hawaiian hoary bat (*Lasiurus cinereus semotus*) overfly the project area on a seasonal basis as they are regularly recorded in the lowland areas on Kaua'i that still contain trees. The removal of coffee trees within the project area should not have adverse affects on bats as they are all smaller in stature than the typical tree size that bats utilize for roosting. As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. However, during the pupping season, females carrying their pups may be less able to vacate a roost site if the tree is felled. Further, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled. Potential adverse impacts from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 m (15 ft) between June 1 and September 15, the period in which bats may have pups. Do not use barbed wire fencing.

***Coconut rhinoceros beetle***

The Coconut rhinoceros beetle (*Oryctes rhinoceros*) is an invasive beetle species from South East Asia that has become established on O'ahu and is now spreading to other Islands in Hawai'i. The beetles feed on palm species and are a threat to our coconut trees as well as native Pritchardia species and other ornamental palms. The Coconut Rhinoceros Beetle Response ([crbhawaii.org](http://crbhawaii.org)) recommends best management practices including limiting mulch, compost, and decaying plant material build up in thick piles or layers as it creates breeding material for the beetle larvae. Spreading mulch 2 inches in depth or less helps to keep the material dry which is not favorable for the beetle larvae.

Water Quality	In order to mitigate sediment and other pollutant runoff from construction activities, the contractor will be required to install and maintain construction BMPs in compliance with Kaua'i County BMP standards. Stormwater BMPs include, but are not limited to; sediment basins/ traps; filter fabric silt fences; straw bale, sandbag, or gravel bag barriers; stormwater drain inlet protection, and stabilized construction entrances (COK, 2004). The project will also comply with State water quality regulations HAR Chapters 11-54 and 11-55.
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**Determination:**

**Finding of No Significant Impact** [24 CFR 58.40(g)(1); 40 CFR 1508.27]  
 The project will not result in a significant impact on the quality of the human environment.

**Finding of Significant Impact** [24 CFR 58.40(g)(2); 40 CFR 1508.27]  
 The project may significantly affect the quality of the human environment.

Preparer Signature:  Date: 9/23/2024

Name/Title/Organization: Max Solmssen/Environmental Planner/  
 Kaimana Environmental Solutions LLC

Certifying Officer Signature:  Date: 9/25/24

Name/Title: Derek Kawakami / Kaua'i County Mayor

This original, signed document and related supporting material must be retained on file by the Responsible Entity in an Environmental Review Record (ERR) for the activity/project (ref: 24 CFR Part 58.38) and in accordance with recordkeeping requirements for the HUD program(s).

# Partner Worksheets



**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT**  
WASHINGTON, DC 20410-1000

This Worksheet was designed to be used by those “Partners” (including Public Housing Authorities, consultants, contractors, and nonprofits) who assist Responsible Entities and HUD in preparing environmental reviews, but legally cannot take full responsibilities for these reviews themselves. Responsible Entities and HUD should use the RE/HUD version of the Worksheet.

## **Air Quality (CEST and EA) – PARTNER**

<https://www.hudexchange.info/environmental-review/air-quality>

- 1. Does your project include new construction or conversion of land use facilitating the development of public, commercial, or industrial facilities OR five or more dwelling units?**

Yes → *Continue to Question 2.*

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Provide any documents used to make your determination.*

- 2. Is your project’s air quality management district or county in non-attainment or maintenance status for any criteria pollutants?**

Follow the link below to determine compliance status of project county or air quality management district:

<http://www.epa.gov/oaqps001/greenbk/>

No, project’s county or air quality management district is in attainment status for all criteria pollutants

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.*

Yes, project’s management district or county is in non-attainment or maintenance status for one or more criteria pollutants. → *Continue to Question 3.*

- 3. Determine the estimated emissions levels of your project for each of those criteria pollutants that are in non-attainment or maintenance status on your project area. Will your project exceed any of the *de minimis* or *threshold* emissions levels of non-attainment and maintenance level pollutants or exceed the screening levels established by the state or air quality management district?**

No, the project will not exceed *de minimis* or threshold emissions levels or screening levels

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Explain how you determined that the project would not exceed de minimis or threshold emissions.*

Yes, the project exceeds *de minimis* emissions levels or screening levels.

→ *Continue to Question 4. Explain how you determined that the project would not exceed de minimis or threshold emissions in the Worksheet Summary.*

- 4. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.**

[Click here to enter text.](#)

### **Worksheet Summary**

Dust would be generated on a short-term basis during construction site work. In order to mitigate airborne dust (particulate matter) impacts to the surrounding environment, all construction activities would need to adhere to County of Kaua'i DPW Interim Construction Best Management Practices (BMPs) for Sediment and Erosion Control. BMPs include watering active work areas and unpaved work roads; use of dust fences; establishment of a routine road cleaning and tire washing program; establishment of landscaping or hardened surface early in the construction schedule; and monitoring dust at the project boundary during construction. With these mitigation measures in place there would be no significant impact to air quality from the proposed action during construction. Once completed, it is not anticipated that there would be any significant long-term air quality impacts from the operation of the proposed development since there would be no significant source of dust or other air emissions during operation of the development.



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WASHINGTON, DC 20410-1000

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## **Airport Hazards (CEST and EA) – PARTNER**

<https://www.hudexchange.info/environmental-review/airport-hazards>

**1. To ensure compatible land use development, you must determine your site’s proximity to civil and military airports. Is your project within 15,000 feet of a military airport or 2,500 feet of a civilian airport?**

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within the applicable distances to a military or civilian airport.*

Yes → *Continue to Question 2.*

**2. Is your project located within a Runway Potential Zone/Clear Zone (RPZ/CZ) or Accident Potential Zone (APZ)?**

Yes, project is in an APZ → *Continue to Question 3.*

Yes, project is an RPZ/CZ → *Project cannot proceed at this location.*

No, project is not within an APZ or RPZ/CZ

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Continue to the Worksheet Summary below. Provide a map showing that the site is not within either zone.*

**3. Is the project in conformance with DOD guidelines for APZ?**

Yes, project is consistent with DOD guidelines without further action.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.*

No, the project cannot be brought into conformance with DOD guidelines and has not been approved. → *Project cannot proceed at this location.*

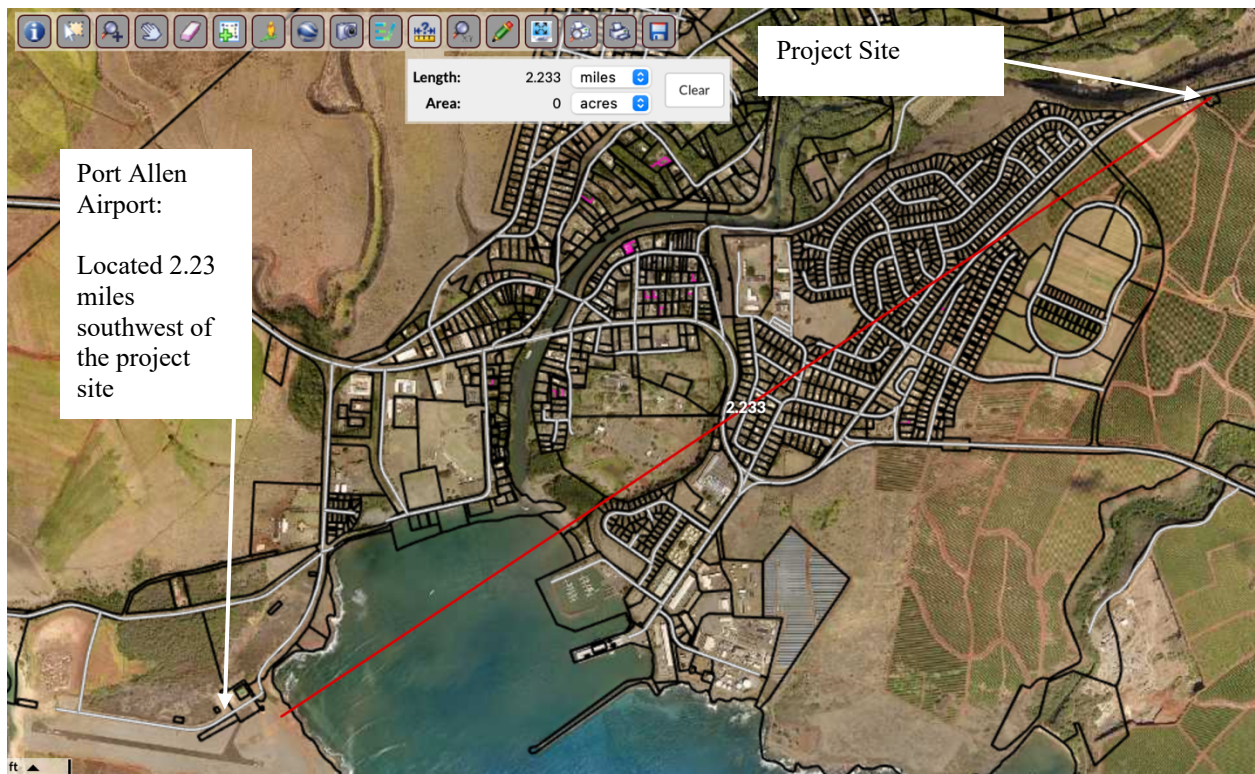
If mitigation measures have been or will be taken, explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.

[Click here to enter text.](#)

→ Work with the RE/HUD to develop mitigation measures. Continue to the Worksheet Summary below. Provide any documentation supporting this determination.

### Worksheet Summary

Below is a map showing the proximity to the nearest airport; Līhu‘e Airport, which is located approximately 2.23 miles southwest of the project site. There are no Military or other airports within the vicinity of the project site.





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WASHINGTON, DC 20410-1000

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## Coastal Barrier Resources (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/coastal-barrier-resources>

Projects located in the following states must complete this form.

Alabama	Georgia	Massachusetts	New Jersey	Puerto Rico	Virgin Islands
Connecticut	Louisiana	Michigan	New York	Rhode Island	Virginia
Delaware	Maine	Minnesota	North Carolina	South Carolina	Wisconsin
Florida	Maryland	Mississippi	Ohio	Texas	

### 1. Is the project located in a CBRS Unit?

- No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within a CBRS Unit.*
- Yes → *Continue to 2.*

Federal assistance for most activities may not be used at this location. You must either choose an alternate site or cancel the project. In very rare cases, federal monies can be spent within CBRS units for certain exempted activities (e.g., a nature trail), after consultation with the Fish and Wildlife Service (FWS) (see [16 USC 3505](#) for exceptions to limitations on expenditures).

### 2. Indicate your recommended course of action for the RE/HUD

- Consultation with the FWS
- Cancel the project

## Worksheet Summary

**Include all documentation supporting your findings in your submission to HUD.**

The project site is located on the Island of Kaua’i, within the State of Hawai’i, which is not included in the above table. See location map on the following page.





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## Coastal Zone Management Act (CEST and EA) – PARTNER

<https://www.onecpd.info/environmental-review/coastal-zone-management>

Projects located in the following states must complete this form.

Alabama	Florida	Louisiana	Mississippi	Ohio	Texas
Alaska	Georgia	Maine	New Hampshire	Oregon	Virgin Islands
American Samona	Guam	Maryland	New Jersey	Pennsylvania	Virginia
California	Hawaii	Massachusetts	New York	Puerto Rico	Washington
Connecticut	Illinois	Michigan	North Carolina	Rhode Island	Wisconsin
Delaware	Indiana	Minnesota	Northern Mariana Islands	South Carolina	

**1. Is the project located in, or does it affect, a Coastal Zone as defined in your state Coastal Management Plan?**

Yes → Continue to Question 2.

No → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing that the site is not within a Coastal Zone.

**2. Does this project include activities that are subject to state review?**

Yes → Continue to Question 3.

No → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination.

**3. Has this project been determined to be consistent with the State Coastal Management Program?**

Yes, with mitigation. → The RE/HUD must work with the State Coastal Management Program to develop mitigation measures to mitigate the impact or effect of the project.

Yes, without mitigation. → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination.

No → Project cannot proceed at this location.

## **Worksheet Summary**

**Include all documentation supporting your findings in your submission to HUD.**

All of the islands of Hawai'i are located within the Coastal Zone, as defined in the CZM Act of 1972 and HRS Chapter 205A. However, the project site is not located within the Special Management (SMA) / shoreline area. Therefore, there are no anticipated impacts to coastal resources from the proposed project.



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## Contamination and Toxic Substances (Multifamily and Non-Residential Properties) – PARTNER

<https://www.hudexchange.info/programs/environmental-review/site-contamination>

**1. How was site contamination evaluated?<sup>1</sup> Select all that apply.**

- ASTM Phase I ESA
- ASTM Phase II ESA
- Remediation or clean-up plan
- ASTM Vapor Encroachment Screening
- None of the above

→ Provide documentation and reports and include an explanation of how site contamination was evaluated in the Worksheet Summary.

Continue to Question 2.

**2. Were any on-site or nearby toxic, hazardous, or radioactive substances found that could affect the health and safety of project occupants or conflict with the intended use of the property? (Were any recognized environmental conditions or RECs identified in a Phase I ESA and confirmed in a Phase II ESA?)**

- No → Explain below.

The project site is undeveloped. The project site has been used in the long-term for commercial croplands. Testing of soil prior to disturbance for worker safety is recommended.

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.

- Yes → Describe the findings, including any recognized environmental conditions (RECs), in Worksheet Summary below. Continue to Question 3.

**3. Can adverse environmental impacts be mitigated?**

---

<sup>1</sup> HUD regulations at 24 CFR § 58.5(i)(2)(ii) require that the environmental review for multifamily housing with five or more dwelling units or non-residential property include the evaluation of previous uses of the site or other evidence of contamination on or near the site. For acquisition and new construction of multifamily and nonresidential properties HUD strongly advises the review include an ASTM Phase I Environmental Site Assessment (ESA) to meet real estate transaction standards of due diligence and to help ensure compliance with HUD’s toxic policy at 24 CFR §58.5(i) and 24 CFR §50.3(i). Also note that some HUD programs require an ASTM Phase I ESA.

Adverse environmental impacts cannot feasibly be mitigated → HUD assistance may not be used for the project at this site. Project cannot proceed at this location.

Yes, adverse environmental impacts can be eliminated through mitigation.  
→ *Provide all mitigation requirements<sup>2</sup> and documents. Continue to Question 4.*

**4. Describe how compliance was achieved. Include any of the following that apply: State Voluntary Clean-up Program, a No Further Action letter, use of engineering controls<sup>3</sup>, or use of institutional controls<sup>4</sup>.**

No known contamination exists at the project site. Soil testing prior to disturbance is recommended based on current and historical land use for commercial agricultural croplands. If soil is determined to contain contaminants at significant concentrations, appropriate controls in accordance with DOH rules will need to be implemented (i.e., Environmental Hazard Management Plans for construction and long-term use, engineering/institutional controls).

**If a remediation plan or clean-up program was necessary, which standard does it follow?**

- Complete removal  
 Risk-based corrective action (RBCA)

→ *Continue to the Worksheet Summary.*

### **Worksheet Summary**

**Include all documentation supporting your findings in your submission to HUD.**

The project site is located in and adjacent to agricultural fields. Besides potential pesticides and metals from potential past soil treatment, there is no evidence of toxic substances present at the project site.

---

<sup>2</sup> Mitigation requirements include all clean-up actions required by applicable federal, state, tribal, or local law. Additionally, provide, as applicable, the long-term operations and maintenance plan, Remedial Action Work Plan, and other equivalent documents.

<sup>3</sup> Engineering controls are any physical mechanism used to contain or stabilize contamination or ensure the effectiveness of a remedial action. Engineering controls may include, without limitation, caps, covers, dikes, trenches, leachate collection systems, signs, fences, physical access controls, ground water monitoring systems and ground water containment systems including, without limitation, slurry walls and ground water pumping systems.

<sup>4</sup> Institutional controls are mechanisms used to limit human activities at or near a contaminated site, or to ensure the effectiveness of the remedial action over time, when contaminants remain at a site at levels above the applicable remediation standard which would allow for unrestricted use of the property. Institutional controls may include structure, land, and natural resource use restrictions, well restriction areas, classification exception areas, deed notices, and declarations of environmental restrictions.



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## Endangered Species Act (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/endangered-species>

### 1. Does the project involve any activities that have the potential to affect species or habitats?

No, the project will have No Effect due to the nature of the activities involved in the project.

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.

No, the project will have No Effect based on a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office.

**Explain your determination:**

[Click here to enter text.](#)

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.

Yes, the activities involved in the project have the potential to affect species and/or habitats. → Continue to Question 2.

### 2. Are federally listed species or designated critical habitats present in the action area?

Obtain a list of protected species from the Services. This information is available on the [FWS Website](#).

No, the project will have No Effect due to the absence of federally listed species and designated critical habitat.

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination. Documentation may include letters from the Services, species lists from the Services’ websites, surveys or other documents and analysis showing that there are no species in the action area.

Yes, there are federally listed species or designated critical habitats present in the action area. → Continue to Question 3.

**3. Recommend one of the following effects that the project will have on federally listed species or designated critical habitat:**

No Effect: Based on the specifics of both the project and any federally listed species in the action area, you have determined that the project will have absolutely no effect on listed species or critical habitat.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination. Documentation should include a species list and explanation of your conclusion, and may require maps, photographs, and surveys as appropriate.*

May Affect, Not Likely to Adversely Affect: Any effects that the project may have on federally listed species or critical habitats would be beneficial, discountable, or insignificant.

→ Partner entities should not contact the Services directly. *If the RE/HUD agrees with this recommendation, they will have to complete Informal Consultation. Provide the RE/HUD with a biological evaluation or equivalent document. They may request additional information, including surveys and professional analysis, to complete their consultation.*

Likely to Adversely Affect: The project may have negative effects on one or more listed species or critical habitat.

→ Partner entities should not contact the Services directly. *If the RE/HUD agrees with this recommendation, they will have to complete Formal Consultation. Provide the RE/HUD with a biological evaluation or equivalent document. They may request additional information, including surveys and professional analysis, to complete their consultation.*

**Worksheet Summary**

**Include all documentation supporting your findings in your submission to HUD.**

A biological survey was completed for the project site. The study concluded that the project site does not include any endangered or protected species habitat. Protected avian species may traverse the project site. Mitigation measures to avoid impacts to these species are presented in the HUD ER report.



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## Environmental Justice (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/environmental-justice>

**HUD strongly encourages starting the Environmental Justice analysis only after all other laws and authorities, including Environmental Assessment factors if necessary, have been completed.**

**1. Were any adverse environmental impacts identified in any other compliance review portion of this project’s total environmental review?**

Yes → *Continue to Question 2.*

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

**2. Were these adverse environmental impacts disproportionately high for low-income and/or minority communities?**

Yes

**Explain:**

Click here to enter text.

→ *The RE/HUD must work with the affected low-income or minority community to decide what mitigation actions, if any, will be taken. Provide any supporting documentation.*

No

**Explain:**

Click here to enter text.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

### Worksheet Summary

The proposed action includes upgrades of an existing public County municipal water system. No adverse impacts to low income or minority populations are anticipated as a result of the proposed action.





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**Explosive and Flammable Hazards (CEST and EA) – PARTNER**

<https://www.hudexchange.info/environmental-review/explosive-and-flammable-facilities>

- 1. Does the proposed HUD-assisted project include a hazardous facility (a facility that mainly stores, handles or processes flammable or combustible chemicals such as bulk fuel storage facilities and refineries)?**

No

→ Continue to Question 2.

Yes

**Explain:**

Click here to enter text.

→ Continue to Question 5.

- 2. Does this project include any of the following activities: development, construction, rehabilitation that will increase residential densities, or conversion?**

No → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.

Yes → Continue to Question 3.

- 3. Within 1 mile of the project site, are there any current *or planned* stationary aboveground storage containers:**

- Of more than 100-gallon capacity, containing common liquid industrial fuels OR
- Of any capacity, containing hazardous liquids or gases that are not common liquid industrial fuels?

No → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide all documents used to make your determination.

Yes → Continue to Question 4.

- 4. Is the Separation Distance from the project acceptable based on standards in the Regulation?**

Please visit HUD’s website for information on calculating Acceptable Separation Distance.

Yes

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.

*Provide map(s) showing the location of the project site relative to any tanks and your separation distance calculations. If the map identifies more than one tank, please identify the tank you have chosen as the “assessed tank.”*

No

*→ Continue to Question 6.*

*Provide map(s) showing the location of the project site relative to any tanks and your separation distance calculations. If the map identifies more than one tank, please identify the tank you have chosen as the “assessed tank.”*

**5. Is the hazardous facility located at an acceptable separation distance from residences and any other facility or area where people may congregate or be present?**

Please visit HUD’s website for information on calculating Acceptable Separation Distance.

Yes

*→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

*Provide map(s) showing the location of the project site relative to residences and any other facility or area where people congregate or are present and your separation distance calculations.*

No

*→ Continue to Question 6.*

*Provide map(s) showing the location of the project site relative to residences and any other facility or area where people congregate or are present and your separation distance calculations.*

**6. For the project to be brought into compliance with this section, all adverse impacts must be mitigated. Explain in detail the exact measures that must be implemented to make the Separation Distance acceptable, including the timeline for implementation. If negative effects cannot be mitigated, cancel the project at this location.**

Note that only licensed professional engineers should design and implement blast barriers. If a barrier will be used or the project will be modified to compensate for an unacceptable separation distance, provide approval from a licensed professional engineer.

[Click here to enter text.](#)

**Worksheet Summary**

There are no above-ground explosive tanks/containers within the vicinity of the project site.



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## Farmlands Protection (CEST and EA) - PARTNER

<https://www.hudexchange.info/environmental-review/farmlands-protection>

**1. Does your project include any activities, including new construction, acquisition of undeveloped land or conversion, that could convert agricultural land to a non-agricultural use?**

Yes → Continue to Question 2.

No

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.

**2. Does “important farmland,” including prime farmland, unique farmland, or farmland of statewide or local importance regulated under the Farmland Protection Policy Act, occur on the project site?**

You may use the links below to determine important farmland occurs on the project site:

- Utilize USDA Natural Resources Conservation Service’s (NRCS) Web Soil Survey <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- Check with your city or county’s planning department and ask them to document if the project is on land regulated by the FPPA (zoning important farmland as non-agricultural does not exempt it from FPPA requirements)
- Contact NRCS at the local USDA service center <http://offices.sc.egov.usda.gov/locator/app?agency=nrcs> or your NRCS state soil scientist [http://soils.usda.gov/contact/state\\_offices/](http://soils.usda.gov/contact/state_offices/) for assistance

No → If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide any documents used to make your determination.

Yes → Continue to Question 3.

**3. Consider alternatives to completing the project on important farmland and means of avoiding impacts to important farmland.**

- Complete form [AD-1006, “Farmland Conversion Impact Rating”](#) and contact the state soil scientist before sending it to the local NRCS District Conservationist.
- Work with NRCS to minimize the impact of the project on the protected farmland. When you have finished with your analysis, return a copy of form AD-1006 to the USDA-NRCS State Soil Scientist or his/her designee informing them of your determination.

**Work with the RE/HUD to determine how the project will proceed. Document the conclusion:**

Project will proceed with mitigation.

**Explain in detail the proposed measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.**

[Click here to enter text.](#)

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide form AD-1006 and all other documents used to make your determination.*

Project will proceed without mitigation.

**Explain why mitigation will not be made here:**

No mitigation is required since the project site includes a public municipal water project that would occupy a minimal footprint, that would not impact the adjacent commercial agricultural operation (Kaua'i Coffee Company).

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide form AD-1006 and all other documents used to make your determination.*

### **Worksheet Summary**

The project site is designated as prime farmlands by the USDA. However, the project site includes a public municipal water project that would occupy a minimal footprint, that would not impact the adjacent commercial agricultural operation (Kaua'i Coffee Company).



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## Flood Insurance (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/flood-insurance>

**1. Does this project involve mortgage insurance, refinance, acquisition, repairs, rehabilitation, or construction of a structure, mobile home, or insurable personal property?**

No. This project does not require flood insurance or is excepted from flood insurance.

→ Continue to the Worksheet Summary.

Yes → Continue to Question 2.

**2. Provide a FEMA/FIRM map showing the site.**

The Federal Emergency Management Agency (FEMA) designates floodplains. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs).

**Is the structure, part of the structure, or insurable property located in a FEMA-designated Special Flood Hazard Area?**

No → Continue to the Worksheet Summary.

Yes → Continue to Question 3.

**3. Is the community participating in the National Flood Insurance Program or has less than one year passed since FEMA notification of Special Flood Hazards?**

Yes, the community is participating in the National Flood Insurance Program.

Flood insurance is required. Provide a copy of the flood insurance policy declaration or a paid receipt for the current annual flood insurance premium and a copy of the application for flood insurance.

→ Continue to the Worksheet Summary.

Yes, less than one year has passed since FEMA notification of Special Flood Hazards.

If less than one year has passed since notification of Special Flood Hazards, no flood insurance is required.

→ Continue to the Worksheet Summary.

No. The community is not participating, or its participation has been suspended.

Federal assistance may not be used at this location. Cancel the project at this location.

**Worksheet Summary**

The project site is located in an area of minimal flood hazard (FEMA Zone X). See FEMA FIRMette map attached.

# National Flood Hazard Layer FIRMette



159°34'13"W 21°55'23"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature

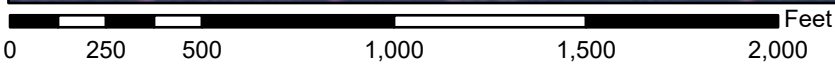
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **9/9/2024 at 6:09 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



1:6,000

159°33'36"W 21°54'50"N



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## Floodplain Management (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/floodplain-management>

1. Does [24 CFR 55.12\(c\)](#) exempt this project from compliance with HUD’s floodplain management regulations in Part 55?

Yes

Provide the applicable citation at 24 CFR 55.12(c) here. If project is exempt under 55.12(c)(6) or (8), provide supporting documentation.

[Click here to enter text.](#)

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Continue to the Worksheet Summary.

No → Continue to Question 2.

2. Provide a FEMA/FIRM map showing the site.

The Federal Emergency Management Agency (FEMA) designates floodplains. The [FEMA Map Service Center](#) provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs).

Does your project occur in a floodplain?

No → Continue to the Worksheet Summary below.

Yes

Select the applicable floodplain using the FEMA map or the best available information:

Floodway → Continue to Question 3, Floodways

Coastal High Hazard Area (V Zone) → Continue to Question 4, Coastal High Hazard Areas

500-year floodplain (B Zone or shaded X Zone) → Continue to Question 5, 500-year Floodplains

100-year floodplain (A Zone) → The 8-Step Process is required. Continue to Question 6, 8-Step Process

3. Floodways

Is this a functionally dependent use?

Yes



The 8-Step Process is required. Work with HUD or the RE to assist with the 8-Step Process.  
→ Continue to Worksheet Summary.

- No → *Federal assistance may not be used at this location unless an exception in 55.12(c) applies. You must either choose an alternate site or cancel the project.*

**4. Coastal High Hazard Area**

**Is this a critical action such as a hospital, nursing home, fire station, or police station?**

- Yes → *Critical actions are prohibited in coastal high hazard areas unless an exception in 55.12(c) applies. You must either choose an alternate site or cancel the project.*

- No

**Does this action include new construction that is not a functionally dependent use, existing construction (including improvements), or reconstruction following destruction caused by a disaster?**

- Yes, there is new construction of something that is not a functionally dependent use.

New construction must be designed to FEMA standards for V Zones at 44 CFR 60.3(e) (24 CFR 55.1(c)(3)(i)).

→ Continue to Question 6, 8-Step Process

- No, this action concerns only existing construction.

Existing construction must have met FEMA elevation and construction standards for a coastal high hazard area or other standards applicable at the time of construction.

→ Continue to Question 6, 8-Step Process

**5. 500-year Floodplain**

**Is this a critical action?**

- No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Continue to the Worksheet Summary below.*

- Yes → Continue to Question 6, 8-Step Process

**6. 8-Step Process.**

**Is this 8-Step Process required? Select one of the following options:**

- 8-Step Process applies.

This project will require mitigation and may require elevating structure or structures. See the link to the HUD Exchange above for information on HUD's elevation requirements.

→ Work with the RE/HUD to assist with the 8-Step Process. Continue to Worksheet Summary.

- 5-Step Process is applicable per 55.12(a)(1-4).

**Provide the applicable citation at 24 CFR 55.12(a) here.**

Click here to enter text.

→ Work with the RE/HUD to assist with the 5-Step Process. Continue to Worksheet Summary.

- 8-Step Process is inapplicable per 55.12(b)(1-5).

**Provide the applicable citation at 24 CFR 55.12(b) here.**

Click here to enter text.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

**Worksheet Summary**

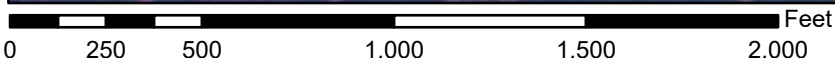
Provide a full description of your determination and a synopsis of the information that it was based on.

**See attached FEMA FIRMette**

# National Flood Hazard Layer FIRMette



159°34'13"W 21°55'23"N



1:6,000

159°33'36"W 21°54'50"N

Basemap Imagery Source: USGS National Map 2023

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |  |  |
|------------------------------------|--|--|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  |  | Without Base Flood Elevation (BFE)<br><i>Zone A, V, A99</i>  |
|                                    |  | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>   |
|                                    |  | Regulatory Floodway  |
| <b>OTHER AREAS OF FLOOD HAZARD</b> |  | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
|                                    |  | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>  |
|                                    |  | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>  |
|                                    |  | Area with Flood Risk due to Levee <i>Zone D</i>  |
| <b>OTHER AREAS</b>                 |  | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>   |
|                                    |  | Effective LOMRs  |
| <b>GENERAL STRUCTURES</b>          |  | Area of Undetermined Flood Hazard <i>Zone D</i>  |
|                                    |  | Channel, Culvert, or Storm Sewer   |
|                                    |  | Levee, Dike, or Floodwall  |
| <b>OTHER FEATURES</b>              |  | 20.2 Cross Sections with 1% Annual Chance  |
|                                    |  | 17.5 Water Surface Elevation   |
|                                    |  | Coastal Transect   |
|                                    |  | Base Flood Elevation Line (BFE)  |
|                                    |  | Limit of Study   |
|                                    |  | Jurisdiction Boundary  |
| <b>MAP PANELS</b>                  |  | Digital Data Available   |
|                                    |  | No Digital Data Available  |
|                                    |  | Unmapped   |
|                                    |  | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.                                     |



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/9/2024 at 6:09 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



**U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT**  
WASHINGTON, DC 20410-1000

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## Historic Preservation (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/historic-preservation>

### Threshold

#### Is Section 106 review required for your project?

- No, because a Programmatic Agreement states that all activities included in this project are exempt. (See the [PA Database](#) to find applicable PAs.)

**Either provide the PA itself or a link to it here. Mark the applicable exemptions or include the text here:**

Click here to enter text.

→ *Continue to the Worksheet Summary.*

- No, because the project consists solely of activities included in a No Potential to Cause Effects memo or other determination [36 CFR 800.3(a)(1)].

**Either provide the memo itself or a link to it here. Explain and justify the other determination here:**

No significant historical or cultural resources were found at the project site during the archaeological survey.

→ *Continue to the Worksheet Summary.*

- Yes, because the project includes activities with potential to cause effects (direct or indirect). → *Continue to Step 1.*

#### **The Section 106 Process**

After determining the need to do a Section 106 review, HUD or the RE will initiate consultation with regulatory and other interested parties, identify and evaluate historic properties, assess effects of the project on properties listed on or eligible for the National Register of Historic Places, and resolve any adverse effects through project design modifications or mitigation.

Step 1: Initiate consultation

Step 2: Identify and evaluate historic properties

Step 3: Assess effects of the project on historic properties

Step 4: Resolve any adverse effects

Only RE or HUD staff may initiate the Section 106 consultation process. Partner entities may gather information, including from SHPO records, identify and evaluate historic properties, and make initial assessments of effects of the project on properties listed in or eligible for the National Register of Historic

Place. Partners should then provide their RE or HUD with all of their analysis and documentation so that they may initiate consultation.

### Step 1 - Initiate Consultation

The following parties are entitled to participate in Section 106 reviews: Advisory Council on Historic Preservation; State Historic Preservation Officers (SHPOs); federally recognized Indian tribes/Tribal Historic Preservation Officers (THPOs); Native Hawaiian Organizations (NHOs); local governments; and project grantees. The general public and individuals and organizations with a demonstrated interest in a project may participate as consulting parties at the discretion of the RE or HUD official. Participation varies with the nature and scope of a project. Refer to HUD's website for guidance on consultation, including the required timeframes for response. Consultation should begin early to enable full consideration of preservation options.

Use the [When To Consult With Tribes checklist](#) within [Notice CPD-12-006: Process for Tribal Consultation](#) to determine if the RE or HUD should invite tribes to consult on a particular project. Use the [Tribal Directory Assessment Tool \(TDAT\)](#) to identify tribes that may have an interest in the area where the project is located. Note that only HUD or the RE may initiate consultation with Tribes. Partner entities may prepare a draft letter for the RE or HUD to use to initiate consultation with tribes, but may not send the letter themselves.

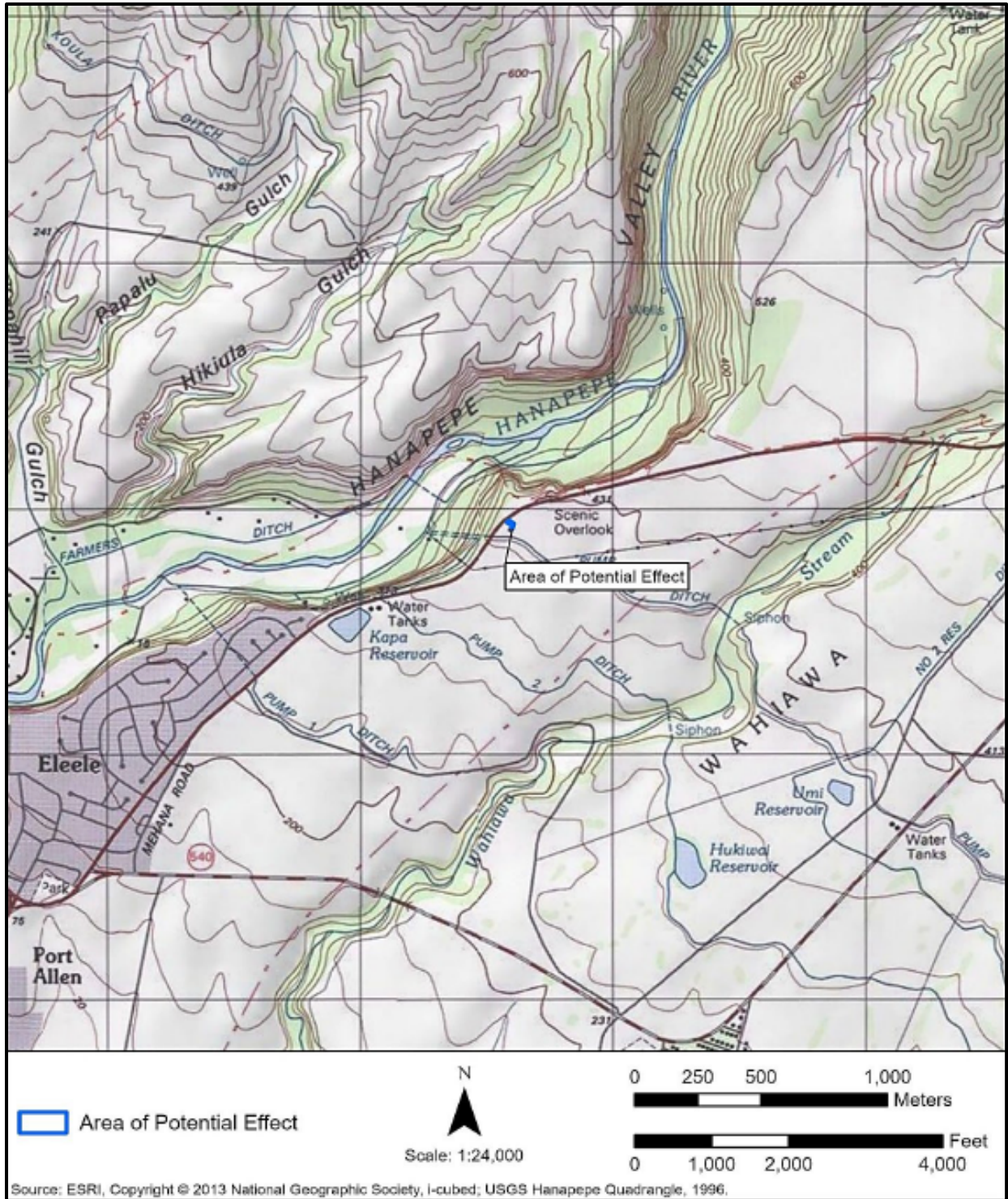
**List all organizations and individuals that you believe may have an interest in the project here:**

Section 106 Consultation has been initiated by the County and will be finalized at a later date.

→ *Continue to Step 2.*

### Step 2 - Identify and Evaluate Historic Properties

**Provide a preliminary definition of the Area of Potential Effect (APE), either by entering the address(es) or providing a map depicting the APE.** Attach an additional page if necessary.



Gather information about known historic properties in the APE. Historic buildings, districts and archeological sites may have been identified in local, state, and national surveys and registers, local historic districts, municipal plans, town and county histories, and local history websites. If not already listed on the National Register of Historic Places, identified properties are then evaluated to see if they are eligible for

the National Register. Refer to HUD's website for guidance on identifying and evaluating historic properties.

**In the space below, list historic properties identified and evaluated in the APE.**

Every historic property that may be affected by the project should be listed. For each historic property or district, include the National Register status, whether the SHPO has concurred with the finding, and whether information on the site is sensitive. Attach an additional page if necessary.

No historic properties were identified within or directly surrounding the APE.

*Provide the documentation (survey forms, Register nominations, concurrence(s) and/or objection(s), notes, and photos) that justify your National Register Status determination.*

**Was a survey of historic buildings and/or archeological sites done as part of the project?**

If the APE contains previously unsurveyed buildings or structures over 50 years old, or there is a likely presence of previously unsurveyed archeological sites, a survey may be necessary. For Archeological surveys, refer to HP Fact Sheet #6, [Guidance on Archeological Investigations in HUD Projects](#).

Yes → Provide survey(s) and report(s) and continue to Step 3.

Additional notes:

[Click here to enter text.](#)

No → Continue to Step 3.

**Step 3 - Assess Effects of the Project on Historic Properties**

Only properties that are listed on or eligible for the National Register of Historic Places receive further consideration under Section 106. Assess the effect(s) of the project by applying the Criteria of Adverse Effect. ([36 CFR 800.5](#)) Consider direct and indirect effects as applicable as per HUD guidance.

**Choose one of the findings below to recommend to the RE or HUD.**

**Please note: this is a recommendation only. It is **not** the official finding, which will be made by the RE or HUD, but only your suggestion as a Partner entity.**

No Historic Properties Affected

**Document reason for finding:**

No historic properties present.

Historic properties present, but project will have no effect upon them.

No Adverse Effect

**Document reason for finding and provide any comments below.**

Comments may include recommendations for mitigation, monitoring, a plan for unanticipated discoveries, etc.

[Click here to enter text.](#)

Adverse Effect

**Document reason for finding:**

Copy and paste applicable Criteria into text box with summary and justification.

Criteria of Adverse Effect: [36 CFR 800.5](#)]



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## Noise (CEST Level Reviews) – PARTNER

<https://www.hudexchange.info/programs/environmental-review/noise-abatement-and-control>

**1. What activities does your project involve? Check all that apply:**

- New construction for residential use

NOTE: HUD assistance to new construction projects is generally prohibited if they are located in an Unacceptable zone, and HUD discourages assistance for new construction projects in Normally Unacceptable zones. See 24 CFR 51.101(a)(3) for further details.

→ Continue to Question 4.

- Rehabilitation of an existing residential property

NOTE: For modernization projects in all noise zones, HUD encourages mitigation to reduce levels to acceptable compliance standards. See 24 CFR 51 Subpart B for further details.

→ Continue to Question 2.

- None of the above

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.

**2. Do you have standardized noise attenuation measures that apply to all modernization and/or minor rehabilitation projects, such as the use of double glazed windows or extra insulation?**

- Yes

**Indicate the type of measures that will apply (check all that apply):**

- Improved building envelope components (better windows and doors, strengthened sheathing, insulation, sealed gaps, etc.)

- Redesigned building envelope (more durable or substantial materials, increased air gap, resilient channels, staggered wall studs, etc.)

- Other (explain below)

[Click here to enter text.](#)

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below and provide any documentation.

- No

→ Continue to Question 3.



3. **Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).**

**Describe findings of the Preliminary Screening:**

[Click here to enter text.](#)

→ *Continue to Question 6.*

4. **Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).**

**Indicate the findings of the Preliminary Screening below:**

- There are no noise generators found within the threshold distances above.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing the location of the project relative to any noise generators.*

- Noise generators were found within the threshold distances.

→ *Continue to Question 5.*

5. **Complete the Noise Assessment Guidelines to quantify the noise exposure. Indicate the findings of the Noise Assessment below:**

Acceptable: (65 decibels or less; the ceiling may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

**Indicate noise level here:** 45 dBA

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide noise analysis, including noise level and data used to complete the analysis.*

Normally Unacceptable: (Above 65 decibels but not exceeding 75 decibels; the floor may be shifted to 70 decibels in circumstances described in 24 CFR 51.105(a))

**Indicate noise level here:** [Click here to enter text.](#)

**Is the project in a largely undeveloped area<sup>1</sup>?**

No → ***The project requires completion of an Environmental Assessment (EA) pursuant to 51.104(b)(1)(i).***

Yes → ***The project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i).***

→ *Work with the RE/HUD to elevate the level of review. Provide noise analysis, including noise level and data used to complete the analysis. Continue to Question 6.*

Unacceptable: (Above 75 decibels)

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<sup>1</sup> A largely undeveloped area means the area within 2 miles of the project site is less than 50 percent developed with urban uses and does not have water and sewer capacity to serve the project.

**Indicate noise level here:** [Click here to enter text.](#)

***The project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i). Work with HUD or the RE to either complete an EIS or obtain a waiver signed by the appropriate authority.***

*→ Continue to Question 6.*

**6. HUD strongly encourages mitigation be used to eliminate adverse noise impacts. Work with the RE/HUD on the development of the mitigation measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.**

Mitigation as follows will be implemented:

[Click here to enter text.](#)

*→ Provide drawings, specifications, and other materials as needed to describe the project's noise mitigation measures.*

*Continue to the Worksheet Summary.*

No mitigation is necessary.

**Explain why mitigation will not be made here:**

[Click here to enter text.](#)

*→ Continue to the Worksheet Summary.*

### **Worksheet Summary**

The proposed project does not include a residential development that will be occupied by anyone. There would be short-term noise impacts during construction, but there would be no long-term noise impacts from the new water tank and booster pumps, compared to existing conditions.



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## **Sole Source Aquifers (CEST and EA) - PARTNER**

<https://www.hudexchange.info/environmental-review/sole-source-aquifers>

### **1. Is the project located on a sole source aquifer (SSA)<sup>1</sup>?**

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination, such as a map of your project or jurisdiction in relation to the nearest SSA.*

Yes → *Continue to Question 2.*

### **2. Does the project consist solely of acquisition, leasing, or rehabilitation of an existing building(s)?**

Yes → *The review is in compliance with this section. Continue to the Worksheet Summary below.*

No → *Continue to Question 3.*

### **3. Does your region have a memorandum of understanding (MOU) or other working agreement with EPA for HUD projects impacting a sole source aquifer?**

Contact your Field or Regional Environmental Officer or visit the HUD webpage at the link above to determine if an MOU or agreement exists in your area.

Yes → *Continue to Question 4.*

No → *Continue to Question 5.*

### **4. Does your MOU or working agreement exclude your project from further review?**

Yes → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide documentation used to make your determination and document where your project fits within the MOU or agreement.*

No → *Continue to Question 5.*

### **5. Will the proposed project contaminate the aquifer and create a significant hazard to public health?**

Consult with your Regional EPA Office. Your consultation request should include detailed information about your proposed project and its relationship to the aquifer and associated streamflow source area.

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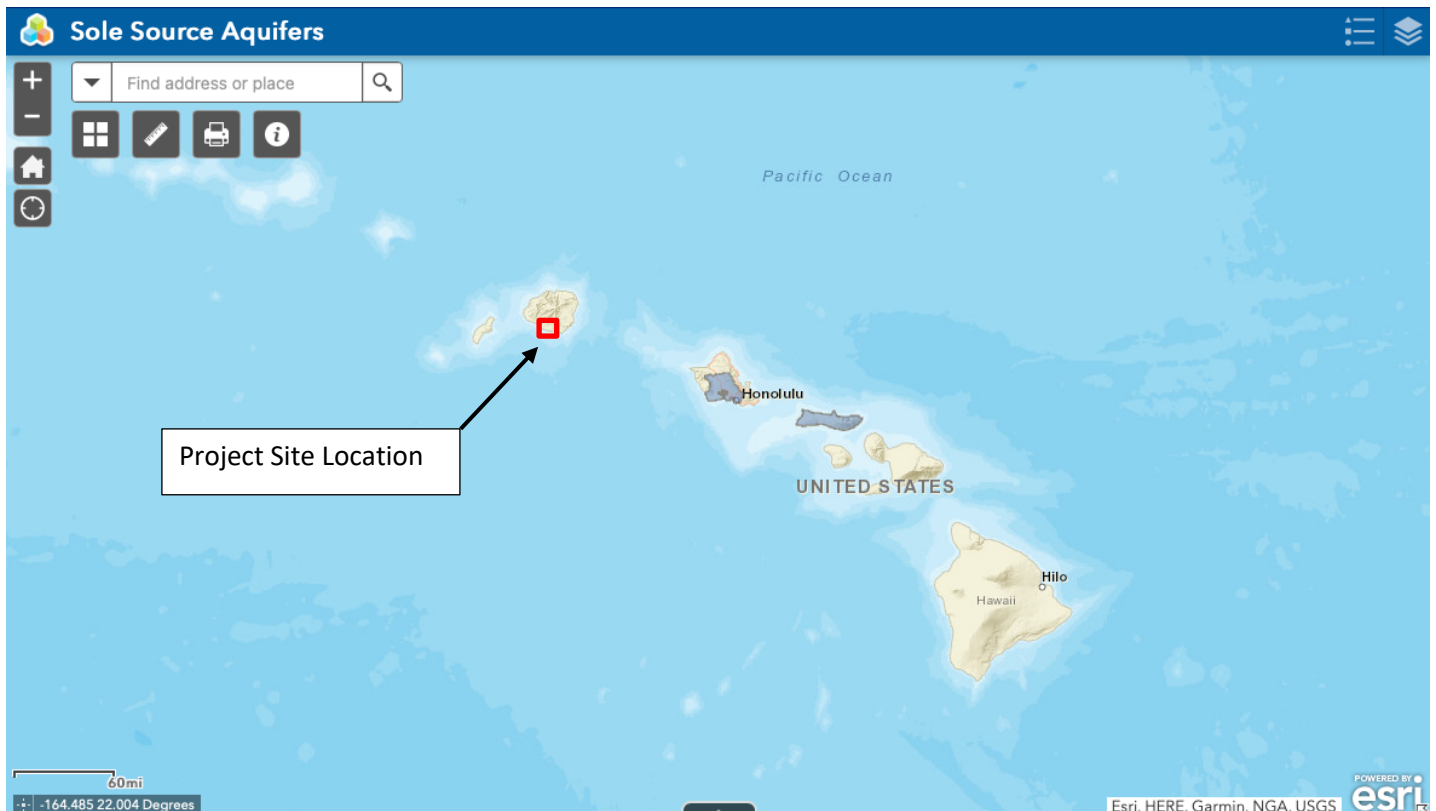
<sup>1</sup> A sole source aquifer is defined as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. This includes streamflow source areas, which are upstream areas of losing streams that flow into the recharge area.

EPA will also want to know about water, storm water and waste water at the proposed project. Follow your MOU or working agreement or contact your Regional EPA office for specific information you may need to provide. EPA may request additional information if impacts to the aquifer are questionable after this information is submitted for review.

- No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide your correspondence with the EPA and all documents used to make your determination.*
  
- Yes → *The RE/HUD will work with EPA to develop mitigation measures. If mitigation measures are approved, attach correspondence with EPA and include the mitigation measures in your environmental review documents and project contracts. If EPA determines that the project continues to pose a significant risk to the aquifer, federal financial assistance must be denied. Continue to Question 6.*

### **Worksheet Summary**

Provide a full description of your determination and a synopsis of the information that it was based on, Kaua'i County does not include an sole source aquifers (See map below).





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## Wetlands (CEST and EA) – Partner

<https://www.hudexchange.info/environmental-review/wetlands-protection>

**1. Does this project involve new construction as defined in Executive Order 11990, expansion of a building’s footprint, or ground disturbance?**

The term "new construction" includes draining, dredging, channelizing, filling, diking, impounding, and related activities and construction of any any structures or facilities.

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

Yes → *Continue to Question 2.*

**2. Will the new construction or other ground disturbance impact a wetland as defined in E.O. 11990?**

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map or any other relevant documentation to explain your determination.*

Yes → *Work with HUD or the RE to assist with the 8-Step Process.* *Continue to Question 3.*

**3. Does Section 55.12 state that the 8-Step Process is not required?**

No, the 8-Step Process applies.

This project will require mitigation and may require elevating structure or structures. See the link to the HUD Exchange above for information on HUD’s elevation requirements.

→ *Work with the RE/HUD to assist with the 8-Step Process. Continue to Worksheet Summary.*

5-Step Process is applicable per 55.12(a).

**Provide the applicable citation at 24 CFR 55.12(a) here.**

Click here to enter text.

→ *Work with the RE/HUD to assist with the 5-Step Process. This project may require mitigation or alternations. Continue to Worksheet Summary.*

8-Step Process is inapplicable per 55.12(b).

**Provide the applicable citation at 24 CFR 55.12(b) here.**

Click here to enter text.

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to Worksheet Summary.

8-Step Process is inapplicable per 55.12(c).

**Provide the applicable citation at 24 CFR 55.12(c) here.**

[Click here to enter text.](#)

→ If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to Worksheet Summary.

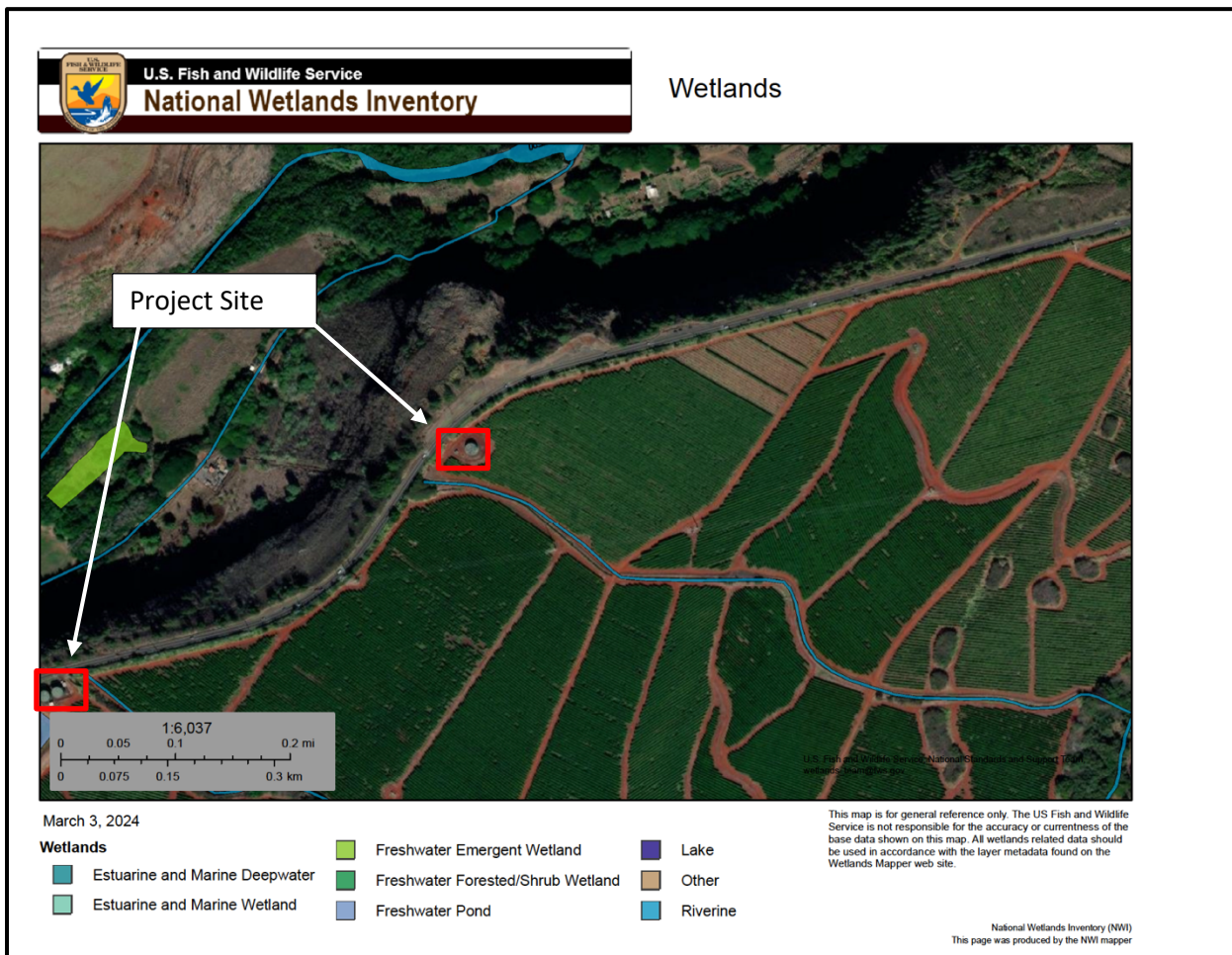
### **Worksheet Summary**

Provide a full description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your program or region

**Include all documentation supporting your findings in your submission to HUD.**

See wetland map below-no wetlands are mapped at the project site





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## Wild and Scenic Rivers (CEST and EA) – PARTNER

<https://www.hudexchange.info/environmental-review/wild-and-scenic-rivers>

### 1. Is your project within proximity of a Wild and Scenic River, Study River, or Nationwide Rivers Inventory River?

No → *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Provide documentation used to make your determination.*

Yes → *Continue to Question 2.*

### 2. Could the project do *any* of the following?

- Have a direct and adverse effect within Wild and Scenic River Boundaries,
- Invade the area or unreasonably diminish the river outside Wild and Scenic River Boundaries, or
- Have an adverse effect on the natural, cultural, and/or recreational values of a NRI segment.

Consult with the appropriate federal/state/local/tribal Managing Agency(s), pursuant to Section 7 of the Act, to determine if the proposed project may have an adverse effect on a Wild & Scenic River or a Study River and, if so, to determine the appropriate avoidance or mitigation measures.

#### Select one:

The Managing Agency has concurred that the proposed project will not alter, directly, or indirectly, any of the characteristics that qualifies or potentially qualifies the river for inclusion in the NWSRS.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Provide documentation of the consultation (including the Managing Agency’s concurrence) and any other documentation used to make your determination.*

The Managing Agency was consulted and the proposed project may alter, directly, or indirectly, any of the characteristics that qualifies or potentially qualifies the river for inclusion in the NWSRS.

→ *The RE/HUD must work with the Managing Agency to identify mitigation measures to mitigate the impact or effect of the project on the river.*

**Worksheet Summary**

The State of Hawaii has approximately 3,905 miles of river, but no designated wild and scenic rivers (National Wild and Scenic Rivers System. Accessed at: <https://www.rivers.gov/rivers/hawaii>)